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# CLIMATE AND SECURITY IN LATIN AMERICA AND THE CARIBBEAN



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# INTRODUCTION

Climate change has been recognized by the United Nations (UN) and by regional organizations, such as the African Union (AU) and the European Union (EU) to be a multiplier of insecurity and vulnerability, especially where efforts to mitigate and adapt are not implemented. Discussion around the nature and dynamics of the links between climate and security have intensified since the Intergovernmental Panel on Climate Change (IPCC) released its *Global Warming of 1.5 Special Report* (2018), which stresses that the international community has only until 2030 to limit the increased risks brought on by climate change (IPCC 2018).

The connections between climate change and security are complex. The interaction with other factors and the speed and type of social change vary across different contexts. Climate change rarely, if ever, causes insecurity directly; intervening variables – most of them related to governance, development and resource management – mediate this relationship.

While reliably quantifying how much climate change contributes to a single event is challenging, the literature has made progress in terms of identifying the causal paths through which climate conditions worsen insecurity. In general, climate change tends to exacerbate existing social tensions and may generate new ones altogether. This augmentation effect can happen through “outlier” crises, such as disasters, or as a result of more incremental changes, such as gradual soil erosion. In many contexts, these dynamics occur simultaneously or feed one another.

These links are increasingly recognized not only by a number of states – including Germany, Denmark, and Czech Republic – but also by the UN Security Council (UNSC)—which has held debates since 2007. In 2017, the Council issued a resolution underlining the need to assess and address the risks associated with climate and security more proactively (UNSC 2017; SCR 2018). There is also growing concern across the UN system that the impact of climate change on security is hampering the achievement of the Sustainable Development Goals (SDGs) (UN 2019). Private sector actors, including insurance companies and security consulting firms, also acknowledge that climate

poses additional security risks. In the 2019 World Economic Forum annual report, environment-related risks account for three of the top five risks by likelihood and impact, according to the businesspeople interviewed (WEF, 2019).

In Latin America and the Caribbean (LAC), climate change is affecting specific areas in different ways. From the melting glaciers of the Andes to the increasingly unpredictable floods in the Amazon Basin, from intensifying droughts in the Brazilian *cerrado* (tropical savannah) to growing food insecurity in Central America, from extreme weather events in the Caribbean to shifting rain patterns in Patagonia, the entire region faces a series of emerging challenges. Far from being confined to remote or sparsely populated areas, these challenges also affect residents of densely populated places, including major cities such as Mexico City, Lima, Rio de Janeiro and Manaus. The *IPCC 2018 Special Report* underlines the potential impact of sea-level rise in highly populated coastal areas, with the potential need of resettlement of communities and the rearrangement of public services provision – phenomena that are directly relevant to the millions of Latin Americans living along the region’s coastlines.

The articles in this volume explore how climate contributes to insecurity in the LAC region. They resulted from a partnership between the Igarapé Institute and the Instituto Clima e Sociedade (ICS), both in Rio de Janeiro, Brazil, with the support of the German Embassy in Brasília. This partnership yielded a workshop, held in July 2019, that brought together the twelve researchers and practitioners from across the region to discuss how climate and security are linked in LAC.

The publication has two key goals. First, it is meant to provide an initial trove of evidence-based research on the links between climate and security in LAC. Most of the articles focus on case studies or comparisons, while others tackle more conceptual dimensions of the climate security debate and the role of governance in LAC. Second, it is intended to raise awareness of these links and to promote solutions-oriented debate among researchers and policymakers within the region.

# SCHOLARSHIP ON CLIMATE AND SECURITY

Research on the links between climate and security has been growing rapidly over the past five years, but much of this literature remains fragmented, in the sense that there is inadequate dialogue across sectors and institutions. Most scholars and policymakers working on the topic agree that climate change means “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods,” as underlined in Article 1 of the *UN Framework Convention on Climate Change* (UN 1992).

In contrast, the definition of security is more controversial. Two key ways in which scholars have conceptualized this term revolve around state security or human security. The former focuses on the national level and is strongly associated with the realist and neo-realist perspectives in the International Relations field, whether in reference to inter-state conflict or intra-state conflict. The latter tends to emphasize individuals and communities and is often associated with the constructivist tradition (Dellmuth et al. 2017). In the LAC, the most commonly used term is public security, which is typically used to refer to the function of governments (and, to a lesser extent, non-state actors) in ensuring the protection of citizens, persons in their territory, organizations, and institutions against threats to their well-being. In practice, issues seldom fall squarely within just one of these categories; many security challenges (and some solutions) transcend the boundary between national and international security.

An earlier wave of research on the links between climate and security explored the impacts of climate change on the United States’ national security (for instance, Schwartz and Randall 2003). Hence, these studies focused on state security. In contrast, most of the recent literature has adopted a human security lens (Barnett 2011). Since climate change is not confined within state borders and demands

concerted policy responses among not only state actors but also international and governmental organizations, civil society entities, and private sector firms, most of the articles in this volume analyze the relations between climate and security from a human security perspective.

In addition to the different concepts of security, the literature on climate and security has covered a number of policy areas. Research on national security has emphasized diplomacy, security, peace, and conflict, whereas work on human security has stressed development dimensions (Barnett and Adger 2007), disaster risk reduction (Birkmann and Von Teichman 2010; Schipper and Pelling 2006), and refugees (Hartmann 2010; Baldwin, Methmann and Rothe 2014) (Dellmuth et al. 2017). Since the mid-2010s, some topics have gained prominence within this literature, particularly global governance, food security, migration, and violent conflict.

On global governance, the literature has debated the securitization of climate change – i.e. that is, the framing of climate change as a security or defense issue – by governments and international organizations (Gilman, Randall and Schwartz 2011). On the one hand, securitization is useful for actors who are willing to push for collective action (Floyd 2015). For governments and international organizations, this process allows them to frame climate change as a global challenge (Adger 2010). For instance, the EU has attempted to securitize climate-induced migration since 2008 (Trombetta 2014). On the other hand, some governments and individuals fear the securitization of climate change, especially since the first debate on this topic was held at the UNSC in 2007 (Scott 2009, 2012, 2015). They argue that climate and security should be discussed in plural and open spaces, such as the UN General Assembly. They also fear that securitization can lead actors to gloss over the development and human rights aspects of the issue.

With respect to food security, Wheeler and Von Braun (2013) underline the risks of climate change for global food systems. They argue, more specifically, that food insecurity will become more severe in the most vulnerable countries. Schmidhuber and Tubiello (2007) find that the impact of climate change on food security depends on socio-economic development. The authors emphasize the need for urgent mitigating measures as their stabilizing effects on the agricultural sector can take decades to be realized.

Writing on large-scale migration, Gleditsch, Nordas, and Salehyan (2007) emphasize that, although the literature remains speculative, people seem to be migrating to minimize the impacts of climate change, which - in the absence of adequate policies - can generate security threats, including violent conflict. This shows that the impacts of climate change on security depends at least in part on adaptation policies (Barnett and Webber 2009). These authors suggest a number of policy responses - from ensuring the rights of migrants in the host community to strengthening regional emergency response systems - that, if put into practice, could curb the risks associated with climate-related migration.

On violent settings, researchers have worked to identify the key causal links between climate and security. Homer-Dixon (1999) proposes an environmental conflict model, arguing that scarcity of food, water, and forests, leads to migration and violent conflict in the developing world, especially in Africa. Years later, Hartmann (2010) criticizes Homer-Dixon's model, calling attention to the danger of treating climate change as a security threat inasmuch as it might lead to a militarization of the responses, such as in the provision of development assistance for African countries.

Some of the differences in findings in the literature on climate and armed conflict may be due to methodological divergences. Barnett and Adger (2007), for instance, highlight that the direct impacts of climate change (on individuals' lives) but also indirect impacts (for instance, on governmental functions) may increase the risk of violent conflict. In contrast, Wheeler and Von Braun (2013) and Bernauer, Bohmelt and Koubi (2012) argue that the effects of climate change on violent conflict depend on economic and political

conditions. They find that qualitative case studies suggest environmental stress can contribute to violent cases; however, they note that results from large quantitative studies always call for caution in drawing general conclusions. Finally, reviewing the emerging literature on climate and conflict, Burke, Hsiang and Miguel (2015) find that deviations from moderate temperatures and precipitation patterns systematically increase conflict risk.

While some scholars believe that climate change has exacerbated vulnerabilities in conflict-affected regions (Scheffran et al. 2012; Seter 2016; Gleditsch 2012; Buhaug 2015; Detges 2017), others have disputed whether the effects are significant.

While some evidence-based research has emerged on Africa (Brown, Hammill and McLeman 2017; Hendrix and Glaser 2007) - and, to some extent, on Asia - the ways in which climate and security are interlined in the LAC remain largely unexplored. Few existing studies of climate and security encompass the region, and even fewer focus on it. Lobell et al. (2008), studying the necessary changes to cope with climate change in food security, include (and compare) Central America and Brazil to other regions, while Scheffran and Battaglini (2011) explore climate and conflict, particularly water insecurity in Latin America, yet case studies and comparisons within the region have been rare.

High-quality diagnostics that draw explicitly on regional, national and local data can help to consolidate the evidence linking climate and security in LAC. Promoting quality research can also contribute to building an interdisciplinary epistemic community cutting across climate, development, human rights and security agendas. This research can also contribute towards the creation or improvement of risk assessments, such as early warning systems, and early response mechanisms through the incorporation of relevant climate stressors and pathways.

# POLICY INITIATIVES AND ISSUES IN CLIMATE AND SECURITY

The articles in this volume offer a variety of perspectives on climate security in LAC. Nonetheless, some key political initiatives and issues run across them that may be central not only for understanding those dynamics, but also for decision making on climate security in the region.

First, some states within the region have engaged directly with climate and security at the regional and global levels. In January 2019, the Dominican Republic organized an open debate within the UN Security Council on how climate disasters threaten international peace and security. In addition, a UN Climate and Security Mechanism has been established to propose new risk assessments and tools, and in 2018 Germany and Nauru launched the Group of Friends on Climate and Security, which has expanded to include dozens of member states.

Second, civil society is also starting to engage with the topic. Youth leaders like Greta Thunberg are breathing new life into climate activism, bringing attention to catastrophic risks and to the idea of a climate emergency. A new Global Commission on Adaptation, announced by the Washington-based World Resources Institute in 2018, is preparing a report with recommendations on how to curb climate-related security risks. In addition, think tanks and companies are starting related initiatives on research and policy, from Adelphi (Germany) and Igarapé Institute (Brazil) to Sipri (Sweden) and the Center for Climate and Security (US). In February 2019, a group of think tanks announced the creation of the International Military Council on Climate and Security (IMCCS), an umbrella organization of senior military leaders, security experts and security institutions working on the topic.

Third, some of the countries that are most vulnerable to climate change are also spearheading innovative initiatives, initially focused on raising the political profile of the links between risks and vulnerability under the 2013 Warsaw International Loss and Damage Mechanism, and more recently through international cooperation. The Pacific Island Forum, for instance, included climate change as a security issue during its 2018 Nauru Summit. In Latin America, the Caribbean Disaster Emergency Management Agency organized a conference to debate the effects of climate change in the region. Yet the reality is that most governments have not begun incorporating a climate and security theme into their policies. And when they did, the policy implementation challenges are substantive, like in the case of Brazil, where the National Defense Policy acknowledges the climate implications for national security (Brazil 2012) but the guideline is not translated into concrete action plans.

Finally, climate security continues to be controversial at the UN, which is part of the challenge. Some member states, such as India and Brazil, worry that linking these two thematic areas can lead to securitization – reframing the issue as requiring military solutions and thus distributing the allocation of resources away from development and human rights toward hard security. Many countries fear that the securitization of climate change could also threaten principles of national sovereignty; for instance, climate change being invoked as justification for military intervention.

Moreover, some Pacific island nations fear that turning climate and security into a global agenda at the UN may provide fodder for conservative governments to channel resources narrowly into challenges at home, at the expense of climate-related assistance to developing countries. Nonetheless, some UN member states have begun to address the relationships between security and climate change more directly. Diplomats and researchers have noted that nowhere on the planet can climate change contribute toward insecurity more than in the Arctic, where geopolitical rivalries are mounting as the ice melts with global results.

There is a growing awareness within the UN that climate and security priorities must be streamlined across the UN system and other international organizations. Some countries have started to incorporate appropriate stressors, risk factors and associated outcomes into their diagnostics and planning. UN officials note that climate and security factors should be included, wherever possible, in national development strategies – while keeping

in mind that poorly planned adaptation responses can lead to unintended consequences, as when newly introduced crops damage ecosystems and livelihoods. Responses should also address the disproportionate effect of climate and security on vulnerable populations, from the poor to women, children and indigenous communities.

Addressing the challenges posed by the connections between climate and security requires sensitizing people at the UN, and regional organizations as well as among governments in making climate and security a human-centered agenda. Given the increase in the global rejection of multilateralism and leadership that dismisses science for politics, breaking the complex vicious cycles linking climate and security requires creating incentives to shift institutional preferences and behavior toward improving people's lives. This publication is intended to contribute towards this process by launching a conversation on the need to evidence-based research on climate and security in the LAC.

## ABOUT THIS ISSUE

The articles in this issue represent an incipient effort to build evidence on the links between climate and security in LAC. The workshop that generated these papers brought together a wide variety of actors engaged in evidence-based research: think tanks and NGOs representatives, academics and practitioners from both civilian and military backgrounds and institutions. Three key take-away points emerged from this meeting.

First, the plurality of concepts related to security adopted by the authors enriches the debate about climate and security in the LAC. Rather than adhere to a narrow definition, the articles presented here run the gamut from human security to public security and inter- and intra-state conflict. This diversity reflects the heterogeneity of perceptions

of the climate and security links in ways that are relevant for policymakers.

Second, the workshop identified several emerging themes in this incipient body of research. Given the region's high rates of socioeconomic inequality, taking into account the distribution of income, wealth, access to public services and other indicators is essential in understanding the differential impacts of climate and LAC societies. In addition, authors called attention to the need to address climate and security not just in rural locations but also in urban zones, including the cities and towns of the Amazon Basin. Themes as infrastructure and gender were especially underlined. The role of infrastructure in climate and security also merits further attention, especially given the

region's long history of betting heavily on large-scale development projects that leave vast social as well as environmental footprints. Infrastructure has an especially important role in shaping migratory flows that are often present in the analyses of how climate change impacts security in the region. Finally, the importance of gender in mediating the relationship between climate and security – as well as in designing innovative responses to the associated challenges – was noted by several of the participants as a key gap within the existing literature.

Across all these themes, the role of governance was debated, with a special focus on the construction of regional and subregional regimes that may nudge LAC states towards more climate- and conflict-sensitive policymaking. This need for more robust governance is all the more essential given that, like other parts of the world, LAC has seen a deterioration of the commitments made to climate change as some of the region's key states, including Brazil, back away from international regimes such as the Paris Agreement. At the same time, participants expressed concern with the potentially excessive securitization of climate phenomena, at the expense of their social, economic and human rights dimensions.

The papers fall roughly into two categories. The first set of papers analyzes specific case studies – whether particular countries or subregions within the LAC – and how climate contributes to insecurity. These papers adopt varying definitions of security, from national security to human security. In the second set of papers, authors address issues that are relevant to governance and public policy, exploring key challenges in the design of climate-sensitive responses that may help to curb insecurity in parts of the region.

In the first set of articles, **Oliver Leighton Barrett**, looking at Venezuela, underlines how climate change risks magnify economic and security vulnerabilities in and around the country. The paper focuses on the role of water shortages and overdependence on hydroelectricity in the social tensions in and around Venezuela.

**Saul M. Rodriguez**, considers climate change as a potential threat multiplier within the context in Colombia, both during the conflict and in the aftermath of the peace agreement signed between the government and the *Fuerzas Armadas Revolucionarias de Colombia* (FARC). The paper underscores the importance of considering how socioeconomic inequalities mediate the impact of climate change on security in Colombia.

**Marilia Closs** highlights the connection between climate change in Chapare, a coca production region in the department of Cochabamba, Bolivia, and the increase in crime linked to the production and distribution of illicit substances. She finds out that floods and intense storms have altered the relationship of individuals with the territory, the economy, and the social production of space, intensifying a process of criminalization.

In the second set of articles, **Beatriz Mendes Garcia Ferreira** sheds light on an often-neglected aspect of climate change, namely how it impacts transboundary aquifers for water security in South America. Her research invites the question of how better governance for such aquifers can be implemented.

**Eloisa Beling Loose**'s paper looks at a key element in the construction of climate governance: the perception of climate risks and how they are related to security, drawing on analysis of Brazilian news sites. She finds that media coverage of climate risks remains largely disconnected from security issues, which presents challenges for public policy in this area.

**Marco Cepik and Hannah Machado Cepik** hone in on the indigenous people in the Brazilian-Peruvian border. By comparing the floods along the Jordan river in Acre (Brazil) and those along the Ucayali River (Peru), they analyze how public mitigation policies can have differential impacts on human security outcomes, depending in part on the timing of such interventions.



**Moisés Santos, Antônio Nascimento, Márcio Corrêa and Charlis Barroso da Rocha**

investigate how extreme weather events, namely abnormally high rainfalls in the Amazon, affect levels of crime in urban areas. Focusing on the city of Manaus, their analysis suggests that heavy rains may temporarily curb criminal activity, but also calls attention to several methodological challenges that future research will have to address to draw more precise conclusions.

**Matias Franchini and Eduardo Viola** build a climate security risk index and analyze trends across Latin America and the Caribbean. They conclude from this data analysis that the region has higher risks of climate aggravating domestic security problems than exacerbating inter-state conflicts.

**Luis Paulo B. da Silva, Larry Swatuk and Lars Wirkus** investigate the “boomerang effect” – the largely unanticipated consequences of climate mitigation and adaptation on domestic non-state actors that create negative feedback. Analyzing Brazilian hydropower initiatives in two other Amazonian states – Peru and Bolivia – the authors note some of the harmful consequences of dam-building projects from a climate and security perspective.

The analyses in this publication invite a series of questions that may help to guide further research on the topic:

How do the links between climate and security work in Latin America and the Caribbean, and how do these dynamics vary by local context?

How can better policies be designed to as to curb this magnification effect?

More broadly, what constitutes effective governance of climate and security within the Latin American and Caribbean context?

The papers in this publication are part of the first step towards a broader solutions-oriented discussion of the relationship between climate and security in LAC. But these papers are by no means exhaustive. Further research is needed on thematic areas such as gender, climate and security; the impact of climate on patterns of organized crime; and the role of regional organizations in mitigation and adaptation as they relate to climate and security. Likewise, while the paper selection process for this publication has yielded a geographically diverse range of case studies, more research is needed on the dynamics and impacts of climate and security in Central America, the Caribbean and the *cerrado* region of South America, among other subregions that are highly vulnerable to climate change. Yet, by launching a debate about key concepts and methodologies and by fomenting evidence-based research, Igarapé and iCS hope that research on climate and security in LAC will gather momentum. Ultimately the goal is not only to understand the drivers and diagnose the emerging challenges, but also to shed light on invisible crises and to foment the design of effective solutions by all of the relevant actors, including government bodies, international organizations, civil society entities and private sector actors.

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Venezuelan Refugee Camp in Roraima. Photo: CSP Conlutas

# HOW CLIMATE CHANGE RISKS MAGNIFY ECONOMIC AND SECURITY VULNERABILITIES. CASE STUDY: VENEZUELA AND ITS NEIGHBORS

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## ABSTRACT

Climate risk assessments for South American nations such as Brazil, Colombia and Venezuela are increasingly severe and suggest that critical infrastructure, energy and water security strategies are not sufficiently climate-change sensitive.

Recent climatic shocks, particularly the 2013-2016 El Niño event that significantly disrupted rainfall patterns, have played a consequential role in Venezuela's water, energy and food security crises specifically, and its overall human security challenges more generally. Lack of available research and data

complicate accurate assessment of the effects of climatic shocks on Venezuelan instability and insecurity. However, there is enough data to make informed hypotheses about the role of environmental variability in the crisis, and to invite further study. While many of the climatic risks the region faces are unprecedented, the capability to foresee these risks is also unprecedented. Preventing, preparing for, adapting to and mitigating these risks will require that policy makers, thought leaders and other stakeholders take action in the near term.

Keywords: **climate change, Venezuela, Latin America, vulnerabilities, resilience.**

# INTRODUCTION

This study<sup>1</sup> examines the role of climate change and environmental variability as contributing factors that undermine national security across Venezuela and neighboring states by analyzing the interaction of recent climate trends and human security vulnerabilities.<sup>2</sup>

The principal question this research effort seeks to answer is, how much of Venezuela's ongoing human security crisis (and other similar crises emerging in the region) can be attributed to environmental variability and climate change. Through an investigation of climate-exacerbated changes in the unfolding Venezuelan human security crisis, this research offers direct and circumstantial evidence that can be of value in informing conflict mitigation, resilience and security planning efforts. Although many Latin American states have made measurable developmental advances in recent years, there is a dearth of research regarding how the convergence of climate change and underlying economic and security vulnerabilities (hereafter referred to as climate-security vulnerabilities), may stymie development, resiliency and peacekeeping efforts in the region in general, but in Venezuela most particularly.<sup>3</sup>

One of the focus trends discussed in this study is how emigration from Venezuela may be contributing to social tensions in some Eastern Caribbean states (e.g. Trinidad and Tobago and Aruba), Colombia and Brazil. It also explores how the exploitation of vulnerable migrants during the migration process, and at reception zones, may be another indirect

climate-security outcome (Otis 2018a). Sciences & severely strained (report. that addressed the "hallngere robust, with research and policy institute like IGarapThough there is some evidence to support these linkages, the role of climate-exacerbated changes as a contributing factor in regional insecurity is largely understudied and underreported. However, a key finding that is not in question is that governments across the region are not adequately prepared for the slow moving but very consequential impacts of both anthropogenic climate change and environmental variability events such as the El Niño phenomenon. This failure to mitigate and to adapt to these trends exposes states and communities in the region to forces that further will only continue to jeopardize food, water and energy security.

The information gleaned through this research effort should not only enrich regional climate security discourse but will also aid policy makers in formulating disaster response and security policies that are more climate sensitive. This research also reviews the potential of Venezuela (and neighboring states) to anticipate climatic risks to critical infrastructure/services and its use of this information to develop mitigating and adaptation-oriented policies to reduce the likelihood of climatic shocks and increased state fragility. Lastly, it briefly explores how better incorporating climatic trends/risks into water, energy and security policies can reduce the likelihood of additional stress and potential conflict.

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<sup>2</sup> For the purposes of this research effort, the term national security is to be understood to include non-military dimensions of security, including security related to crime, economic security, energy security, environmental security, and food security. Similarly, it also includes risks associated with the effects of natural disasters and climate change.

<sup>3</sup> For the purposes of this paper, the term climate-security denotes the security related effects and outcomes related to destructive climate or environmental effects. Representative climate-security outcomes include displacement of populations due to droughts, energy shortages due to hydro-dam reservoir depletion; salination of aquifers due to sea level rise associated salt-water penetration and extreme weather events that cause casualties.

# RESEARCH METHODOLOGY

A literature review of Spanish, Portuguese and English languages articles, analyses, and reports related to the subject matter was conducted. Interviews with key leaders, environmental activists and researchers will inform and round out the final iteration of this study. The main challenge of this approach is that, since it is focused on Venezuela, some data may be inaccessible due to the political sensitivities and poor security conditions within the country. Therefore, the information

that informs this seed paper' was gleaned from reliable academic and media sources, as well as research and policy institutes. The final iteration of this paper will have the benefit of information produced through joint research arrangements with academic and policy institutes in the region that are already studying human security trends across Venezuela and its neighbors.

# KEY STAKEHOLDERS UNDERSTANDING OF CLIMATE-SECURITY

Latin American policy makers and security community officials are the key stakeholders most responsible for formulating policies and plans to mitigate and adapt to climate-security risks, however, there is not much evidence that these risks are being factored into new policies. In our professional opinion based on environmental security work conducted on behalf of the United States Southern Command, the majority of these stakeholders are not aware of the security implications of shifting climatic conditions. Appreciation of the linkages between climate change and the economic and political stability of states and populations is generally low across policymaking communities globally, especially when compared to awareness of the linkages between climate change and easily traceable and measurable impacts such as heat stress and coastal erosion.

Policymaking addressing environmentally driven economic and political insecurity is in a nascent stage in Latin America, and at this point in the region's climate response agenda does not adequately factor scientific evidence and prognostics into plans and strategies that would enable climate-sensitive responses commensurate with the severity of the challenges. The disconnect between the research and policymaking communities in particular further exacerbates poor understanding of the climate-security risks the region faces. This "disconnect" leads to an under-appreciation of the fact that anthropogenic climate change, in many scenarios, will act insidiously and slowly, but will have cross-sectorial impacts, to include outcomes that could require more frequent involvement or intervention of national security services (i.e. militaries and domestic security services), which may not be desirable for a variety of legitimate historical reasons.



Current security sector policies and strategies in particular, do not give due consideration to environmental factors in security affairs for several reasons. Chief among them are:

1. Biases towards traditional threats/challenges;
2. A resistance to “non-traditional” security risks narratives;
3. Political sensitivities surrounding climate change matters;
4. National authorities and institutional doctrines that restrict how resources can be spent; and
5. Lack of policy-ready climate information that can be integrated into security policy/strategies.

Imbuing broader and richer understanding of climate risks across regional security communities will require more energetic advocacy by academics, analysts and activists to elevate the regions’ policymaking and security communities understanding of the risks, and the consequences of inaction.

# THE LINK BETWEEN CLIMATE CHANGE AND SECURITY IN AND AROUND VENEZUELA

Risks such as water scarcities, rapid urbanization, fragile economies which reduce a nation’s resiliency to shocks are features of South American states like Brazil, Colombia and Venezuela (We Are Water Foundation 2017). The region is not only falling behind in keeping up with their burgeoning populations’ demand for water but are also heavily dependent upon hydro-energy production to satisfy their growing energy and water needs (Belt 2015). Reporting from an American technical consulting firm that tracks water issues and trends across the continent reported in early 2018 that

Water deficits of varying severity for much of the continent, with large pockets of exceptional deficit in Brazil. Intense deficits are also forecast for southern Venezuela, southern Guyana, Suriname, French Guiana, the Argentine Pampas, the Gulf of Corcovado in southern Chile, and along many rivers (Isclences, 2018).

The water scarcity trend is particularly alarming because energy production in many of the most populous South American cities is highly dependent upon the water levels of the dams that feed hydro-electro turbines.

Hydroelectricity is one of the cleanest forms of energy production, however, the benefit is betrayed by the risks hydro-energy dependent nations face when the river systems and reservoirs become water depleted. Reporting produced by the Center for Climate and Security, suggests that within only the last five years, both Brazil and Venezuela have experienced significant underproduction of their main hydro-electric facilities due to water depletion across major reservoir systems (Barrett 2018). Water scarcities also have detrimental impacts on agriculture, especially on small farmers that do not have the resources to survive protracted drought periods. Honduras, Guatemala and El Salvador are representative examples of how drought-driven food

security crises can exacerbate and catalyze both internal and external migration.

According to the Food and Agricultural Organization (FAO) of the United Nations, “The Dry Corridor in Central America, in particular Guatemala, Honduras and El Salvador is experiencing one of the worst droughts of the last ten years with over 3.5 million in need of humanitarian assistance (Barrett 2019).” Some of the “3.5 million in need of humanitarian assistance” may make the decision to migrate north for a chance of asylum in the United States. The same kinds of decisions are being made across Venezuela as citizens faced with some of the direst economic and security conditions in the world – aggravated by drought – seek legal residency in

nations across the hemisphere.

The UNHCR, the UN Refugee Agency, and the UN Migration Agency, reported in November 2018 that the number of refugees and migrants from Venezuela globally is approximately three million. Colombia leads in the number of refugees and migrants received (over one million) with Peru hosting over half a million, Ecuador over 220,000, Argentina 130,000, Chile over 100,000 and Brazil 85,000 (Spindler 2019). The scale and the longevity of the migration is concerning for countries in the region and beyond, increasing the importance of understanding the forces that are driving the phenomenon, to include trends that have been traditionally overlooked.

## CLEAR EVIDENCE OF CONTRIBUTION – WATER SHORTAGE LINKAGES

According to the UNHCR, “Hyperinflation, shortages, political turmoil, violence and persecution have caused more than 2.7 million Venezuelans to flee [the] country since 2015 to seek safety or a better life abroad” (*The Guardian* 2018). With over three million Venezuelans now living abroad, the vast majority in countries within South America, this is the largest exodus in the recent history of Latin America (Spindler 2019). The dominant political and media narratives which frame and attempt to explain the reasons for one of the largest humanitarian crises in the region’s history center on the dismal economic and security conditions across the country caused by sustained government mismanagement of not only the economy, but of political and justice processes.

Domestic and international critics of the current Venezuelan government allege that corruption and gross mismanagement of the economy, as well as a departure from democratic norms, are the proximate causes for the degradation of human security in this nation of 32 million people. More specifically, they contend that

two decades worth of farm nationalizations, currency manipulations and a government takeover of food distribution as a few of the most obvious causes for the ongoing crisis which has as one of its most defining features the mass migration of over three million citizens—one of the largest mass migrations in Latin American history. (Spindler 2019)

At the other end of the political spectrum are domestic and international proponents of the Venezuelan government who allege that foreign interference in Venezuelan domestic affairs, along with depressed global oil prices (well above \$100 a barrel in 2014 to just over \$51 in June 2019) are most responsible for the crisis (Ghitis 2018). However, neither of these narratives include the 2013-2016 El Niño event that significantly disrupted rainfall patterns and affected water, energy and food security during this period, with ripple effects across all sectors of national life.

Assessing the degree to which adverse environmental trends, such as drought, contribute to Venezuela's problems is challenging. This is especially true as the country is embroiled in a crisis with multiple converging adverse socio-economic and political trends, and in which data gathering and research efforts are hampered due to the prohibitive diplomatic and security environments. Nevertheless, a growing body of direct and indirect evidence suggests that the 2013-2016 El Niño driven dry period, more specifically, its impacts on the nation's primary energy production facility, the Simón Bolívar Hydroelectric Plant (also better known as the "Guri Dam") contributed significantly to the humanitarian crisis.

According to the United States government's entity most responsible for tracking climatic trends, the National Oceanic and Atmospheric Administration (NOAA), "El Niño is one of the most important climate phenomena on Earth due to its ability to change the global atmospheric circulation, which in turn, influences temperature and precipitation across the globe." It causes a pattern of unusually warm water stretching across the surface of eastern equatorial Pacific that occurs every 3-7

years (L'Heureux 2014). Due to the localization of the phenomenon (the Pacific Ocean), North, Central and South American states often are significantly affected by its impacts, the most common of which is drier than normal conditions. There is some evidence that suggests that climate change may make the impacts of El Niño more pronounced than previously understood.

In an article published in January 2014 in the online periodical, *Nature Climate Change*, researchers argued that climate change could double the frequency of *super* El Niño events, which have increased in intensity roughly 20% over the course of the 20th century (Cai and Simon 2014). Although research is ongoing as to whether or not climate change is intensifying contemporary El Niño events, vulnerable regions would be best served planning for the worst rather than hoping for the best. This is especially true as it concerns how drier conditions produced by climate change and El Niño interplays may affect the South American states most heavily dependent on hydroelectricity.

# CLIMATE CHANGE AND HYDROELECTRICITY OVERDEPENDENCE

Precipitation variability may be one of the most impactful global climate change trends. Temperature-precipitation interactions and urban heat island phenomena are made worse by the increased water demands for core industries (especially extractive industries) and population growth, increasing water stress. These dynamics are increasingly exposing the vulnerability of global hydropower generation systems and processes, especially in South America, a region with a significant dependency on hydropower, particularly in Venezuela, Colombia and Brazil, states that invested heavily in hydropower decades ago to mitigate their overreliance on fossil fuels.

Variability in regional hydrology affects the capacity of hydroelectric facilities to perform as designed with consequences for domestic and industrial users (Belt 2018). Brazil is the most hydro-dependent country in the hemisphere, making it vulnerable to climate-related hydrological changes. As a mitigating action, Brazil is currently building more dams with expanded reservoirs and is stepping up its reliance on fossil fuels to meet energy needs. However, as recent developments demonstrate, Venezuela, due to existing vulnerabilities and fragilities, has a population that is most exposed to the risks of an underperforming hydroelectric system. A recent episode illustrates how protracted drought can affect hydroelectric function and, when combined with other aspects of national dysfunction, can cause ripple effects that can affect the national security of neighboring states.

According to Venezuela's Ministry of Electricity, between 2013 and 2016, Venezuela's rainfall measured 50-65% lower than normal due to El Niño (Schneider 2016). This rainfall deficit dramatically reduced Venezuela's capacity to generate electricity via its hydroelectric power generators. Further,

Venezuelan Dr. Alejandro Álvarez Irarorri, an expert in environmental education, biologist and founder of the Venezuelan Environmental Education Forum explained that,

Eighty percent of Venezuela's citizens live in the north of the country and 80% of the freshwater stores are located in the south. Drinking water service is poor in availability, quality and continuity, and water safety is threatened by pollution, deterioration of basins and climate change. Most existing wastewater treatment plants are damaged or not functioning at all. (Alvarez 2014)

The shortage of reservoir stores led to the government imposing rolling blackouts and water rationing in 2016, compounding the stress already felt by the majority of Venezuelans due to the economic contraction and its attendant food crisis (Kurmanaev and Otis 2016). The government even took the extreme measure of shortening the workweek to four days in the months of April and May in an effort to save electricity (Mills 2016).

The protracted drought deeply affected all aspects of the economy at a time when many Venezuelans were already in financial extremis and vulnerable to shocks. Further, according to Venezuela's Confederation of Farmer Associations (a trade group), an under-performing agriculture sector, featuring a 60% reduction in the domestic production of rice, corn and coffee in the past decade, also exacerbated economic and food security stresses. Consequently, when the 2013 rainfalls were far lower than needed to replenish dam stores the impacts were profound (Barrett 2019).

Venezuelan national, Professor Juan Carlos Sánchez (co-recipient of the 2007 Nobel Peace Prize for his work within the IPCC) warned in a June 2017 interview that climate models forecast that by mid-century there may be an 18% decrease in rainfall in the natural reservoir and tributary system that leads to the Guri dam (Ahmed 2019). According to the International Energy Agency, the Guri dam hydroelectric facility generates almost 70% of Venezuela's electricity and is the second-largest hydroelectric plant in the world, after Itaipu in neighboring Brazil.

Venezuela did have national power woes prior to El Niño 2013-2016, including a major blackout in 2009. However, two major blackouts in 2013, with unclear causes, coincided with the start of El Niño effects in the region. According to Javier Val, Environmental Engineer from the Cranfield University, Venezuela has battle with El Niño is not new and will likely be prolonged with significant consequences for the nation. He argues that the country suffered over the past twenty years from the intensification of droughts caused by the El Niño phenomenon, he further explained that [t]hese effects will become ever stronger and have their impacts on the country, so we need to adapt to them. Some of the forecast effects include droughts that will affect the hydroelectric generation system, which accounts for approximately 60% of the total power generation of the country.

Mr. Val explains that other related El Niño forecast impacts are:

- Droughts that will affect water reservoirs levels in the country;
- Certain crops will stop growing in areas where they normally grow;
- Rising sea levels will put at risk coastal areas in Delta Amacuro, Zulia, Falcón, Nueva Esparta, among others;
- Vector-produced diseases (dengue, malaria, Zika, among others) will expand throughout the national territory reaching places where they do not arrive today (Val 2016).

It is important to note that Venezuela's increasing electricity demand is largely residential related. For example, in Zulia state, 60% of the electricity consumption is due to household appliances like air conditioning units. With rising temperatures, demand for these residential cooling units have increased annually and though the nation's hydro and thermoelectric plants are increasing to generate capacity, the very poor conditions of these facilities lead to power outages and government rationing. A general global warming trend, superimposed upon by stronger El Niño events, are together increasing the frequency of droughts across the nation, thus making energy and water scarcities more frequent and prolonged (González 2018).

During the first blackout in early September 2013, 70% of the country plunged into darkness with 14 of 23 states reporting they did not have electricity for most of the day. The second blackout in early December 2013 left most of Venezuela in the dark again and occurred a few days before elections (*The Guardian* 2013). The twin outages in the year of onset of El Niño in the region (2013) invites a more thorough investigation into the possible linkages (Newman 2019). However, the environmental variability occurring due to El Niño specifically, and climate change more generally, significantly affects other vital sectors of the Venezuelan economy.

Venezuela is also heavily dependent upon water-intensive mining industries, agriculture and other sectors sensitive to climate change impacts. Should these services/sectors underperform for protracted periods the degradation will interact with preexisting security vulnerabilities causing consequential adverse outcomes that the state may not be able to address effectively (Barrett 2014). The El Niño drought, and the damage it inflicted upon the nation's energy, water supply and agriculture catalyzed economic contraction, illicit criminal activity, and food and water insecurity. This damage not only intensified domestic social unrest, but also compounded dissatisfaction with government performance that may have contributed to the decisions of tens of thousands of individuals and families to migrate.

# REGIONAL SECURITY IMPLICATIONS

The breakdown of Venezuelan economic and security order resulted in the historic displacement of people across the country's borders and into neighboring states like Ecuador, Peru, Panama and Colombia. Of Venezuela's numerous neighbors that have received migrants, perhaps none have been more affected than Colombia. The Colombian immigration department reported in December 2018 that there were more than half a million Venezuelans in Colombia, most of whom immigrated within the two previous years. The steady inflow of Venezuelans in the spring of 2018 alarmed the Colombian government so much that then president Juan Manuel Santos requested "international aid to cope with the large numbers of immigrants, many of whom are impoverished, hungry and desperate" (Otis 2018b).

According to the UNHCR, the majority of Venezuelans arriving in neighboring countries are families with children, pregnant women, elderly people and people with disabilities. Often obliged to take irregular routes to reach safety, they fall prey to smugglers, traffickers and irregular armed groups. (UNHCR 2019)

Host nations and regions such as Brazil, Colombia, Costa Rica, Ecuador, Panama, Peru, and the southern Caribbean, have struggled to accommodate these rising migration numbers, though many continue to strive to meet their obligations as signatories to asylum treaties. According to Eduardo Stein, UNHCR-IOM Joint Special Representative for Refugees and Migrants from Venezuela "Countries in Latin America and the Caribbean have largely maintained a commendable open-door policy to refugees and migrants from Venezuela; however, their reception capacity is severely strained" (Spindler 2018). There are concerning signs that "this generosity and solidarity" is under strain in receiving states.

Cross-border migration, and sometimes-harsh responses from populations in receiving countries, has contributed to the ratcheting up of tensions in states bordering Venezuela, with clashes between migrants and local residents becoming more frequent. One notable example occurred in August 2018, when Brazilians in the border town of Pacaraima attacked and burned a migrant camp designed for new Venezuelan migrants, which triggered the deployment of Brazilian troops to the border. According to military officials, "as many as 1,200 Venezuelans who feared for their safety rushed back into the country they had fled."

At one point, some Venezuelans ran for the hills as Brazilians chased them, an attack fueled by an allegation that a group of Venezuelans from the squatter camp assaulted a local Brazilian merchant (Andreoni, 2018). In border towns such as Pacaraima, Brazil there is growing resentment about the continuous flow of migrants into communities struggling to deliver public and social services to their respective populations. In another Brazilian border state, the governor proposed a plan to return Venezuelans to their country, demanded that the federal government close the border, and that her state be compensated for rising education and health care costs (Londoño 2018). However, social pressures driven by transnational migration and sometimes-harsh responses from receiving countries is not limited to Venezuela's large, continental neighbors.

As of September 2018, an estimated 98,500 Venezuelans were living in the southern Caribbean, concentrated in Trinidad and Tobago (40,000; Trinidad lies 12km from Venezuela's north coast), Aruba (20,000) and Guyana (15,000). As a proportion of its population (only 1.3 million people), Trinidad and Tobago has received more Venezuelans than almost any other country. In this context, some governments are taking a harder line on the migration crisis, to include the deportation of migrants.

Trinidad is one example. In 2018, the government failed to process the petitions from approximately 10,000 Venezuelan asylum applicants, and in April 2018, authorities deported 82 Venezuelans—an action the United Nations protested at the time (UNHCR2018). In an April news conference following the deportations, island's Prime Minister Keith Rowley defended his policy explaining that “We are not in China. We are not Russia. We are not

America”, he said. “We are a little island — limited space — and therefore we cannot and will not allow the U.N. spokespersons to convert us into a refugee camp” (*NPR* 2018). It is projected that the ongoing economic and political instability in Venezuela could amplify migrant outflows to the Caribbean placing further strain on already fragile economies and possibly instigating more hardline responses from island governments (UNHCR 2018).

## CONCLUSION

More research needs to be done to estimate how much of Venezuela's human security crisis was exacerbated by the 2013 – 2016 El Niño driven drought episode. Nevertheless, what is known is that the drought served as a multiplier of water, food and energy scarcities, aggravating preexisting weaknesses and vulnerabilities. Such climate-security outcomes should be viewed as harbingers of future conditions not only for Venezuela, but also for the region as a whole. Since the risks and consequences are significant, there is an urgency for more in-depth research on how climate-security outcomes can stimulate unrest, water/energy insecurities, immigration and possibly even contribute to political reordering in some nations across the hemisphere.

The implications of these research findings are that many nations are direly underprepared for both the slow moving and faster impacts of both environmental variability to anthropogenic climate change. A key takeaway from this research is that since the impacts are crosscutting and cross-sectorial, responses need to reflect this multifaceted character of the challenges. Whole-of-society solutions will need to be applied, so will public resourcing commensurate with the scale of the forecast effects and impacts. This is especially true for Latin American states with high-compound risks and exposure to their respective economies, energy and water supplies. The primary research gap is the need for a more nuanced understanding of the extent to which recent environmental/climate stressor events

adversely affected the supply/distribution of resources such as energy, food and water. A natural extension of this research problem is to determine what set of mitigating policy prescriptions could start to tame the human security implications of environmentally related stressor events.

Lastly, while many of the climatic risks Venezuela and its neighbors are facing are unprecedented, the capability to foresee these risks via climate modeling are also unprecedented. One of the principal features that differentiates the 21<sup>st</sup> century from past periods of widespread crises is the ability employ new technological tools to better forecast, track and prepare for a range of plausible future scenarios (Werrell 2017).

Venezuela and its neighboring states – all with burgeoning populations causing increasing demands on critical resources – should harness the technological and scientific advantages available to them to inform policy prescriptions that can prepare their populations for climate driven perils and scenarios currently forecast.

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Slum of Bogotá, Colombia. Photo: Flora Baker

# CLIMATE CHANGE, INEQUALITY AND SECURITY IN COLOMBIA: SOME REFLECTIONS ON THE SUBJECT

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## ABSTRACT

Colombia is considered a key territory to tackle climate change. However, the current scenario under a post-conflict process is, at the same time, challenging and volatile both for the consolidation of peace agreement and enhancing protection of the environment that is rapidly under threat. The long-lasting internal conflict shielded the environment in some regions but destruction of these have become a hot topic. Likewise, some of the structural problems of the conflict persist, particularly land unequal distribution. The literature progressively is interested in the relation between security and climate change; however, the correlation to inequality has been sidelined, despite its relevance. This paper

intends to be a primary approach to the relationship between climate change (environment), security and inequality in Colombia, considering a path dependence approach, considering historical facts to provide inferences about probable impact of climate change in the coming years as a “threat multiplier”. This is a sensitive country where violence and several social disruptions have been present along the years. The findings show that, due to the local situation where land is one of the most valuable commodities, the pressure produces for climate change can push the reemergence of conflict.

Keywords: **climate change, security, inequality, Colombia, post conflict.**

# INTRODUCTION

Colombia and the global society face one of the most critical conjectures in recent history regarding peace and ecological sustainability, as the future depends on today's decisions. This is not an easy task due to economic pressures, lack of political will and insufficient global society's awareness. Along to other Latin American countries, Colombia is considered a key territory to keep and improve ecological stability to confront climate change, probably the most relevant challenge and threat for humanity in the coming years (Hollingswoth 2019). This country has the second largest biodiversity in the world, and a half of its territory is natural rainforest surrounded for hundreds of rivers that help drastically to tackle global warming, likewise mountains, flat regions and coral ecosystems assist to stabilize global temperature and to process excess of greenhouse gases (Rangel 2015; Duque 2018). As well as other countries, Colombia is also vulnerable to the impact of climate change. Even, if nothing is done urgently to reverse it, in the next 50 years, the country could have an increase of temperature between two and four-centigrade degrees and reduction of rainfall between 10 and 40 percent, destroying biodiversity and altering directly the quality of life of millions of Colombians (IDIGER 2019).

According to the Institute for Hydrology, Meteorology and Environment Studies (IDEAM), climate change could generate in the country:

1. Rising of sea levels affecting coastal populations.
2. Melting of moorlands that will affect the production of fresh water.
3. Extreme climate seasons (drought and flooding).
4. Heat waves in the cities.
5. The decrease in agriculture production.
6. Extreme desertification.
7. Loss of water resources; and
8. The radical increase in diseases (IDEAM 2017: 27).

Some experts have pointed out that climate change is a "threat multiplier", and although there is no consensus about its impact on society and what kind of actions should be displayed to confront it, its relevance is undeniable in the current international agenda (McDonald 2018). The link to security issues has become stronger not only for a steady "securitization" process sponsored by some international actors to position this issue as a top priority (Trombetta 2008), but also, for the indirect consequences of climate change in the conventional security sphere, such as increase of conflictivity in some regions because of radical weather changes (Mobjörk 2016: 2). Right now, Colombia is undergone a sensitive moment regarding at least three interconnected factors. Firstly, implementation of the peace agreement between state and left-wing guerrilla FARC. Secondly, rapid deforestation that is happened in the former territories controlled for this guerrilla. Thirdly, the persistence of many of the variables that have fueled the conflict across the years, particularly, high socio-economic inequality. In this respect, climate change can put an extra burden in the local scenario in the nearest future that added to long lasting tradition of violence and low level of social capital emphasize for socio- economic differences among citizens may produce unexpected consequences.

In this respect, this paper intends to address preliminary the question: "What are the possible scenarios in the relationship between climate change, security and inequality in Colombia after the peace agreement?" For that, we will move back and forth in the conflict and post-conflict settings to point out some facts and inferences about the relationship between these three variables considering a historical path dependence perspective. Although, it is not an easy task due to conflicting perspectives about these topics, we can take advantage of some previous studies to apply to Colombian case. This paper will be a mixture between secondary literature and observations and evidence gathered from fieldwork and interviews in the last 10 years. It will also be a primary approach to start an academic discussion in the local context. The first part reviews the theoretical literature; the second, security and environment (climate change); and the final part, provides an analysis about the link between environment, and inequality with emphasis on the Department of Cauca.

# A 'SPECULATIVE' APPROACH: CLIMATE CHANGE, SECURITY AND INEQUALITY

Many scientific agencies, international organizations and governments have recognized the negative impact of climate change on the humanity's wellbeing and stability. From skepticism to concern in government and military spheres, climate change has begun to occupy a central role in the political and academic discussions as a probable trigger of violence and conflict. This influence directly on security, understood like the search of predictability against durable disorder (Hettne 2010) and the actions to prevent or deal with these issues. Then, climate change is a source of uncertainty.

Along to these issues, inequality is another important concern that have emerged in the contemporary world that however has been marginalized in the discussion related to climate change and security, despite certain empirical link. In this respect, our first goal will be attempted to stablish a connection analyzing three conceptual sets of concepts: "climate change-security-violence", "climate change-inequality", "inequality-violence" following some literature in these issues and attempting to link these topics for shedding light on our case of studying. We consider violence as an extreme form of threat upon security of individual and communities driven for different motivations (including sense of scarcity produce by climate change).

The literature about climate change and security coincides that change in weather impacts directly on the risk of violence. The conventional approaches consider that climate change is a "new" security threat, in the way that this unfolds or amplify other drivers for human conflict related to environment like drought, desertification, land degradation,

deforestation among others (Brown et al. 2007). This goes together to many international organization's perspectives, including the United Nations, that asserts that climate change is a threat for the livelihood and security of human beings (United Nations Trust Fund for Human Security n.d.).

In the same line, a growing literature – including some articles in this book – point out how climate change leverages violence and delinquency. In this respect, a recent study based on an extensive analysis of empirical studies asserts that climate change, including heat waves, decrease of rainfall and sea level rise multiple probabilities of collective violence such as armed conflict, state-sponsored violence and organized violent crime. In this analysis, the authors suggest "the role of climate change in causing or contributing to collective violence is greatest in places that are already at high risk of collective violence" (Levy et al. 2017). Even, Nordqvist and Krampe (2018: 6), studying South Asian countries, point out that radical climate changes have been used tactically by violent actors "to gain power in an ongoing conflict" recruiting disaffected people.

The relationship between climate change and inequality can be considered in global and domestic terms. Paraphrasing United Nations, we understand inequality as a mixture between inequality of outcomes or unequal level of material wealth, and inequality of opportunity or the impossibility of choosing one type of life any society or individual wants due to disadvantage opportunities (United Nations 2015). Recently, a team of researchers proved that increase in the global temperature might

get the rich countries richer and the poor countries poorer regarding to income in the coming 70 years. This due to global north countries probably will experience better weather useful to agriculture and production; meanwhile, global south countries will become hotter which may deteriorate the agriculture and quality of life (Burke et al. 2015).

In domestic terms, it is recognized that climate change exacerbate the inequality within the countries, particularly mid and low income ones, in the way that most vulnerable people will face directly the effects of radical weather changes like natural disasters, scarcity, difficulties to access to fresh water and reduction of land productivity. In this respect, Islam and Winkel point out that “social inequality” is impacted for climate change in a kind of “vicious cycle”, because initial inequality is exacerbated due to adverse effects of climate change that resulting in greater subsequent inequality and fewer possibilities to cut this cycle (2017). In this way, vulnerable people, like poor women and children are the innocent victims of global warming; meanwhile young men are an available workforce for many activities, including illegal ones, in this respect “climate change can therefore compound existing inequalities (Colenbrander and Sudmant 2018). In other way, inequality can produce a driver for climate change in the way that disadvantage people can became predators of natural rainforest due to lack of opportunities or low level of awareness about their impact in these regions.

Probably the most controversial duo in this analysis is “inequality-violence”. The literature about this couple is extensive and full of controversies. Some studies suggest that inequality is not a driver of violence, meanwhile other studies point out that inequality is a powerful trigger for violence (Østby 2013). Many analyses conclude while inequality is not the only factor for violence this is an important booster and predictor of lethal actions when it is combined with other variables like state repression, injustice, no future sentiments among others (Brinkman et al. 2013). Likewise, inequality more than poverty “create conditions more conducive to the outbreak of violence” (Barnett and Adger 2007: 645).

On a different line, violence, and particularly conflict, influence over increase of inequality during combat actions due to destruction of economy, difficulties of state action, disruptions on agricultural production. In this line, after the legacies of war vanish inequality decrease (Bircan et al. 2010). Therefore, the link between these two variables is not conclusive, nonetheless this can fuel volatile scenarios. In this respect, meanwhile climate change is a trigger for inequality and violence deteriorating the quality of life of millions of people due to its consequences, the pauperization of living conditions among population embedded into a society with deep inequalities can produce recurrence of violence.

# POST-CONFLICT, SECURITY AND ENVIRONMENT (CLIMATE CHANGE): A VOLATILE SCENARIO

For many years, the brutality of the Colombian conflict invisibilized the richness of local environment. The signed of the peace agreement between the Colombian state and the left-wing guerrilla FARC in 2016, opened the Pandora box related to environmental issues. This, not only regarding the natural marvels presented like the forefront of the country abroad via mass media campaigns, but also because blow up all the risks that is confronting the local nature, including illegal activities like coca and poppy production, mining, cattle ranching, deforestation, openness of agricultural frontier and precarious laws and state apparatus to preserve these regions. The role of domestic environment is highly recognized for its usefulness to help to reduce climate change. In this way, this trait was crucial to achieve the international support for the late peace agreement due to former president Juan Manuel Santos sold the idea that local conflict resolution was and is crucial in this global environment campaign.

Together to the peace accord, the post-agreement actions related to environment have included enhancing the protected natural areas that have been three folded during the last years, the commitment with sustainable development and the establishment of policies to protect the environment (Paz 2018). Perhaps, the most important action was the enactment of the Law on Climate Change (LCC) in mid-2018, which is part of the Colombian commitment with the Paris Agreement (2016) to reduce greenhouse gas emissions in 20% until 2030 and to unfold subnational actions to mitigate climate change (Congreso de Colombia 2018).

Nonetheless, the political and legal spheres crashed against reality in Colombia, characterized for a structural violence that has mutated during the post agreement era and the difficulties to implement environmental laws and the agreement itself. While the FARC are no more a threat for the state like the main guerrilla group that wanted to change the political system throughout violence, and the majority of its combatants laid down their weapons. The government of Ivan Duque has carried out a slow action to fulfill the agreement and to unfold the necessary state apparatus to take the control of the areas left by the FARC. In a detailed report, Lorenzo Morales (2017: 7-8) identified that the most violent zones during the peak of the conflict occupied for this guerrilla group matched to those when the natural resources are more valuable in terms of biodiversity and impact on the mitigation of climate change.

In this vein, two years after the signed of the agreement, several dissidences of FARC added to other illegal groups have filled the vacuum left for this armed group, and at the same time have carried out predatory activities against natural rainforest such as mining, cattle and seeding illegal crops (personal interviews, 2018-2019). In the same perspective, the Red Cross has asserts that multiple illegals groups have been fighting to control the illegal activities left by FARC and civil population are at the middle of this confrontation generating a sense of anxiety and lack of protection (*Vanguardia* 2019). Thus, the initial promise of state action contained on the pact has been delayed, including actions related to security, education, health, land, infrastructure and opportunities to change illegal activities in several regions historically affected for the conflict.



At the middle of the controversy about implementation of peace agreement, deforestation have become a real hot topic for society and current government. For many years, conflict was waged in the these regions, and left-wing guerrillas organized a kind of para-states throughout the “law of violence”, imposing restrictions to access to remote and most biodiverse zones, and likewise, establishing some rudimentary conservationist rules to keep biodiversity (Personal interviews in Cauca, 2015). These actions helped to preserve natural rainforest and kept away extractivist industries. However, the situation has change radically after demobilization of FARC. According to Fundación Paz y Reconciliación the huge deforestation is a direct byproduct of the authorization of illegal leaders to exploit wood from the natural rainforest, the illegal mining activities and logging of the jungle to plant different crops, added to the incapacity of the state to repel these illegal groups (2018). Indeed, the expert Sebastian Lama, points out that deforestation goes in tandem with livestock as a way to take and hold the land at the hands of landowners and illegal groups, contributing with greenhouse gas emissions (2019). These have broken the natural equilibrium across different regions, making disappear not only the jungle but also rivers due to overexploitation.

For the first time, environment and climate change have become a concern for the state and society into an instable scenario. For two reasons mainly: Firstly, because of predatory action of different illegal groups against nature that is condemn by environment activists, mass media and international organizations. Secondly, because the awareness about this critical situation has been positioned like a security problem by the President Ivan Duque, in a notorious process of securitization. This is particularly worrisome due to in Colombia there has been a

tradition to militarize different problems that in the long term end up making the situation worse. Now, the natural resources are considered like “strategic assets” and in this line will be protect according to the National Defense and Security Policy guidelines.

In an interview the Ministry of environment, Manuel Rodriguez, asserted that deforestation and other activities against nature will be managed with a national security perspective to counter the criminal activities and degradation of environment (*El Tiempo* 2019).

Despite punctual empirical evidence about relationship about climate change and security is still difficult to find in Colombia. With the background and the instability in the post-conflict scenario, it is easy to infer the exacerbation of current situation is highly possible. The climate change may multiple the insecurity atmosphere due to absence of the basic services from the state, the illegal activities, and the unsatisfied needs of the people in this particular conjuncture. In an empirical study about the indigenous communities of the Amazon Region in Colombia, the professor Juan Echeverri, shows how the climate change is changing rapidly the social relations into indigenous communities. The difficulties to access to food and resources due to climate change, and the need for money to pay services like education and health pushed the members of these communities to predate natural resources, or to participate in the illegal activities to earn money (Echeverri 2009: 26-28). This is a small sample how climate alterations can push people that traditionally defend the nature to be involved in illegal activities that in some respect fuel the conflict and destroy the social ties and nature.

# POST-CONFLICT, ENVIRONMENT AND INEQUALITY

It is not a secret that Colombia is a developing country with high levels of poverty and inequality that was exacerbated for the internal armed conflict. According to the official institution of statistics (DANE) in 2018 with almost 50 million population, there was 27% of people in poverty and 7% in extreme one (DANE 2018). Likewise, the inequality is considered high according to world standards. The Gini coefficient is 49.70 for 2017, and the 10 % more rich population controlled 39 % of the economy (Knoema 2019). The most ambiguous issue is that even during the peak of conflict the Colombian economy was considered like stable and well-performed in macro-economic terms, between 2005 and 2015 the GDP growth 4.5 % per year (ANIF 2017), almost equal and better than many regional neighbors without conflict. For the World Bank, the balance after the peace agreement, and despite world economic slowdown, is the local resilience and proven structural economic strength across the years (World Bank 2019).

Historically, the political elites have been proud about the well-economic performance, however, the actions to spill over the economic growth across the most vulnerable population have been weak, in part, due to political elites' selfishness, lack of inclusive national project and the conflict itself. The post-conflict environment has opened the opportunity to change this situation and it is estimated that could improve local GDP between 0.5 to 1 % per year until 2022 if the right decisions are taken (Fedesarrollo 2019: 4).

In this respect like an unprecedented event, the peace accord recognized the root causes of the conflict, and the central point was the unequal distribution of land – a source of wealth – and exclusion of the citizens, particularly those living in the remote regions of the country due to historical

state negligence. Likewise, the agreement included some guidelines to change this situation, including evaluating, and supporting judiciary branch to help to get back the land to the real owners. Thousands of peasants who were deprived of their properties during the conflict for different illegal actors and its sponsors, likewise, to redistribute fertile land among poor peasants.

This is a critical issue in Colombia because the majority of commodities both legal and illegal use the land as the primary resource of production. In this respect, in a report elaborated for Oxfam, Colombia is categorized as the most unequal country in the region related to land distribution. The productive land is only 38.6 % of Colombian territory and the remaining is natural rainforest and urban spaces. According to this information, 73.78% of productive land is owned by 1 % of the population, and the majority are large “haciendas”, the remaining land is in hands of 99 % of the population, many of them victims of conflict, and minority communities like Indigenous and Afro-Colombians (Oxfam 2017).

The fight for the land is embedded in the nature of the Colombian conflict, and despite some analyst underestimate the impact of this as a trigger of the conflict, due to many people live now in the cities. The historical and empirical evidence shown that unequal distribution of land and wealth in Colombia has been a source of discomfort and animosity to push the people to combat against state and some sectors of the society, particularly the people who have monopolized the land (Personal interviews, 2010-2018). Like has been stated in the first section, climate change will affect the reduction of fertile land and natural rainforest, adding to the decrease in job opportunities. This hypothetical, but close to real situation, may push the most vulnerable people to

fight for the productive land violently, to continue with the recurrent practice of destroying the rainforest to plant and cattle, or to become an available manpower for illegal groups taking advantage of despair situation. Likewise, the international demand for cocaine and heroin is increasing the pressure to struggle for productive land.

The department of Cauca located in the southwestern region of Colombia will be useful to speculate about the relationship between inequality, climate change and conflict in Colombia following a historical path dependence approach. This department not only is central in the current post-conflict process related to demobilization and programs to consolidate a sustainable peace; at the same time in the scale of vulnerability to climate change is located in the rank 8<sup>th</sup> among 32 departments (Gonzalez et al. 2010: 34). According to official institutions, the impacts of climate change will be the increase of temperature that will oscillate between 0.5 to 1 centigrade degrees and reduction in rainfall, which will influence negatively in the food security of people confronting them to obtain their livelihood in the coming years (Ministerio del Medio Ambiente 2016: 18-19).

This department has a long history in the internal conflict, particularly related to the struggle for productive land and widespread inequality. Since the 20<sup>th</sup> century indigenous, afro-Colombians and mestizo communities have been clashed against landowners and state for a better redistribution of land, perhaps the most famous leader was Quintin Lame. Cauca has a privilege geostrategic position, two of the most important rivers of Colombia: Cauca and Magdalena born there, and the mountains make this territory perfect to fight different kinds of warfare, even among Colombian military became known as "Caucanistán" due to its dangerous landscape (Personal interviews, 2016).

The historical demands of poor communities along to geography have made this territory ideal for two of the most critical security issues in Colombia: widespread violence (originally left-wing guerrillas) and illegal drug production. Despite indigenous and afro-Colombians tried to expel the armed actors from their territories this was a difficult activity due to armed pressure and unsatisfied needs of people that took some of them to be involved in these illegal activities (Personal interviews in Cauca, 2015). In the last half century, the main economic activities of this department became legal and illegal crops. However, less of 40% of the land in the department is useful for agricultural activities (Rodriguez 2016: 648). At the same time, this department has had a historical poverty and inequality (*Radio Super Popayan* 2016). Thus, in the nearest future the climate change will reduce the possibilities of individuals and society to fight against poverty and inequality (Gonzalez et al. 2010: 29), increasing the clashes for the land, that is a limited resource in this department.

All these factors together make the department of Cauca a perfect example about how the historical trajectories between inequality, conflict and probably climate change can push an extra pressure if the unequal distribution of land is not solved in the post-conflict scenario. However, this imply a state and society commitment that is not easy to achieve due to historical egoism and socio-economical division between high-income elites and low-income majorities. In this respect, the possibilities of the increase of security instability is highly probable.

# CONCLUSION

The studies about security and climate change has not incorporated the discussion about inequality, a topic that is crucial in the context of Latin America and Colombia, which in some respect has been identified as a key variable to understand its high rates. Despite of that, several political actors and high-income elites have tried to minimize the relevance of this issue as one of the triggers of this chaotic situation. Historically, Colombia has not solved the problem about inequality in the distribution of land, which has been identify as a crucial issue in the persistence of the internal armed conflict across the years, even recognized in the last peace agreement. Likewise, widespread inequality in other spheres is highly know as a driven force behind for domestic mayhem. Among these: income inequality, unfair access to public goods, weak political participation and low opportunities to be listened for the authorities, perhaps the most evident example is the huge number of social and environment leaders that has been killed in Colombia without effective action of the civil or military authorities.

The post conflict scenario is, at the same time, a challenging period and a volatile setting due to the historical violence related to the conflict and the current situation that has mutated from the violence and para-state duties exerted by FARC to predatory violence of other illegal groups. The unequal distribution of land, the lack of opportunities, the competence for fertile land and the predation on natural rainforest together to problems related to climate change may make worsening the situation altering the instable consolidation of peace, particularly in the regions where the internal war was waged like the Department of Cauca.

This paper has departed from the preposition that climate change is a threat multiplier. In this vein, it used historical and current facts to infer about what will be the relation between climate alterations, security and inequality in Colombia both at the present moment and in the future. We have given examples taking into account several theoretical perspectives applied to local case, nonetheless, we think this seminal correlation can be used to analyze other scenarios where violence and inequality are present, particularly across Latin America.

In the future, it is urgent to research empirically regions vulnerable to climate change where inequality and violence will be a common feature to test the preliminary hypothesis of this paper observing if climate alterations exacerbate inequality and this booster conflictivity. For this goal, it is important to create multidisciplinary teams including social scientists, environmentalists and authorities, combining fieldwork, statistical data and environmental information. Likewise, a subnational comparison between two regions, one vulnerable to climate change and other non-vulnerable could be very useful to test the validity of this hypothesis.

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Rurrenabaque storm. Photo: Phil Whitehouse



# CLIMATE CHANGE, SOCIAL CONFLICT AND THE COMPLEXIFICATION OF CRIME IN BOLIVIA: AN ANALYSIS OF THE IMPACT OF FLOODS AND STORMS IN CHAPARE AS A COCA GROWING REGION

Marília Closs

## ABSTRACT

This paper aims to understand the connection between climate change in Chapare, a coca production region in the department of Cochabamba, Bolivia, and the increase in crime linked to the production and distribution of illicit substances. It assumes that the relationship between climate and security - in the crime research agenda - is indirect. Due to the role of natural resources for subsistence, climate change has opened up structures of opportunity for new forms of sovereignty and relationship with territory, which consequently gives room for

a new role for crime. Climate change therefore multiplies threats to stability and security. In the coca growing region of Chapare, in particular, the findings indicate that floods and intense storms have altered the relationship of individuals with the territory, the economy and the social production of space - which intensifies an existing social conflict and brings new dynamics of crime to the region. Therefore, it was noted that this is the beginning of a process of criminalization, especially in Villa Tunari and TIPNIS Polygon 7, which has been intensified due to climate change.

Keywords: **climate change, floods and storms, crime, coca production, Chapare.**

# INTRODUCTION

Bolivia is among the countries most affected by climate change on the globe. Increased rainfall, the definitive disappearance of lakes by droughts, the significant rise in temperatures, landslides, fires and climate anomalies in the El Niño and La Niña phenomena - all these have been diagnosed in recent years and have a bearing on the social stability of the country. The situation is aggravated by the fact that Bolivia is a state marked by deep social inequality and a condition of vulnerability. In central Bolivia, on the fertile land in the department of Cochabamba and near the border with the department of Beni, lies the province of Chapare.

The region, one of the wettest on the globe, is the scene of some of the most dramatic climate change in Bolivian territory. Although it is a space of high volume of precipitation, a considerable growth can be observed in the last years. The region is also located in one of the most dangerous flooding points in the country. In the Isidoro Secure National Indigenous

Territory Park (TIPNIS in Spanish), a park that has much of its territory within Chapare, the situation is of calamity. It is in this part of the country that much of the coca leaf production occurs. The cultivation and consumption of coca leaf is a fundamental part of Bolivia's political, social and economic life and plays a significant role in its economy.

This paper aims to understand the relationship between climate change in Chapare and the increase in crime linked to irregular coca production. Research is focused on hydrological disasters such as inundation, torrents and floods, and meteorological disasters such as heavy rainfall. In order to achieve the objectives, the region's security and climate dynamics will be observed between 2015 and 2019. As this is a very present temporal delimitation, news on the themes will be used such as the online published versions of the two most widely circulated newspapers in Bolivia: *La Razón* and *El Deber*.

## RELATION BETWEEN CLIMATE AND SECURITY: A BRIEF INITIAL DEBATE

If security is a constant on the political agenda, only in recent decades has the climate change debate become more present in national or interstate debates. Today it seems consensual in the literature and public debate that climate change and emergencies are disruptive and structuring elements within various social dynamics. More rare and difficult, however, is the debate about the relationship and implications between climate and security. A first difficulty in the debate that relates the two elements is the multiplicity of the concept of security. If, until the first half of the twentieth century, the concept of security referred internationally to interstate war and,

at the domestic level, to public security, at the end of the twentieth century this would be re-signified.

This was from the "opening" of the concept to the conception of human security, in which the individual, not the state, is the object; the physical security of the population becomes fundamental. From this notion, human security embraces within itself previously ignored themes such as food security, health, epidemics or ecological disasters; that is, it becomes a multidimensional concept. This work, however, looks specifically at a traditional (public) security theme: crime. Because it is a mainstream

security theme, one caveat should be made. Even considering the multidimensionality of security, one cannot fall into the risk of securitization and, consequently, militarization of some social agenda. Just as the security debate is multiple, so is the discussion about both climate and the relationship between the two. Among the many relevant interpretations on the subject, this paper is dedicated to observing how much impact the climate has in the field of conflict. It was opted for trying to understand the relationship between climate change and crime, that is, when the impact of climate favors situations that lead to the mobilization of force. Although there is a greater number of studies that seek to understand the relationship between climate and human security (UNGA 2009; Schaeffer et al. 2008), studies on the relationship between climate change and “traditional” security have been growing in the research agenda - which mobilizes the use of force and overcomes the barrier of “structural violence”. Examples are works that seek to understand the relationship between climate and non-state armed actors (Nett and Rüttinger 2016) or with violent conflict (Scheffran et al. 2012).

Of particular relevance are the conclusions reached by the Stockholm International Peace Research Institute (SIPRI) on the subject that try to understand the relationship between climate and security risk (Van Baalen and Mobjörk 2016). For them, there is already some consensus that there is no direct relationship between climate and the eruption of violent conflicts, either intra- or inter-state. After all, “the following of events that lead to outbreaks of violence are always multifactorial and complex and it is usually not possible to identify a single triggering factor” (SIDA 2018: 9).

However, it seems to be a consensus, too, that the climate does have indirect impacts regarding the rupture of security stability; “Factors that play a role in increasing the risk of conflict are likely to be reinforced by climate change” (SIDA 2018: 9). Van Baalen and Mobjörk (2016) conclude that there are 5 ways in which climate change can increase the risk of conflict:

1. Deterioration of means of subsistence. This is mainly because the opportunity costs for resource control regarding more normal situations decreases - especially when it comes to sudden crises;
2. Migration in larger quantities in an unforeseen way, which certainly changes the local dynamics;
3. Changes in the mobility patterns of the peasant sectors;
4. Tactical considerations among armed groups participating in the conflict; and, finally,
5. The use and exploitation by political and economic elites of local demands and dynamics.

For this research, it is important to note, mainly, item 1. Despite some changes and the construction of some social policies since Morales and the MAS took over the Bolivian state, the country remains deeply unequal and with a series of regions where populations live in vulnerable conditions. This is not only due to the crossing of Bolivian structural poverty - with major markers of gender and race - but also due to the scarcity of public goods and the effective presence of the plurinational state with adequate institutions. The existence of a political-economic regime unable to cope with socio-economic inclusion is dramatized by climate emergencies - which will likely build larger opportunity structures for other armed actors such as organized crime.

More than that, it is important to note that ensuring livelihoods and climate - and the causality of both with respect to violence - are intimately connected with territoriality. Since this research deals with a rural region in which the livelihoods and survival of the actors involved depend profoundly on their production - in this case coca - a very particular relationship was built between the actors with natural resources and territories. More than the construction of social movements based on leaf production, the very identities and collective subjectivities of various actors in the region are linked to land and production. The very word *cocalero*, used later in

this text, has in itself cultural and ancestral weight beyond meaning economic activity. Therefore, once a climate emergency changes the actor's relationship with land and territory, it certainly has security impacts as it affects identities as well. After all, it opens space for new resource dynamics and new sovereignties for the social production of space.

Even if it recognizes that this pattern of observation and causal construction are of great importance, rather than applying them rigidly, this paper intends to grasp the notion that climate change multiplies threats to stability and security. Climate is not a direct intervening factor in the outbreak of armed conflict or violent social phenomena - just as probably no social science variable given the complexity of the processes is. However, changing climate urgencies certainly reinforce the elements that can lead to conflict.

# SITUATION IN CHAPARE

## *Coca Leaf Cultivation and Social Conflict*

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In Bolivia, coca leaf is of enormous social, cultural, religious, ancestral and economic value. Along with Peru and Colombia, it is among the largest leaf producing countries. Since Evo Morales's election to the presidency in 2006 by the Movimiento al Socialismo (MAS), the country has been trying to resignify the national and international leaflet: campaigns like "*Si a la coca, no a la cocaina*" and "*La hoja de coca no es droga*" have tried to demystify the notion that leaf and cocaine are the same thing. For this reason, for almost 15 years, the government's policy has been that of regulating the leaf production – restricting it to confined spaces while combating the production and trafficking of illicit substances. Since then, the government has been working to limit hectares of coca production to regulated spaces, and in 2015 it reached approximately 20,000 hectares of legal limits. According to a report by the United Nations Office for Drugs and Crime (UNODC 2013), of the three countries that produce the most, Bolivia was the only one that achieved a substantial decrease in the 21st century. Coca regulation in Bolivia defines two specific spaces where production is allowed: in Chapare and Yungas de La Paz (Miranda 2017).

In 2017, Law 906 was passed, which changed the maximum amount of hectares that could be produced in each region: in the Yungas, the maximum goes from 8,800 to 14,300; at Chapare, it goes from 3,200 to 7,700. To be marketed, Yungas production goes to the Villa Fatima market, while Chapare coca goes to the Sacaba market. Until it reaches commercialization, coca leaf goes through three stages: 1) the delivery of the product by the producer to the intermediaries; 2) the negotiation of retailers for the sale of the sheet; 3) the arrival of the product to the market. In Chapare, there are 6 federations responsible for production and much of the local production goes to the Santa Cruz department. The largest recipient of Yungas paceños cultivation, in turn, is northern Argentina - the only region of the Southern Cone country where consumption is regulated.

Law 906, passed in 2017, officially replaced that of 1981, which was far more restrictive with the production. However, since 2008 Morales had already negotiated with *cocaleros* sectors for the expansion of the production. In addition, the 2017 Act regulates different types of use of coca production, such as traditional use for leaf chewing

(*accullicu*), traditional medicine and sacred use or for marketing the leaf itself or in food products, among others. The approval of the law took place in a somehow conflictive way: Yungas producers, articulated in the Departmental Association of Coca Producers (Adepcoca in the Spanish abbreviation), were against the delimitation of hectares, since, for the region, despite the expansion of the maximum allowed, this still did not account for including within the law all the amount produced on the site. More than that: Adepcoca paceña announced that the Chapare region was being privileged over the Yungas, since the former is Morales' social base. Regardless of the perspective adopted, it can be noted that the relationship between producers, workers and union leaders of Bolivia's two largest coca production zones is not peaceful (*El Deber* 2019).

The *cocalero* sectors have been, for decades, mobilized and organized collectively to claim their demands. The restrictive law of 1981 was one of the main objects of dispute and was a driving force for union organization among the producers. In this process, Evo Morales personally built himself an image as the *cocalero* leader of the Chapare region and reached the highest rank of union leader in the category. More than that: Cochabamba department is also a region that historically goes through deep social conflicts. An example of this are the protests and collective action cycles that took place between 1999 and 2003 in opposition to the processes of deregulation and privatization of hydrocarbons and water supply services, which would be known as the Water War and the Gas War. Another point of tensions in the department is the Isidoro Secure National Indigenous Territory Park (TIPNIS), park that has much of its territory within the Chapare. This is a disputed territory: while communities of native and peasant populations claim the space for themselves, the Morales government, after several comings and goings, resumed in 2017 the project of building a road inside the park territory to integrate Cochabamba and Beni departments. The issue is controversial and has already generated several waves of protests across the country. The Bolivian plurinational state's relationship with natural resources is one of the biggest tensions in the country. Summing up, it can be seen that this is a region with latent social conflicts that have been getting worse in recently.

Between 2006 and 2016, the coca production in Bolivia had finally stagnated, almost reaching the amount targeted by the government. Since then, however, UNODC has released a report (UNODC 2016) that showed the change in this trend, with a 14% increase in cultivated hectares in 2016. In 2017, the cultivation territories in the country rose 6% over the previous year, reaching 24,500 hectares. For UNODC, most of this increase was in the Chapare region: Yungas cultivation increased from 15,700 to 15,900 hectares, while in the Cochabamba Tropic from 7,200 to 8,400 hectares (Montero 2018).

In addition to that, in recent years, as the production has increased, tensions around coca leaf production in Chapare have become more complex. According to the latest UNODC report, about 90% of Chapare's coca leaf production goes to the illegal market – that is, it never arrives in Sacaba; The data regarding this, however, are conflicting (UNODC 2018). According to Felipe Cáceres, deputy minister of Social Defense and Controlled Support and one of the main names in the policy against drug trafficking, it is precisely in the Yungas that the largest coca production destined for illegality is to be found. However, it is clear that since 2016, a greater amount of coca leaf production has been leaking out of legal markets. Specifically in TIPNIS, coca cultivation is allowed on about 400 hectares, divided between 66 communities; However, according to UNODC report, in 2017 there was cultivation on about 1100 hectares, of which 65% was destined for illegal markets.

As a result, the groups considered to be drug traffickers have multiplied. This was especially true in two main locations: the municipality of Villa Tunari and TIPNIS Polygon 7. In Villa Tunari, in March 2019, 15 cocaine factories (or *pozas de maseración*) were found in the city and a crystallization laboratory, as well as a clandestine track for aero-motor vehicles carrying the base paste (*la pasta base*). The group of about ten people responsible for such instruments was linked to the San Rafael *cocalero* union. In addition to the main group, there was a support group of about fifty people - many of them armed.

Even though Chapare itself contains coca-producing territories, what has been seen in recent years is that, in addition to the expansion of irregular production, there is a multiplication of new actors involved in crime. An example of this is the increase in the number of people who work as street vendors, who are responsible for the transit of illicit substances both between communities and outside Chapare and even Bolivia. The illicit activities related to coca are three: production of unregulated coca, preparation of substance in the *maseración* pools or factories and transport to other locations in order to be commercialized. Due to the illegality, these activities have taken advantage of the force so that they can continue to occur due to the expansion of repression. In summary, in Villa Tunari the issue is complex because legality and illegality are mixed, especially in the San Rafael *cocalero* union, which seems to be involved in the production and transportation (or aid) of illicit substances.

At TIPNIS, and in particular at Polygon 7, the situation between 2016 and 2019 is more complex. As already mentioned, the TIPNIS is a space of constant tension, mainly between *poblaciones originarias* and the central government of Bolivia. Polygon 7 is in the south of the park and has both native population and colonizing *cocalera* population. The situation has become even more tense since, in 2017, the Morales government returned with the proposal to build a road linking Villa Tunari and San Ignacio de Moxos within the park's territory. The indigenous population that lives in the TIPNIS often complains that their territory is invaded by the *cocalera* population, who would not respect the environmental conditions necessary for a healthy life in the place. According to UNODC, between 2015 and 2016 the coca growing territory in the Polygon grew by 43%. In 2017, there were 1,109 hectares of cultivation in the locality - more than 700 hectares beyond the allowed. In the same year, the government announced that it had reached its goal of zeroing illegal coca production at TIPNIS and Polygon 7 after eradicating 181 hectares - when production at Polygon reached 450 regulated hectares (Paco 2018). However, this is an area of constant dispute, and government data are controversial.

Bolivia, however, is not the final destination of illicit substances. In general, unregulated coca leaves Chapare towards the departments of Beni and Pando to cross the Brazilian state of Acre from there to Peru; This route is mainly between the cities of San Pedro de Bolpebra (Pando / Bolivia), on the triple border with Assis Brasil (Acre) and Iñapari (Peru). The traffic also takes place between the cities of Cobija (Pando) and Brasileia (Acre).

Although the government claims that the major Brazilian factions, such as the First Capital Command (PCC in Portuguese) or the Comando Vermelho (CV), are not acting on Bolivian soil, it is already possible to observe the action of factions like the B13 in transit of coca from Bolivia. It should be noted that this type of dynamic is linked to the construction of the new South American drug geopolitics. Since the dismantling of the largest Colombian cartels between 1990 and 2000, Brazilian factions have gained greater prominence in the production and distribution chains. In recent years, these have also expanded to other countries; Such a process is relevant as it builds new transnational networks - and Chapare seems to be embedded in this dynamic.

Between 2016 and 2019, one can also notice transformations in the way the multi-national state deals with drug trafficking – and this is consequently reflected in the way the Morales government deals with coca production. If, at first, the State sought to separate coca from cocaine, in addition to adopting a less secure approach to trafficking, from 2016 onwards the use of force as a method became a priority again. In 2018, in Chapare alone more than 8,300 hectares of surplus coca production were eradicated – rising by more than 5,000 hectares eradicated from the previous year (Cuiza 2019). Also, according to the government, it is in Chapare that most (more than 75%) of anti-drug operations and activities take place (Montero 2018). The official rhetoric is to increase operations of “eradication and rationalization”; however, the main instruments used are the Rural Patrol Mobile Unit (Umopar in Spanish), the Special Drug Fighting Force (FELCN in Spanish) and the Special Crime Fighting Force (FELCC in Spanish), in addition to the Joint Task Force (FTC in Spanish) and the Regional Center for Anti-Drug Intelligence (CERIAN in Spanish), opened in May 2019.

Some more controversial examples stand out, such as the FTC operations within TIPNIS for crop eradication (Ariñez 2017) or Umopar operations mainly in Villa Tunari, where clashes took place that led to the death of both sides (Valdés 2019). In the same location, the number of confrontations between coca producers and alleged traffickers with FELCN also grew. In March 2019, when the cocaine factories were seized as described above, Umopar was working on operation COLMENA, and the drug trafficking group ambushed two injured police officers and a dead civilian (Valdés 2019). Following the ambush, the FLCN acted in support of Umopar, confirming the presence of a group of more than 50 people involved in support of criminals carrying

high-caliber weapons, as well as pistols, revolvers and shotguns (*El Día* 2019). The ten Bolivians accused of leading organizers of illicit activities are responding for criminal association, attempted murder and illegal possession of a firearm. The accusation regarding involvement with drug trafficking is still under discussion. According to Carlos Romero, the country's government minister (*Ministro de gobierno*), it is the third time in the last 5 years that the FTC has ambushed illegal irregular coca eradication operations (Ariñez 2019). Since then, FELCN, FELCC, and police intelligence have acted jointly to address the issue, according to Romero. Another element to be taken into account is the greater role of the Armed Forces in combating illicit coca-related activities.

## *Climate Change and Emergencies*

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Bolivia is a country composed of great biodiversity and multiple ecosystems while being among the countries most affected by climate change. The definitive disappearance of lakes such as Poopó in Oruro, rising temperatures, landslides and climate anomalies have all been diagnosed in recent years, with consequences for the country's social stability. The El Niño and La Niña phenomena deserve special mention, as the major consequences and climate change are felt from both. Clear data is still lacking for us to understand the intensification of the two phenomena and their relation to the accentuation of climate change in Bolivia; It can be noted that since the end of the twentieth century, the two natural phenomena have intensified - and it seems to be related to terrestrial heating (BMI 2015). In addition, climate change in the country has also caused the emergence of diseases in previously non-endemic areas such as malaria and leishmaniasis (Magrin et al 2016). In addition to the dramatic security impacts that leave diverse populations and communities without access to basic livelihoods, climate change has had truly structuring effects in Bolivia: changing water flows, land-related behavior, loss of biodiversity - impacting even the mode of production and land use (Magrin et al 2016; UNDP 2011). It can be said, therefore, that it is a disruptive element for political and social organization.

The main object here is the flood and heavy rainfall climate stressors and their impacts on the Chapare region. It is worth pointing out that rainfall imbalances are among the most notable consequences of climate change. During the high season (from December to March), precipitation became more abundant, extending to April, while from September to October there were deep reductions, with a further increase in the degree of precipitation in November (UNDP 2011). Chapare is the scene of some of the most dramatic climate change in the country. Although this is a high volume of precipitation, considerable growth can be observed lately. The region is also located in one of the country's most dangerous flooding points. According to a UNDP report (2011), around 1000 families have lived there in regions at constant risk of river overflow since 2011, when the situation only got worse. At least once a year, rainfall has been heavier than usual since 2014, causing flooding and destroying the region's infrastructure.

In January 2014, Chapare was historically flooded when 11 rivers in the town overflowed and affected more than 20,000 families (*BBC* 2014). The department of Beni, bordering Chapare, was also affected by the incident (Sistema de las Naciones Unidas e Cruz Roja Boliviana 2014). In

January 2015, the municipalities of Villa Tunari and Shinahota, home to one of the main regulated coca markets, were flooded by the September 24 river overflow, affecting 600 families and 1589 hectares of cultivation (*Los Tiempos* 2015); other municipalities, such as Chimoré and Puerto Villarroel, also entered a state of emergency due to rain and flooding. By December, the dead and missing were reported in Cochabamba and Beni due to rainfall and river overflows (Pérez 2015). In March 2016, the Chipiriri River overflowed.

In January 2017, nearly 2,000 families, mainly riverside families, were affected by the depletion of rivers such as Chapare, Mamoré, Beni, Ichilo, Yacuma, Acre, Madre de Dios and Tuichi in the Cochabamba, Beni and Santa Cruz departments (Aliaga 2017). In the same year, heavy rains lasted until April, a month when overflowing rivers such as Sajta, Ichilo, Ivirgarzama, Sabala and Chancadora affected more than 20 communities and 5300 families. Not only communities were affected, but also roads, livestock and other crops, and the local market. In the previous month, the landslides due to rain had left nearly 30 dead and 15,000 families affected in Bolivia. In January 2019, according to the Cochabamba government, the overflows of the Chapare and Isiboro rivers affected more than 7,000 families, the production of over 10,000 hectares of bananas mainly in the cities of Tunari, Chimoré and Puerto Villarroel (Ariñez 2019).

Above only some of the most striking cases of flooding in the Chapare region have been reported. Since 2014, every year there have been dramatic situations involving rainfall and river overflows, which have systematically damaged bridges, roads, crops, and especially placed entire communities in conditions of deep vulnerability. In addition to more structural elements linked to climate change in Bolivia, the literature has pointed to local elements of Chapare as influencing the calamity that has unfolded in the region. Firstly, it should be noted that the region's soil has been damaged mainly due to deforestation for the expansion of agricultural crops - especially for coca leaf cultivation. This causes the loss of depth in the region's rivers by the accumulation of sediments that were previously held by trees. The region's soil has also lost its ability to channel rivers, bringing another dramatic element to the floods

Much of this materializes in TIPNIS - and especially in Polygon 7. TIPNIS's native populations have constant conflicts with the expanding *cocalera* population in the region. In order to try to build capacity for mediation between the two social sectors, a new instrument for organizing native populations was created - the *Consejo Indígena del Sur* (CONISUR in Spanish). This has not, however, eliminated local contradictions - especially regarding the land exploitation model and the possible limits to coca plantations in the region. It is in the midst of these tensions that climate emergencies develop.



# CONCLUSION

This text is an essay about an ongoing research. It was attempted to analyze the impacts of climate change - with particular attention to flooding and heavy storm - for a specific security issue - the spread of coca-related crime in Chapare. The impossibility of drawing direct correlations between the two variables was announced. After all, when dealing with complex social phenomena, it is impossible to find unique variables that prove to be triggers for the outbreak of violence. However, the research provided an understanding of what the indirect relationship is between the two phenomena mainly from the notion that climate changes affects the livelihoods of people in vulnerable zones. Flooding and heavy rainfall have been found to affect living conditions in the region. In addition to the transformations in natural resource dynamics, which are now being contested with less opportunity costs due to calamity situations, it was noted that flooding, river overflows and storms also affected infrastructure and trade - consequently, the economy - of local communities. If climate and security breach cannot be directly correlated, it can certainly be said that the dismantling of the social structure that guarantees access to income for citizens is an element that helps them move towards irregularity and illegality.

In Chapare, social conflict is latent. From collectively organized *cocaleros* - historically marginalized and who, with the election of Morales, managed to reach some state apparatuses - to original communities that claim for themselves the totality of TIPNIS and denounce the exploitative character of the government - all these are elements that put the Chapare in the center of some of Bolivia's greatest political disputes. The combination of natural resources and their tense relationship with the central

state and social mobilization was already enough to be a space with tensions. The cultivation of coca leaf and all its significance, however, has been causing new problems. What can be seen is a region whose risks of conflict eruption that mobilize the use of force are high. More than that: it was noted that flooding and intense storms have altered the relationship of individuals with the territory, with the economy and with the social production of space - which intensifies an existing social conflict and brings new dynamics of criminality to the region. Climate emergencies are therefore multipliers of the threats of conflict in Chapare. What's more, by helping to lead to the expansion of illegality, the two processes not only link indirectly, but also malnourish each other - as the growth of irregular coca cultivation directly impacts soil deterioration, increasing the chances of overflowing rivers.

Chapare's panorama of illegality linked to coca cultivation cannot properly be called organized crime: neither does the Bolivian government know how to define the characters involved in the observed scenario. Vague names such as "alleged traffickers" or "narcos" are used. However, between 2015 and 2019, there was a complexification of the legality / illegality relationship in Chapare. One of the great examples of this is the alleged action of the San Rafael union in illicit activities related to cocaine production and transportation. It can be understood that it is a phenomenon that is in its infancy and that it is a process that is being systematically aggravated by climate emergencies. Understanding and analyzing it involves understanding the territoriality and climate change in the region.

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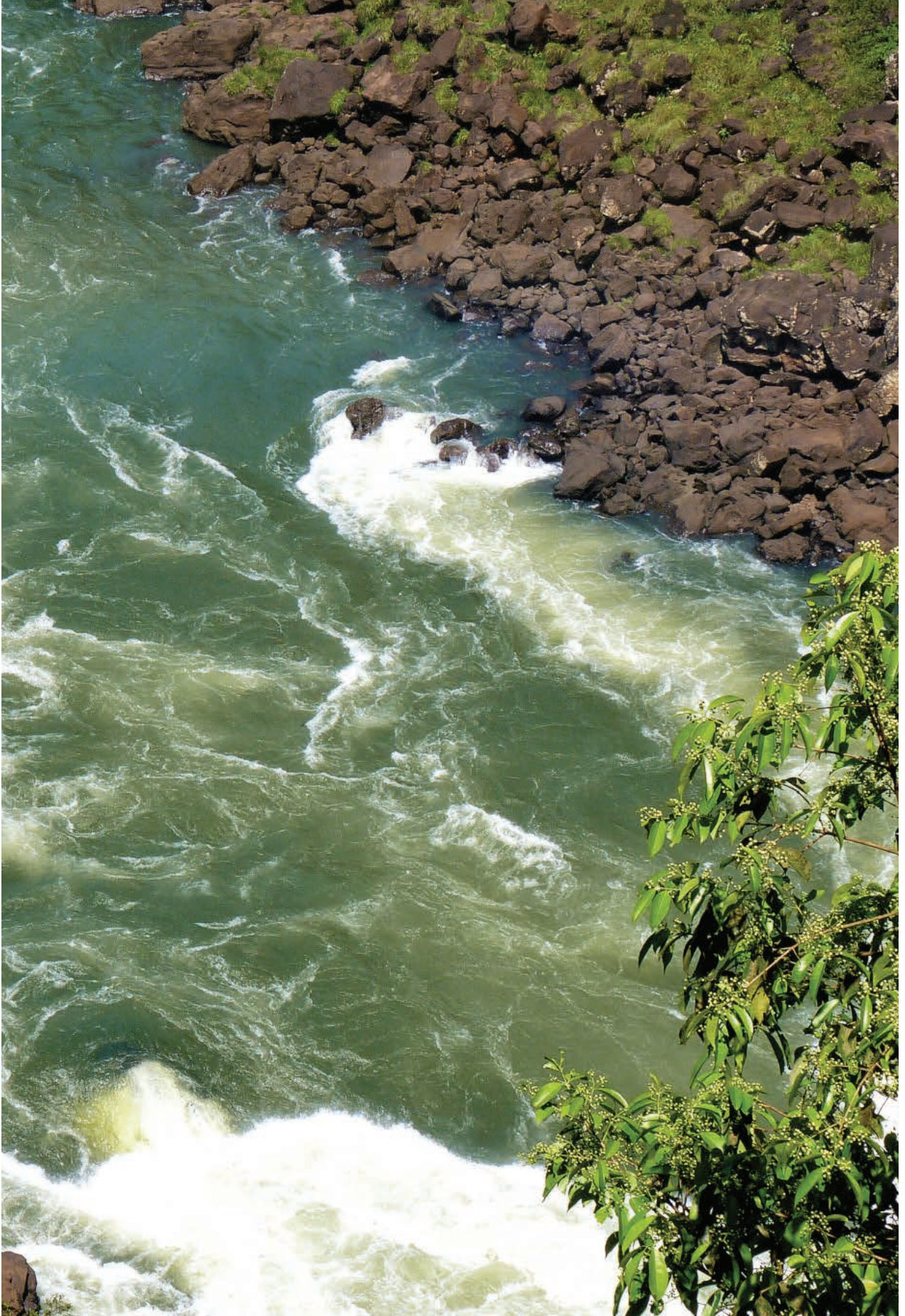
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Iguaçu river. Photo: Diego Silvestre

# TOWARDS AN INTEGRATED GOVERNANCE OF TRANSBOUNDARY AQUIFERS IN SOUTH AMERICA: BALANCING SECURITY, HUMAN RIGHTS AND TERRITORIALITY

Beatriz Mendes Garcia Ferreira

## ABSTRACT

The present research aims to address the conjunctural scenario related to the governance of South American transboundary aquifers, through the perspective of water security and human rights. To this end, it will discuss the impact of climate change on the South American's aquifer systems, while understanding the structural challenges posed to this region countries in the face of a humanitarian and economic crisis scenario triggered by global water scarcity. Thus, considering this conjecture, and understanding the importance of protecting these large potable water reserves and democratizing the access to these sources, we will address the current debate in the international forums, related to

the status of water as a human right, as well as the consequence of this debate on resolutions related to the management of transboundary aquifers. Therefore, understanding that this conjunction of factors contributes to the definition of the panorama of this theme, as well as its extent, it is considered that the projection of the challenges brought by climate change, as well as its geopolitical consequences, situate South America as a region with a major importance in the implementation of an integrated and effective governance of this strategic water resource, due to the fact that the region holds the two largest aquifer systems in the world.

Keywords: **climate change, South America, aquifers, security, governance.**

# INTRODUCTION

The continuous movement that guides human beings' relationship, as an individual and a social agent, with the environment in which he operates can be addressed through Hannah Arendt's<sup>1</sup> concept of *vita activa* and its symbiotic connection to the human condition. Consequently, the need for social organization is fundamentally associated with the actions of man's *bios politiko* involving the surrounding environment. Thus, it is possible to observe that the interaction between human beings and nature permeates all levels of the human condition, insofar as it is necessary for the maintenance of their own existence.

Based on this premise, it can be said that water is emerging as a key element in the 21<sup>st</sup> century. Because it is fundamental to life in all its aspects, it is established as a strategic and irreplaceable element, unlike other natural resources, which makes it the most valuable and threatened resource in the long term, an object of disputes and conflicts (Chellaney 2013).

As a consequence, the contemporary water resource dilemma is fundamentally related to the escalating security challenges of states and organizations. One of the main axes of this discussion regards to transboundary aquifers, which corresponds to a recent theme that catalyzes a series of resolutions and policy formulations aimed at the effective, strategic and cooperative governance of this resource.

Another axis on that matter that has been generating recent debates is the correlation between aquifers and the permanent threats brought by climate change. In this sense, groundwater is a vital element for the terrestrial hydrological cycle, as well as being of central importance for the support of streams, lakes, wetlands (UNESCO 2015: 3). Consequently, there is a growing concern about the extent to which climate change

may affect the intensification of water scarcity in several regions, including the quality of the natural process of recharge, discharge and storage of aquifers.

From this background, the theme to be developed in this paper is the governance of transboundary aquifers in South America, as the region emerges as the largest holder of freshwater reserves on the planet, largely due to the volume and capacity of replenishment of water from its aquifers (Bruckmann 2011).

Therefore, the object of the research is to indicate the importance of governance based on cooperation between the countries of the region, which takes into account the security challenges posed by the increasingly tangible global water scarcity scenario, as well as the opportunities to establish mitigation measures over the impacts of climate change. Because large aquifer systems have high strategic value, given their volume and extent, these transboundary waters make most South American countries mutually dependent and responsible.

In this manner, the methodology will focus on a broad bibliographic research, emphasizing mainly on the discussion of the relationship between water security and climate change, as well as its impact on geopolitical issues. Likewise, the importance of guaranteeing this resource as a human right will be listed, considering the structural inequalities of the region.

In general, essential factors for effective governance will be considered, bearing in mind the natural characteristics of transboundary aquifers and their importance to sustain ecosystems, as well as their relationship with food and water security. Also, the importance of establishing territoriality as a strategic factor will be addressed, balancing between governance, infrastructure and social issues, all priority factors to be adopted by public policies.

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1 The reflection based on the definition of the *vita activa* expression is brought by Arendt in her book *The Human Condition*, based on the concepts brought by Aristotle, defining two spheres for human activities: *oikia*, family and private life, and *polis*, common life and space for political debate. It is within the framework of the *polis* that man develops his *bios politiko*.

# WATER SECURITY AND CLIMATE CHANGE: GEOPOLITICAL DIMENSION

## *Conceptual Formulations and The Connection to Impacts of Climate Change*

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As one of the main contemporary global challenges, protection against threats related to water security and disputes over water resources has led to the need for a strategic planning aimed at preserving potable water sources. Consequently, the conceptual debate on this issue is relatively recent.

One of the first milestones regarding the formulation of this concept was put on the agenda in the document produced at the II World Water Forum (FMA 2000), which establishes, with the participating community, the common goal of thinking about water security in the 21<sup>st</sup> century. According to this document, such an objective can only be achieved through sustainable development and efficient public management, which must be guided by affordable access to safe potable water and the protection of those in exposure (FMA 2000).

In this sense, water security concerns risks and threats that may cause different levels of environmental, social and economic impacts. These include scarcity and drought, leading to a lack of water to meet the short and long-term demand of individuals and industries. In addition, there is a risk of a declining water quality as well as flooding, and the risk of deterioration of freshwater systems, causing irreversible damage to the hydraulic and biological functions of surface and groundwater (OECD 2013a).

Such water security paradigms are associated with the global agenda of the environmental sector as the impact of climate change becomes a possible focus of international systemic destabilization. This is because climate change catalyzes complex interactions between climatological, environmental, economic, social, political and institutional processes (European Commission 2009). These include the destruction of ecosystems, which comprise the problems caused by pollution, as well as energy insecurity issues, caused mainly by the scarcity of natural resources and food security problems, stressed by hunger, poverty and loss of soil fertilization (Buzan et al. 1998).

One of the most recent provisions aimed at this purpose is the Paris Agreement, a multilateral pact signed with the central objective of articulating measures to slow down and prevent the impacts of climate change, especially at the national level (UNFCCC 2015).

This agreement was widely adopted to by the South American countries at the time of its conception in 2015. Although the implementation measures in the Agreement provide for the distribution of responsibilities through Nationally Determined Contributions (NDCs), there was some consensus at the time that there would be an effort on the part of the region's governments to pursue economic growth through the sustainable development alternative by fostering the low carbon economy (Pontes 2016) and protecting vital natural resources such as water.

However, due to changes in the political and economic scenario in most South American countries, the implementation of NDCs is likely to become a major challenge in the coming years. This shows that South American countries do not always take the same stance on climate change (European Commission 2009). Since there are economic and geographical disparities, there are also differences in how to deal with vulnerabilities and economic dependence on fossil fuels, highlighted by the level of asymmetry in the energy matrix of these countries.

The threats posed by climate change in South America concern primarily the rise in temperature and the risk of decreasing soil humidity as a consequence. One of the biggest risks is the decline in food productivity, especially for livestock and agriculture, which would further increase the rate of hungry people in the region (IPCC 2007). In addition, changes in precipitation patterns and the risk of glacier disappearance would significantly reduce the availability of water for human consumption and other subsistence activities (IPCC 2007).

The previous arguments demonstrate an increasing need for governments to take a more proactive approach to managing water security and climate change issues, which are increasingly placing themselves as turning points on the global agenda. The process of adaptation and the adoption of long-term measures will require assertive planning, as well as water governance that takes into account climate variability and risks to water systems that must be minimized (OECD 2013b).

Specifically, the risks posed by climate change to groundwater will be significant for this century. The reduction in the reserve level of this resource, due to the change in rainfall periodicity, which is mainly responsible for the recharge process, may permanently affect the hydrological cycle and the quality of water resources (Treidel et al. 2012).

In this sense, the importance of aquifers is primarily that of the supply of drinking water in times of greater demand, especially in periods of drought when the availability of surface water resources is low (UNESCO 2008). Globally, this resource is to be found in a state of crisis, caused by excessive

extraction in arid and semi-arid regions (UNESCO 2015). Similarly, there is the process of urbanization, population growth and changes in the use of land as potential aggravating factors for aquifers as a result of climate change (UNESCO 2015).

Some of the major threats to aquifers that policymakers must address are also related to short-term effects of human action and long-term climate change, such as mining and surface water pollution in general (UNESCO 2008). An example of this is fracking, which is characterized as a process of drilling the earth through the injection of water and other chemical components under high pressure for oil and gas extraction. This practice is potentially hazardous to aquifers as there are serious risks of contamination and long-term social impacts.

In South American countries, this practice is increasingly more developed for the exploration of unconventional hydrocarbons, as exemplified by Argentina in the Vaca Muerta region of Patagonia, with extensive exploration of shale gas reserves. In Uruguay, in 2017, the government banned fracking over the next four years, understanding that this mechanism, among other factors, would endanger the Guarani Aquifer.

In general, human actions and climate change can affect aquifer recharge, discharge and storage processes as they affect the storage conditions of aquifers, especially when the water table approaches the ground's surface and the plants' roots (UNESCO 2008).

Considering the importance of aquifers in improving access to clean water, sanitation and hygiene, as well as their use in agriculture and industry, this resource has been neglected for some time in development strategies and projects. The importance of aquifers for adaptation measures, especially transboundary aquifers, which in great number are large water reserves, shows a promising perspective for groundwater governance (UNESCO 2008). Therefore, these adaptation measures should be appropriate to the water security challenges of a given location.



When dealing with transboundary water resources there must be a contribution and implementation of proper management, thereby having an integration axis (Peña 2016). So, the main challenge for governments is to concentrate efforts on this

subject, mutually conditioning different public policies related to water, and guiding sustainable economic development.

## *Geopolitical Dimension*

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21st century geopolitics is being increasingly shaped into a reordering of agendas and priorities, where climate and security issues are central. The agenda of climate change impacts for the coming decades is related to the adaptation of key sectors for the global economy and society, such as energy transition, food security and water security. This convergence can occur within the Paris Agreement process or through other policy initiatives (Dalby 2017).

The fact is that the worldwide configuration that is built up around the climate change topic is marked by ambivalence in the political and security sectors regarding decision-making processes. This implies a changing context of cooperation (Dalby 2017), in which the global climate agenda will be focused on articulating the implementation of national or regional adaptation and mitigation measures, aiming at global outcomes. Otherwise it will generate interstate conflicts mainly due to the context of resource scarcity.

Regarding to water, it is important to recognize that disputes, armed conflicts and, consequently, internal and regional crises resulting from the demand for this resource are fundamentally related to its appropriation and commercialization (Chellaney 2013). This potential accumulation of tensions increases further when cross-border water resources are included in this agenda, as the degree of conflict and competition between local units and nations tends to be intensified as a result of the division of this good, which may increase dependency or the asymmetric power interactions of some states relative to others in a given region (Chellaney 2013).

Insofar as two or more sovereign states share this common good with diverging interests, the conflicts for water sources may be intensified. At present, some of the conflicts that exist over ground or surface water are caused by its appropriation, commodification and control of one state over another. These factors contradict the logic of good governance and are part of the process of geopolitical and ecological disorder (Bruckmann 2011).

# TRANSBOUNDARY AQUIFERS: DEMOCRACY AND TERRITORIALITY

## *Transboundary Aquifers in South America*

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The existence of three large aquifers - the Amazon Basin, the Maranhão Basin and the Guarani Aquifer System – along with a large affluence in its water reserves (which show a high supply capacity), South America is the region with the largest availability of freshwater reserves in the world (Bruckmann 2011). As a result, almost a third of the world's renewable water resources are in the region. Since the region's most important aquifers are cross-border systems, there is a need to promote integrated infrastructure and distribution policies and agreements. However, in practice, poor infrastructure networks make supply difficult, especially in desert areas (Puri and Aureli 2009), where scarcity and high prices become an imperative of exclusion.

On the other hand, some regional cooperation agreements are present, especially in the Southern Cone. In this sense, although it shows a low degree of institutionalization - with few effective responses towards integrated management of transboundary water resources, Mercosur has begun to address the issue through the establishment of an Agreement on the Environment (1991), which includes a provision related to "Sustainable Management of Natural Resources", including water resources (Ribeiro 2008).

Regarding the transboundary aquifer agreements, recently, in 2010, the organization launched the Mercosur Agreement for the Guarani Aquifer System

(SAG, in Portuguese), which "establishes a set of rules for the development of conservation and sustainable use of SAG's resources, respecting the territorial domain of each party over the portions of the aquifer" (Senado Federal 2017). Among the document's guidelines, the commitment to transparency and the fostering of an administrative structure for the region both stand out, making it an important institutional basis for implementation in the region. However, since the management and administration of the SAG in some countries such as Brazil is done through subnational units, there is a volatility in overseeing the protection and sustainable use of this aquifer.

Considering the topics just described, one of the main variables related to the governance of this resource is equity, an essential concept for determining the level of cooperation between states that hold a particular aquifer. It is also essential for the negotiation and ratification of any shared-water governance agreement, since it shall be a factor used to identify and respect measures that show an equivalent impact on each party to the agreement (Brooks and Linton 2011). Another variable is the economic efficiency of shared water, considering that in order to be successful in the long term, each party to a water sharing agreement needs to be certified that others are using their share of the resource efficiently (Brooks and Linton 2011).

## *Water as a Human Right*

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Nowadays, much of the world's population, especially the most vulnerable, is still subject to the highest mortality rates due to inefficient water management or unequal distribution of this service (Castro 2016a). This articulation between water governance and citizenship involves structural aspects, such as the development of water property rights and the institutions that govern water management and its related services (Castro 2016a).

Thus, the recognition of the human right to water was only put to a vote at the United Nations General Assembly (UNGA) in 2010. From this event emerged the Resolution 64/292 (United Nations 2010), which deals with the human right to water and sanitation and acknowledges that the right to clean potable water and treated sewage is essential for the complete development of life. In addition, it assigns responsibility to states and organizations in promoting financial resources, capacity building and technology transfer in order to enhance accessibility (United Nations 2010). Accordingly, the advancement of the results of this resolution, despite controversies regarding its breadth and lack of implementation, offers an opportunity to rethink and reconfigure the

priorities and mechanisms to be adopted in the post-2015 UN's sustainable development strategies (Castro et al. 2015).

With regard to transboundary aquifers, it is important to highlight that in recent years, the growing relevance of these large freshwater reserves and the ensuing debate on the challenges of defining a convergence point for the establishment of cooperation agreements. As a result, an integrated management of this resource demonstrates the urgent need to develop mechanisms to protect these aquifers as a means of maintaining the sovereignty of the natural resources of states that share this asset in order to secure these reserves for future generations.

Therefore, the biggest challenge is attributed to the complexity of management, regulation and the guarantee that this good is destined to the basic needs of the population in an equitable way. Although of the utmost importance, subregional discussions of cooperation on transboundary aquifer management and governance are relatively recent, producing few resolutions and regulatory norms.

## *Territoriality as a Strategic Factor*

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The concept of territoriality can be defined as the determination of the political field of action within a physical space, manifesting itself as a kind of geography of power. In this sense, the political extract of social activities projected in a space permeates territoriality, organized under a dialectical process resulting from the society-space-time relationship (Costa 1992).

The subjectivity and complexity that constitutes this concept is understood here as a strategic factor for the relationship between state and natural resources,

concerning the jurisdiction that the former exercises over the latter and the social groups that compose it. This implies that geographic issues permeate social, political and economic factors, revealing in many cases the asymmetrical character of power to the detriment of social movements that defend the right to access land and vital natural resources such as water.

This notion about the concept of territory was also explored by Carlos Walter Porto-Gonçalves (2009), stating that new territorialities are necessary according to the changes of time and space

paradigms (2009: 157). Hence, this reinvention of territories indicates that land is not only a means of production, but also, from a different rationality, becomes the basis of another form of social organization, founded on collectivity and a real use of natural resources (Porto-Gonçalves 2009). This

implies, for example, the attempt to link science with the ancestral knowledge of native peoples and with nature-based innovations, such as harnessing resources and biomes for research and the generation of a sustainable economy.

## CONCLUSION

The debate on surface and groundwater currently comprises a latent political issue in multilateral institutions and is progressively taking a leading role on the global agenda in the face of the increasingly manifest threats of climate change.

As one of today's most relevant geopolitical issues, climate change shows a close relationship with water security issues, leading to a need of strategically thinking about adaptation and mitigation measures to protect ecosystems and potable water sources, aiming at the final goal of ensuring human survival.

In this sense, it should be emphasized that universal access to water as an inalienable human right is of great importance for the democratization of access to this resource. However, universal access to this asset depends on effective distribution policies, infrastructure improvement and sustainable technical-scientific development, based on the environmental dynamics themselves.

In the case of transboundary aquifers, the issue becomes more complex as fundamental questions arise, such as how states, regions and subnational units can create axes of cooperation for the promotion of equitable and sustainable management and use of water, taking into account the risks and consequences of climate change.

Consequently, the scenario that has been shaped up in this century is that of cooperation in the shared management of this resource, aiming at a strategic articulation for the use of groundwater for sustainable development. In contrast, there is also the projection of crises and conflicts by the control of transboundary groundwater extraction, generated mainly by the aggravation of water scarcity.

Therefore, the current challenge for the governments of South America is to concentrate their efforts on this subject and to mutually determinate the different water policies, since the irrational use of this good implies the permanent loss of important reservoirs that have the capacity of supplying humanity for decades, besides causing border destabilization.

However, the current scenario puts at risk social groups that are part of a network to defend land rights and access to water. In this sense, the strategic knowledge is ignored - something that could be incorporated into the empirical knowledge and that relates not only to the environmental agenda, but also to the defense of life itself.

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# CLIMATE AND SECURITY IN BRAZIL: THE ROLE OF THE PRESS IN THE DISCUSSION AND PROMOTION OF PUBLIC POLICIES

Eloisa Beling Loose

## ABSTRACT

This exploratory article aims to understand how the concept of security has been used in the context of climate change by the press in Brazil to discuss its role in promoting public policies. Besides bibliographic research, the paper presents a descriptive and interpretative analysis of the uses found in the two main Brazilian news sites, *G1* and *UOL*, from December 2018, at the event of the last Conference of the Parties - COP, until May 2019, totaling six months of coverage. The text articulates journalistic practice, its relationship with the perception of climate risks and its influence on

the formulation and implementation processes of security-related public policies. Among the results found, it was verified that the expression “climate security” is scarce in the analyzed vehicles, as well as its tensioning in the scope of Communication studies. Thus, the contribution of the press to the advancement of public policies on this topic is still shy, despite its potential for amplification and public debate. In the case of climate change, risk coverage is disconnected from the security and / or prevention debate.

Keywords: **journalism, climate change, security, climate risks, public policies.**

# INTRODUCTION

Climate change is increasingly noticeable in the daily lives of citizens, but the response to such consequences remains vague. The Intergovernmental Panel on Climate Change (IPCC) has been reiterating the need to act to prevent the average rise in global temperature (reducing greenhouse gas emissions) for years.

In this scenario, the understanding of people about climate risks - and hence the means to address them for security - becomes extremely relevant. And the press ends up exerting a strong influence on this mediation, either through silencing or through a more incisive and systematic approach. In addition to individual actions, journalism influences the different stages related to public policies and state action mechanisms for social development, from setting the agenda, through the evaluation and selection of options, implementation and monitoring. Pentead and Fortunado (2015: 140) point out that “there is media interference on the public policies cycle, especially in democratic societies where the media are central to social relations, such as is Brazilian society”. Similarly, Miguel (2002: 171) underlines that “the media has the capacity to formulate public concerns”, guiding the themes that will be seen as the most important of the day for both citizens and politicians, who will be forced to position themselves or respond to the demands exposed by the press and the delivery of narrative schemes (frames) that favor some interpretations over others.

A survey made by Ipsos Institute (Earth Day 2019) reveals that the majority of the interviewed (37%) perceives global warming as the main environmental problem today, a growing number in comparison to the perception identified in 2018, when the topic topped concerns with 30% of the answers, but

tied to two other problems (air pollution and dealing with the amount of waste generated). In Brazil, the most important theme is deforestation, with 53% of the answers. In this theme, Brazilians are the most concerned among the 28 countries consulted.

Datafolha’s latest research on climate change (2019) shows that 85% of the Brazilians believe that the planet is getting warmer, although the level of information on the subject has decreased over the decade. Within the portion that believes that the planet is getting warmer, 72% say that human activities contribute a lot to this warming.

Such perceptions derive, in part, from the visibility or invisibility that journalistic media provides about environmental issues. The work of the press is a fundamental link between politics, science and society. It has the potential to amplify the discussion and foster the construction of public policies, but few studies have focused on how climate security is being presented through journalism or who are the social actors being made visible in the public sphere to address the link between climate and security.

The purpose of this research is to identify how the press has been portraying climate security in Brazil, highlighting the actors who have repercussion on their speech. Therefore, in addition to bibliographic research, the content on the theme published in *G1* and *UOL*, the most accessed Brazilian sites, according to the Digital News Report 2018 (Newman 2018) was analyzed. The analyzed period totals six months and comprises the last Conference of the Parties to the United Nations Framework Convention on Climate Change (COP).

# BRIEF BRAZILIAN PANORAMA

Brazil is among the top ten Greenhouse Gas (GHG) emitting countries and has historically played a key role in climate discussions. Obermaier and Pinguelli Rosa (2013) point out that, within the Climate Convention, the country had an important role in establishing the Clean Development Mechanism and other flexible mechanisms, as well as contributing to the discussion of historical responsibilities and presenting a self-inflicted commitment at COP-15 to reduce between 36.1% and 38% of their projected emissions by 2020. This commitment is mainly supported by the reduction of deforestation and the increased use of renewable energy, and is compatible with the National Policy on Climate Change (Brasil 2009). The fact that Brazil has 60% of the Amazon rainforest in its territory is another aspect that makes it evident in the debate of climate change in the international scenario.

Even so, Brazilian coping strategies (including mitigation and adaptation) to Changes are not widely known – and much less taken into action. Mitigation, which seeks to reduce or remedy the adverse impacts of climate change, was the initial approach taken by the Brazilian government, but, according to Obermaier and Pinguelli Rosa (2013), adaptation measures have only been incorporated in recent years. According to the National Policy on Climate Change, adaptation consists of “initiatives and means to reduce the vulnerability of natural and human systems to the current and expected effects of climate change” (Brasil 2009), being necessary to the construction of climate security, a list of actions that seeks to combat the direct and indirect negative effects related to climate change. Both strategies, mitigation and adaptation, have a preventive aspect and are included in the discussion on security against climate risks.

Warner and Boas (2017) point out that securitization enters the climate issue aiming at mitigation and adaptation measures among the international community based on arguments related, above all, to migration. Managing the context of the climate change will be the main challenge of our societies, according to Welzer (2010), who points to wars for natural resources, such as water and soil for cultivation or exploitation. For this author, the displacements and migrations that will be forced by climate change tend to generate tension in those countries (or regions) with greater capacity to adapt to the process. Such a situation would not only mobilize disaster and risk reduction plans and strategies to create conditions for staying in more vulnerable places, but would also include military action.

However, it must be said that the current federal government, which began its mandate in January 2019, runs counter to what Brazilians think and the country’s history in discussing the climate. Environmental public policies, in general, are being dismantled, making the Brazilian agenda incompatible with the urgent need to act in the face of the climate crisis. The Climate Action Tracker Consortium, made up of scientists and research NGOs to monitor progress towards global climate stabilization, found that in just over 100 days in office, President Jair Bolsonaro distanced himself from meeting his goals in the Deal. Noting that a climate denier had been appointed as chancellor by that time, civil society participation in environmental councils had been cut, the budget cut for the Ministry of the Environment by 95%, among other actions that may be called environmental setbacks.

# CLIMATE SECURITY

Spratt and Dunlop (2019) warn that the worst-case scenarios of climate change are ignored (usually public policies start from intermediate forecasts, showing some resistance to more radical change), although their impacts and threats are already part of our reality. The document signed by the authors states that the effects of climate change on food and water systems, with reduced production and rising prices, were catalysts for social collapses and conflicts in the Middle East, Maghreb and Sahel, which resulted in migration to Europe. Thus, the acknowledgement of climate risks is essential to address security.

Security and risk are interconnected concepts. One seeks security when one is being threatened, when one perceives risk. Otherwise, one feels unsafe when assessing the vulnerability of a situation. Giddens (2010: 45) sets the following relationship: "Risk and insecurity are a double-edged sword. Skeptics say the stakes are an exaggeration, but the reverse situation is perfectly possible."

This author points out that the introduction of security into society is something that has been happening in recent decades and, therefore, the tendency to see more threats is higher than before. But of course, not all risks carry equal weight or seriousness. From a set of constituents such as beliefs, values, knowledge and contexts, each individual will be more concerned about some factors over others. The way risks are presented by the press (recurrence, emphasis, approach) also influences the way they are perceived.

Even if climate risk is dramatized and gives rise to momentary concern, it does not mean that concrete action will be triggered. Giddens (2010) points out that there are many risks and dangers competing for our attention and that the emphasis on the subject can have a reverse effect: since the subject is so serious, it may be better to stop worrying about it because there is no possible or appropriate solution.

Climate security can be addressed from specific trends focusing on water (water security), the access to food (food security) and energy (energy security). The term derives from the concept of environmental security (Buzan et al. 1998), which is concerned with the international security of regional and global problems. According to Viola:

Climate security refers to maintaining the relative stability of the global climate, which has been instrumental in building civilization since the end of the last glacial period - 12,000 years ago - significantly reducing the risk of global warming through its mitigation and promoting the adaptation of climate change. the international society and its national units to new warmer planet conditions and the more frequent and intense existence of extreme weather phenomena. (Viola 2008: 183)

In other words, climate security aims to minimize the negative effects of climate change intensification through mitigation and adaptation strategies, and it is a concept that is strongly associated with climate governance, "(...) related to the socio-political and economic management of climate issues" (Loose 2016: 170). It is recalled that climate governance practices have been mostly top-down and with an emphasis on adaptation, although developing countries cannot afford to implement this approach.

The discussion of climate security is also associated with the fomentation of the crisis idea, which amplifies the possibilities of visibility, urgency and prioritization of the theme in relation to other demands. Highlighting the threat or crisis is essential to make room for security discussion. The theory of securitization (known as the Copenhagen School), by discursively determining the framing of a given issue as an existential threat, acknowledges that there is a difference in the way it will be dealt with (either by the press or by political actors).

Just as risks can be viewed as social constructions (Douglas and Wildavsky 2012) and their definitions are based on criteria, the idea of crisis also involves selections. “As a result, not all major events are labelled catastrophe, while not all publicly declared disasters are major events. For a constructivist, whether something represents a crisis is a social decision” (Warner and Boas 2017: 210).

From this perspective, the social context, its values and the interests of the subjects who have the authority to define risks and crises need to be considered. Warner and Boas (2017), based on Buzan, Waeber and Wilde (1998), show that by presenting a problem as a risk to our existence, an opportunity opens up to establish exceptional measures to combat it. Thus, naming an issue as a crisis creates possibilities for breaking with protocols, rules and procedures that would not be permissible in a normal situation.

Clearly, in order for this to happen, this denomination needs to come from a place of authority, which may be someone from the government, a political representative, but also from the press - which has credibility among the public - or NGOs - who usually have moral authority. In addition to discursive articulation, concrete evidence (such as research or disaster) needs to reinforce this dynamic. According to Warner and Boas, “there is, therefore, political capital in the representation of a crisis and its solution, as a national or even global concern, rather than a particularistic one” (2017: 210).

While there is an alarmist discourse of the climate change, associated with the need for means of coping to ensure security, it seems that the responses to this crisis are of little significance. Warner and Boas (2017) argue that the amplification or dramatization involved in the theme has not

generated the expected securitization. While much is said about the need for climate security, it has little reverberation in international and national policies.

Emerging countries, such as Brazil, China and India, are the ones that most reject the security discourse on climate change, calling for caution in the link between security and use of natural resources (Warner and Boas 2017). However, given the precarious situation of island countries, these countries stand as supporters of the climate challenge, even though they are somewhat skeptical of more preventive measures. This position is linked to the perspective that there is a historical right to pollute.

Even so, there are some responses to climate change being implemented. Brazil has had a leading position in the climate change mitigation debates, but its action in terms of adaptation is quite fluid, as in most resource-dependent countries. Obermaier and Pinguelli Rosa (2013) also point out that adaptation strategies are usually adopted only by government policies, although adaptation actions should occur at all levels.

Barbieri and Viana (2013), based on literature review, state that there is a prevalence of mitigation measures in relation to adaptation in the urban environment and, even when there are adaptation strategies, their reach seems to be limited. Moreover, they say that coping public policies are often fragile in Latin America due to the absence or deficiency of a broad and participative debate with society, very technical proposals or the mere reproduction of actions from international organizations without proper articulation with the local scale.

# JOURNALISTIC COVERAGE

Internationally, the climate change got on the radar of journalism especially since the IPCC's emergence in 1988, when the subject got into political debate. Nevertheless, the agenda is not very comprehensive, persisting in the dissemination of scientific predictions and findings or in international meetings that bring together heads of state, such as the COPs. Boykoff (2011) argues that there are spikes in coverage, as happened in 2007, with the release of the 4th IPCC report and the release of the movie *An Inconvenient Truth*, and in 2009, with the holding of COP-15, one of the largest diplomatic meetings. of the story about which there were expectations about the treaty that would replace the Kyoto Protocol. At such times, there is a concentration of media attention on the subject, but it does not hold up on a regular manner.

Studies on climate change coverage in Brazil (eg. Rodas and Di Giulio 2017; Loose 2016) show that the theme is presented with global emphasis, from a political-economic and risk-centered perspective, disconnecting its readers from the reality they know. Vivarta (2010) coordinated a study with 50 newspapers from different Brazilian states, between 2005 and 2008, and verified a shift from the approach of risk, focused on climate impacts, to a more preventive approach, which focused on coping strategies. This framing change was not identified in the analysis of Loose (2016), based on the *Gazeta do Povo*, as the risk framing was dominant, but it is possible to infer that the process is ongoing, since the framing of the coping was the second most recurrent in the corpus of the researcher.

The fact that climate risks encompass uncertainties, high complexity and an idea of future entails, to some extent, psychological barriers to their coping, hindering concrete actions such as responses. Just as the proportion of climate risks can lead to paralysis, the discursive construction of a global crisis can generate inertia by believing that nothing more can be

done. Giddens (2010) states that climate change are set aside, because people cannot assign the same weight to something that is visible and present in parallel to what is invisible and future.

The difficulty of dealing with climate risks is no different in the field of journalism, which deals mainly with present and concrete facts. Reporting forecasts and projections, with portions of uncertainty, is always delicate. Kitzinger and Reilly (2002) state that the news media act better on retrospective than on prospective news, highlighting the lack of an anticipatory look at the problems that may affect us. When discussing ways of coping, this impasse encompasses the preventive aspect, little introjected in the news selection and composition criteria.

The daily coverage and the organizational system of subjects within the vehicles, usually by editorials, tends to give isolated emphasis to this theme, which is transversal to different themes. Bringing together different facets of the problem and connecting them palatably to different audiences remains a challenge for journalists, even when talking about a global crisis. Loose and Girardi (2018) reflect that it is necessary to review aspects of journalistic logic in order to contribute to the minimization of climate risks.

A more precautionary and preventive approach should be incorporated into journalistic practice in order to enable citizens to know the risks that threaten them and to take their actions consciously and responsibly. (Loose and Girardi 2018: 220)

When risks are not experienced, one of the main ways to become aware of them is through journalistic discourse. The media play a key role in mediating climate change by amplifying or minimizing their risks (Kasperson et al. 1988). However, either

because of the priorities assumed by governments, or because there are more concrete problems in Brazil (public security, education, unemployment, etc.), there is little climate coverage. Journalistic

discussion about adaptation and mitigation in Latin America is even more scarce, despite vulnerability to climate risks in that region (e.g. Takahashi 2013).

## ANALYSIS OF PUBLICATIONS IN 'G1' AND 'UOL'

In order to map what is being said about climate security, searches were made on the *G1* and *UOL* sites - the most accessed sites in Brazil - to retrieve as many publications as possible from December 2018 to May 2019. As the chosen vehicles have several publications per day, it is believed that six months is sufficient to reveal the journalistic treatment given to the theme, especially since it includes even the month of the COP.

Therefore, in an initial research the term "climate security" was used in search engines of the news sites themselves. After the low number of results, a new research was carried out with the following combinations: "security" + climate; "Energy security" + climate, "food security" + climate; and "water security" + climate. It must be clarified that the results obtained by the searchers of *G1* and *UOL* often brought results outside the chronological order and with repetition, besides presenting news with part of the expressed combinations (and, therefore, were not in the context of this discussion; the word security in many cases referred to the physical protection of an event or authority). The interpretation of the *corpus* was made from a descriptive-interpretative analysis.

The first finding is that the two main Brazilian websites hardly mention the term "climate security", which is a timid discussion in the Brazilian scenario. The search identified only one article in *UOL* during this period, "A New Itamaraty of Old and Dangerous Ideas for Brazil", an opinion column published on 18/01/2019. Already in the *G1* two news were found: "Climate change is the biggest global security concern", published on 11 February 2019, and

"How our brains disrupt the fight against climate change", from 25 May 2019; and an opinion piece called "Concern for Security Causes Military to Create International Council on Climate Change", 20 February 2019.

Therefore, the first result already signals the silencing of the subject. In another study (Loose et al. 2017), the press had been silenced in the face of environmental regarding journalistic logic, which seeks events - not predictions. Of the four texts found, two fall into the informative format (news) and two into the opinionated (blog and columnist text). The *UOL* text, signed by Alessandra Niro, criticizes the first positions of the current president, Jair Bolsonaro, in the area of foreign affairs, especially those related to the implementation of the 2030 Agenda. It is not a specific text on climate security, but it disapproves the decision of leaving the Global Compact for Safe, Ordered and Regular Migration, in which the country deals with migratory flows, many of them due to the climate change, and the government's own skepticism about the existence of global warming. The researched term "climate security" appears only once but is neither deepened nor explained.

In the other opinion text, published by the *G1*, Amelia Gonzalez focuses on the key theme of this paper when it comes to the creation of the International Military Council on Climate and Security (IMCCS). According to the publication, the Council will produce independent security and climate reports with the purpose of "boosting communications and policies supporting action on the security impacts of a changing climate - at the national, regional and

international levels. “ The author questions the fact that the Council has no members of the scientific community and assumes a role already played by the IPCC itself, and notes that US President Donald Trump, while skeptical of climate change, has a strong interest in the topic ‘security’.

To highlight this “watershed,” the author reports that the White House is setting up a Presidential Committee on Climate Security, to be led by William Harper, director of the National Security Council. The committee, among other things, will advise the president on how climate change can achieve US national security. According to the text, this is in line with evidence long discussed by environmentalists:

[R]esearch by the Austrian-based International Institute for Applied Systems Analysis (IIASA) showed for the first time a causal link between climate change, conflict and migration. The case of the war in Syria is emblematic in this sense, and has always been mentioned, but they had never done a study that clearly demonstrated this. Now there is one. (Gonzalez 2019)

The text signed by Gonzalez highlights a new approach to discuss the issue, via militarization - something not present here in Brazil - and calls for the need for dialogue between the many spheres that are trying to address climate risks. In other ways, it indicates a concern of the US government about the potential for conflict inherent in climate change.

The two informative texts that came into the analysis have quite different aspects, although they were published in the same place. One of them, “How our brains disrupt the fight against climate change”, does not cite the expression searched, but brings together the issue of security. The text is signed by Matthew Wilburn King of the BBC, which indicates for reproduction of news agency content - something common when it comes to the topic of climate change, as seen by Loose (2016). In this news, by listing consequences of the intensification of the phenomenon, risk and security are listed side by side: “we can expect increased risks to health, livelihoods, food security, water supply, human security and economic growth”. It is noteworthy that the expression ‘food security’ was more easily identified in the searches, but, in most

cases, it is only cited - without any context or direct explanation with the climate change. This text does not have strong resonance with the discussion that is proposed, but it exemplifies how little technical terms are explained to the public. It is believed that “human security” in this case was related to climate security, but there is no unfolding of the expression in the following of the text.

The other news, sourced from *Deutsche Welle*, was the only one found with the search expression as its central focus. From the title you can see the relevance given to the link between climate and security: “Climate change is the biggest global security concern”. The news subtitles: “Research shows that climate change on the planet is a security factor that most worries people in the world, followed by terrorism and cyber-attacks, and indicates increased fears about US influence,” which shows us the strength of the scientific authorities to indicate what most worries the population and allows us to relate U.S. military concerns to this construction process.

This article, while emphasizing the relationship between climate change and national security, does not discuss their causes and what could be done to minimize the current picture by merely disseminating research - another recurring problem when analyzing environmental news. The texts found lack further contextualization and signalling for viable solutions.

The second search, with more specific terms, resulted in more content. In the exploratory research done in *G1*, during the same period of time, eight different contents dealt with some kind of relationship between climate change and water, energy or food security; at *UOL* only two more were found. It is noteworthy that the texts that are taken into consideration here do bring the search words within the proposed debate. This sample will not be analyzed descriptively, but it indicates that the analyzed vehicles are approaching climate security in a fragmented manner, presenting news with more specific cut-outs, but belonging to the discussion of the interface between security and climate. This link is still fragile, but it offers a broad and interdisciplinary debate landscape that can mobilize various forms of coping with climate change and expand the perspective of prevention.



Among the actors that appear to address this link in Brazil are, above all, scientists, who point out climate risks and warn of the need to take effective and urgent measures, NGOs, which act at different levels to confront climate change, and political leaders and international institutions, such as the World Bank, who are committed to combating climate change

and look forward to economic development. This finding is in line with the general treatment that the climate agenda has received in the country, giving more room to international sources (especially due to the reproduction of news agency content) and ignoring researchers, activists and citizens who make a difference on a local scale.

## CONCLUSION

As much as Brazil is vulnerable to climate change and Brazilians show some concern about the theme, it is clear that there are many gaps in the communication, which originate in the scientific field, the main source of this subject, and in the political field. In Brazil, it seems that the climate agenda has been neglected, affecting the whole society through journalistic treatment. While understanding journalism as a key role in leveraging public discussion on climate security, this brief study reveals an informative void on the two most accessed news sites in Brazil, *G1* and *UOL*.

The climate risk frameworks persist, but the effect expected by the securitization theory of immediate and exceptional action to combat them is difficult to achieve. There are many forms of climate coping that can be associated with mitigation, adaptation, governance and security and their variables, but these responses need more space in the press and society. Generally speaking, there must be a turn to the question that journalism has difficulty dealing with what is prospective, and which is prediction. In this sense, there is some insistence on a review of “its modus operandi, (of) its present-day logic, since we are living in a future-oriented society” (Loose and Girardi 2018: 220).

In addition to other frameworks, other actors, those who experience the realities of each region of this country, need to be heard. There is a great need to increase citizen participation to include everyone in the fight against climate change. And for collective mobilization to address climate

challenges, journalists must first commitment to the public interest. News may contribute to increasing or reducing perceptions of risk, but also perceptions of security and prevention.

As Miguel (2002) argues, journalism plays a major role in shaping the public agenda, pointing out what is most relevant, and in the way audiences will interpret given issues through their work. Penteado and Furtado (2015: 137) point out that “the main element of the influence of the media lies in its visibility capability (or not) of the social problems, the alternatives presented, the options under consideration, implementation and the evaluation and monitoring of the results achieved by the public policies”, being crucial for the discussion and promotion of policies that guarantee the security or the proper coping with the climate risks.

This brief exploratory study identifies that, despite the potential in journalistic practice to promote and monitor public policies related to climate security, the analyzed vehicles have little news production on the subject and resort to international sources, with little contextualization and / or proximity to their own public. The Brazilian perspective on the subject is not given relief, is it being problematized too little. The discussion needs to be broadened and popularized to reach citizens globally and foster policy actions aimed at reducing climate impacts.

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River in Acre, Brazil. Photo: National Aeronautics and Space Administration (NASA) - 'Suomi NPP' satellite

# CLIMATE CHANGE AND SECURITY IN THE AMAZON: VULNERABILITY AND RISKS FOR INDIGENOUS PEOPLES ON THE ACRE-UCAYALI BORDER

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## ABSTRACT

This article analyzes the mechanisms causally linking climate change and human security. A common trajectory is found to be aggravation of pre-existing social vulnerabilities, occurrence of extreme weather events, institutional failures and / or predatory policy enforcement, and increased insecurity of specific population groups. In the Amazonian context, two similar cases are compared, in which floods on the Jordan River (Acre) and the Ucayali River (in the Peruvian department of the same name) impacted indigenous communities of the Pano language group. Case-specific dynamics have allowed

us to identify how public mitigation policies can distinctly affect the resulting insecurity depending on the point in the chain of events at which they are implemented. It was also possible to see how, in the face of institutional failures and even in the presence of powerful coalitions of interests against environmental protection and indigenous peoples, affected populations are able to formulate consistent responses that result in improved human security through demands and proposals for transversal public policies.

Keywords: **climate change, Amazon, Huni Kuin, Shipibo-Conibo, security.**

# INTRODUCTION

The insecurity of indigenous peoples in the Amazon is compounded by climate change and the actions and omissions of various actors in the region. The perceptions and struggles of indigenous groups about the nexus between climate change and security, as well as the speeches and silences of local, national and international governmental actors, constitute the empirical referent of the work.

This article seeks to answer two questions. What are the mechanisms that causally link climate change and the insecurity of specific population groups? What public policy demands related to insecurity can be identified in the case of the Huni Kuin (Kaxinawá) indigenous people in Acre and Shipibo-Conibo in the Ucayali, on the Brazil-Peru border? To answer them, the article was organized into three sections, followed by a conclusion in which we sought to include recommendations based on the research conducted.

## CLIMATE CHANGE AND INTERNATIONAL SECURITY: MECHANISMS

It is important to start with some basic definitions because the connection between climate change, global warming and international security is controversial (Mach et al. 2019).

In the World Bank's Climate Change Knowledge Portal glossary of terms, the phenomenon is defined as an observable transformation in the average and / or variability of climate properties over a prolonged period of time caused by natural and human factors (World Bank Group 2019). In turn, global warming is defined by the estimated increase in the average surface temperature of the planet (GMST) over a 30-year period, considered from a reference year or decade, in relation to pre-industrial temperature levels. (IPCC 2018).

Security can be defined as "a relative condition of protection in which one can counteract discernible threats against the existence of someone or something" (Cepik 2001). When it comes to living beings, anything that threatens life is a security problem. However, to avoid excessive expansion of the concept, it is necessary to link human insecurity

to the existence of violence. According to a definition adopted by the United Nations,

violence is the intentional use of physical force or power, threatened or performed, against oneself, another person or against a group or community, which results or is highly likely to result in injury, death, psychological damage, poor development or deprivation. (United Nations 2014: 84)

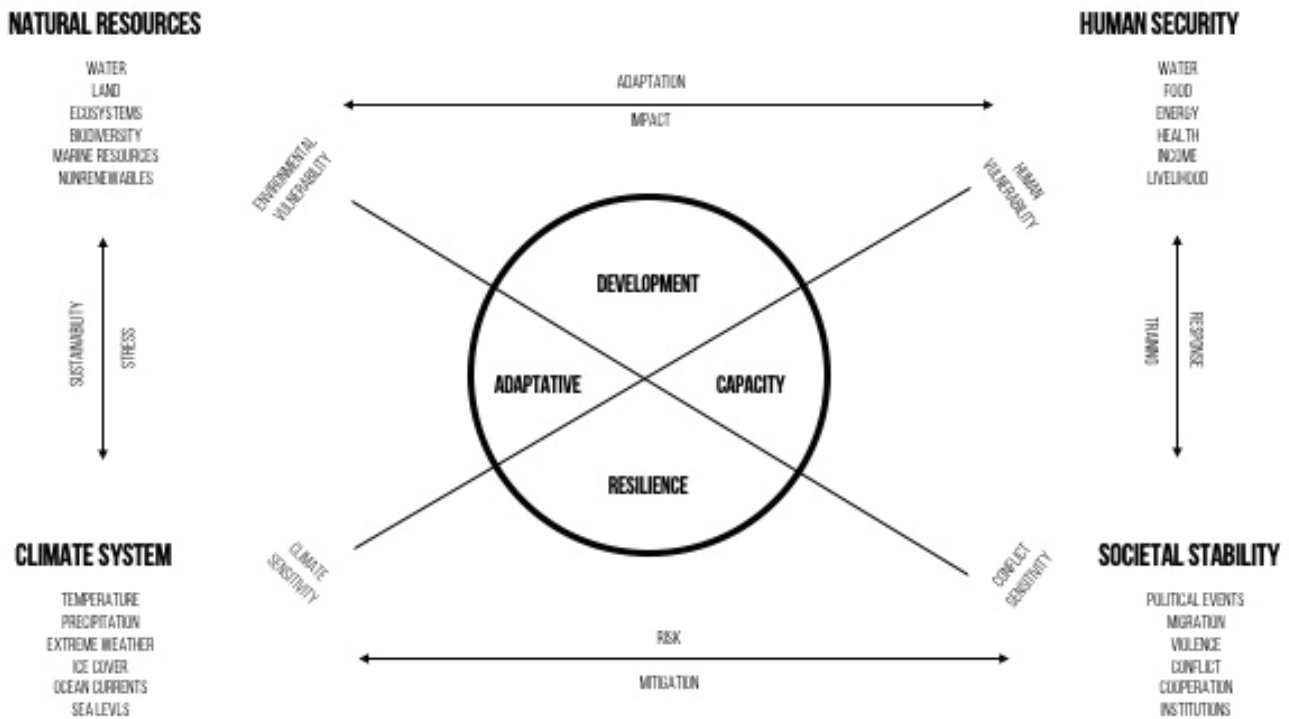
The intensity and scale (local, national, regional and global) of the causal link between climate change and international security vary significantly across different models and theories. For example, Thomas F. Homer-Dixon (1991) characterized the degradation of the environment as a result of human action as a direct (resource scarcity) or indirect (relative deprivation and identity) cause capable of increasing the likelihood of violent conflict involving affected social groups. Intervening variables such as social network institutions, technology and topology were also considered relevant to explain specific outcomes as well as adaptation and mitigation potentials (Zhang et al. 2007). There is no consensus

Expert opinions on future scenarios with nonlinear emerging properties. Still, in a study using a panel of 11 of the world's most cited experts on climate and conflict (expert elicitation), Katherine J. Mach et al (2019) identified climate change as a causal factor cited by experts at 3-20% of intra-state conflicts in the last century. In addition, experts' average estimate is that the risk of violent conflict will increase by 13% in 2° C global warming scenarios and 26% in scenarios approaching 4° C.

Recognizing that more research is needed, we provisionally adopt the model developed by Jürgen Scheffran et al (2012), summarized in Figure 1, for monitoring and evaluating the relationships

between climate change, natural resources, social stability and human security at different space-time scales. The model's premise is that security risks are causally linked to the unequal effects of climate change for different social groups and ecosystems. Vulnerability would be, even when there are no direct armed conflicts over scarce resources, the most important variable in contexts of uncertainty about future impacts. The degree of vulnerability would therefore depend on 1) the degree of exposure to climate change; 2) sensitivity to climate change; 3) adaptation and mitigation capabilities. Reducing vulnerabilities would therefore be the main focus of public risk prevention policies and mitigation of negative effects.

**Figure 1** - Diagram of Relations between Climate Change and Security



Source: Scheffran et al. 2012: 870

It is also worth adding one last argument about the dialectical relationship between vulnerability and threat. Extreme weather events, such as droughts, fires, storms, and floods, for example, do not constitute “threats” in the literal sense of the hostile intention to harm others. However, as the scientific and political consensus on the specific human causes of global warming advances, actions and omissions of the rulers and the powerful that cause harm (often irreversible) become malicious.

That is, environmental conflicts are not restricted to distributive and redistributive economic and cultural aspects involving natural resources. They are, ultimately, issues of life and death and, therefore, must also be analysed from the point

of view of international security. After all, since the United Nations Conference on Environment and Development (Rio de Janeiro, 1992) until the last Conferences of UNFCCC signatories (Bonn and Santiago, 2019), the international recognition of the collective right to development and the responsibilities differentiated in preserving the environment. That is why the Trump administration’s decision to remove the United States from the Paris Agreement is indeed a threat to global collective security (Zhang et al. 2017). Similarly, the disastrous actions and statements of the Bolsonaro government in the area of environmental governance directly threaten the security of the most vulnerable populations (Trigueiro 2019).

# AMAZON: ENVIRONMENTAL MISMANAGEMENT AND HUMAN INSECURITY

According to the World Bank’s Climate Change Knowledge Portal, the average annual temperature in Brazil has increased by about 0.7° C over the past fifty years (World Bank Group 2019). Moreover, all variables on drought and rainfall in Brazil are strongly sensitive to what happens to the Amazon in the coming decades.

The Amazon rainforest covers most of the South American Amazon Basin, but important ecosystems and the headwaters of major rivers are found in neighbouring countries. Overall, the Amazon plays an important role in the planetary carbon cycle, while being a vulnerable and sensitive region to climate change and global warming. The climatic, ecological and environmental stability of the Amazon rainforest is threatened by natural (including specific hydrological cycles of the western Amazon basins) and anthropogenic events, both global and local. Despite research carried out with different modelling,

“science still cannot pinpoint how close we are to a possible breaking point of ecosystem equilibrium and even much of the Amazon biome” (Nobre et al. 2007: 25). In the context of global climate change, it is estimated that the average temperature in the Amazon could rise to 4°C according to the models analyzed by Ambrizzi et al. (2007). According to Brandão (2019), currently the main changes reported in the rainforest are related to the amount and patterns of rainfall and deforestation.

In Brazil, the administrative region called the Legal Amazon (formed by the states of Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia, Roraima and Tocantins) covers 59% of the Brazilian territory, and about 23 million inhabitants live there according to the 2010 Census. The largest biome in the Legal Amazon is the equatorial forest. In addition to having more than 11,300 km of borders with seven countries and more than 25,000 km of navigable



rivers, the equatorial climate and the rain cycle (34% of annual precipitation comes from evaporation) positively affect other biomes such as the Pantanal, the savannah and even the Atlantic Forest.

As the largest of Brazil's six major biomes, with the largest biodiversity on the planet, large hydroelectric potential, mineral riches and cultural diversity (much of Brazil's indigenous population), the Amazon faces important challenges from the standpoint of sustainable development and human security. In recent decades there have been important institutional advances. As a result, there was a marked reduction in the deforested area of the Legal Amazon (from 27,800 km<sup>2</sup> in 2004 to a historic low of 4,600 km<sup>2</sup> in 2012), according to data from the National Institute for Space Research (INPE in Portuguese). Since then, and more intensely since the fall of president Dilma Rousseff in 2016, the pace and deforested area has increased. If preliminary INPE figures are confirmed, between August 2018 and July 2019 about 6,200 km<sup>2</sup> were cleared in the Legal Amazon.

Along with deforestation, other forms of natural resource degradation have increased over the past three years through burning, illegal mining, land grabbing and biopiracy of fauna and flora. Such criminal acts, perpetrated by different groups and companies, pose direct threats to the security of the most vulnerable populations, such as slave-like workers, women, indigenous people, and *quilombolas*. For example, according to data

from the Pastoral Land Commission (CPT in Portuguese), in the Brazilian Legal Amazon there were 48 of 61 murders in field conflicts (79%), 50 of 74 assassination attempts (68%), 391 of 571 physical assaults, 192 out of 228 arrests and 171 out of 200 registered death threats (86%) in 2016. Since the 2018 elections, Bolsonaro has adopted increasingly destructive stances and policies against environmental governance institutions, vulnerable populations and funding mechanisms including the Amazon Fund. In August 2019, when 74,000 outbreaks of Amazon fires were detected, the Bolsonaro government reiterated a hostile course of action and the crisis took on an international dimension (Phillips, 2019).

Environmental degradation affects the most vulnerable social groups the most. In the Amazon, traditional communities and indigenous peoples are among the most vulnerable groups (Rocha et al. 2012). In general, the security of the region and its inhabitants would therefore depend on an increasingly integrated and democratic role of the Brazilian state, neighbouring countries and affected populations, especially indigenous peoples (Abdenur et al. 2019). However, the Bolsonaro government's foreign policy is also moving toward dismantling regional cooperation structures in South America.

# CLIMATE AND INDIGENOUS INSECURITY IN ACRE AND UCAYALI

In the Amazon region, therefore, if climate change is not necessarily a cataclysm, it usually operates as an aggravation of previous problems experienced in a region or group. This is the case of indigenous peoples in the border region between Brazil and Peru, corresponding to the state of Acre and the department of Ucayali.

In the case of Acre, according to the Instituto Socioambiental (ISA in Portuguese), many of the state's 26 approved indigenous lands (LIs) (2.39 million hectares, or 14.56% of Acre's area) are near rivers where there were significant hydrological variations in the last years. As one of the largest indigenous groups in the region, the Huni Kuin are divided between Brazil and Peru, having been separated in the twentieth century as a result of violent conflicts with rubber tappers ("seringalistas" in Portuguese) (Aquino 1993). Groups that focused on a "seringal" on the Envira River, for example, moved to the headwaters of the Purus River in Peru. The relationship between different groups in the two countries is reproduced through marriages, but there are striking differences. For decades, the migratory movement has not ceased, and free movement across borders is done across rivers (Aquino and Iglesias 1994; 1999). There were about 10,818 Huni Kuin living in Acre in 2014.

Ever more vulnerable and struggling for their rights, the increased risk of insecurity for the Huni Kuin can be seen in the floods that have occurred in Acre in recent years. In 2015, in the face of floods in various places in the state of Acre, a state of calamity was decreed. In the Acre River, about 20 villages were affected in the municipalities of Assis Brasil, Seine Madureira, Feijó and Tarauacá. Heavy rains that started in January of that year and caused the

river to rise 24 centimetres in one day affected the Huni Kuin, Yawanawá, Jaminawa and Manchineri peoples. It was the largest flood recorded (17.92 meters), surpassing the record of 1997, when the river rose 17.66 meters. Although February is the state with the highest rainfall in the state (Duarte 2006), the river's ebb was affected by heavy rainfall over a 24-hour period. In 2017, a sudden flood on the Jordan River made Huni Kuin families homeless (Nascimento 2017). At the time, the Acre Fire Department reported that a non-working telemetric station of the National Water Agency (ANA) should have made the reading of the river, which has no ruler. The flooding of the river left uninhabited people unattended until the river could flow. In the face of the 2017 floods, the only official pronouncement was made by the mayor of the city of Jordan (AC), in an interview with journalists: "this is how it is, by the river being located at the headwaters, it fills and leaks fast. It doesn't stay long. It seems that there was no flood" (sic). The city council, which made cars and boats available for families to evacuate in a palliative measure in a place hard to reach for emergency relief, interpreted the event, although sudden, as something to be expected and about what there would not be much to do. Through this kind of mechanism, the vulnerability of indigenous people becomes insecurity.

Conscious of the risk they are taking, in the open letter to governments and society released in Boa Vista in May 2019, representatives of Ashaninka, Huni Kuin, Shawadawa, Yawanawa, Nukini, Noke Koe (Katukina), Shanenawa, Puyanawa, Manxineru, Kuntanawa, Jaminawa and Madija included in their claims the recognition that the impacts of climate change as an issue that aggravates risks to life and the forest.

The same indigenous protagonism in the face of increased vulnerability and insecurity is found in the case of Shipibo-Conibo living in the Ucayali department of the Peruvian Amazon. The name Shipibo-Conibo results from alliances of various populations in the face of demographic losses, as a result of the shock with the European presence. "Since then, Shipibo-Conibo lands have been dotted with other ethnic groups (Piro, Campa, Ashaninka, Cocama) and mixed villages (Caseríos), with which relations are sometimes courteous, often tense" (Colpron 2005). On the streams of the Ucayali River live more than 11,000 Shipibo-Conibo in over 140 communities.

Due to flooding that occurred on the Ucayali River in 2010-2011, Shipibo-Conibo communities experienced an unexpected increase in food insecurity. Drawing on structured fieldwork and using participatory research methods across multiple seasons, the research by Sherman et al. (2016) documented how flooding initially created opportunities for increased fishery and agricultural production in the locality of Panaillo. However, indigenous families lacked the resources to exploit the opportunities presented by extreme conditions and increasingly turned to migration as a mechanism to address vulnerability. International aid organizations have set up in the region in response to the floods, introducing programs and providing training sessions for local institutions. However, weakened local institutions have continued to disregard the growing magnitude and frequency of climate extremes, well documented in the region in recent decades.

That is, even when climate events create opportunities, depending on previously existing vulnerability and institutional and community responses, the result may be increased insecurity. The Shipibo-Conibo case highlights the importance of considering both slow and fast impulses in assessing the vulnerability of the food system to an extreme hydrological event. For example, according to Sherman et al. (2016), many of Panaillo's residents were forced to migrate to urban centers. Shipibo-Conibo women continued their production and sale of handicrafts, but the profits did not cover the full cost of living in the city. In turn, migrant men began to work as labourers in plantations, logging and

even construction. Food insecurity reproduced both inside and outside Panaillo. As local institutions and social participation were already relatively weak, even external mobilization was insufficient to prevent increased food insecurity. During the interviews, Sherman et al. also identified a low perception in Peruvian institutions about the importance of climate change. About 25% of respondents denied that Ucayali droughts and floods had any connection with global climate change. One respondent said that for him, climate change was just a word, but extreme floods and droughts had worsened over time.

As in the case of the indigenous people of Acre, it was up to Peruvian indigenous leaders to link climate change and increasing insecurity in vulnerable communities. During COP 24 in Katowice, Poland, women leaders of indigenous associations and organizations took a firm stand in favour of mitigation and adaptation actions. At the event, the leaders emphasized the participation and empowerment of women in the theme, as well as the allocation of joint activities for the entire indigenous population. In Peru, it is common for indigenous women to be responsible for family food sustenance, to be knowledgeable of medicinal plants, and to carry ancestral wisdom through shamanism (Colpron 2005).

According to leaders, many of the problems of adaptation within indigenous communities have been solved by women seeking to ensure family food sustenance (Servindi 2018). In addition to the problems posed by climate change, Peruvian indigenous leaders also denounced environmental degradation and negative social impacts caused by large timber, oil, natural gas and other mineral resources projects. According to the report *The Human Rights Situation of Indigenous Peoples on the Acre-Peru Border*,

projects for oil and natural gas exploration by the Brazilian and Peruvian governments are being defined and implemented without any free, prior and informed consultation with the local communities and their organizations (Servindi 2018).

Beyond the local level and the strengthening of vulnerable groups themselves seeking to improve their security and experience a more sustainable type of development, the systemic characteristics of the climate transition and the enormity of the Amazon region also depend on institutional, political, national, regional and global responses.

For example, already in 2015, the National Indian Foundation (FUNAI in Portuguese), in its territory protection training program 'Environmental services: the role of indigenous lands', stated:

In recent times, indigenous peoples have verified and reported different facts that prove the impacts of climate change on their daily lives and on their traditional ways of life. Stories about longer periods of drought or rain, as well as changes in tree fruiting and fish reproduction. (FUNAI 2015: 98)

Indigenous Lands (ILs), through their leadership and indigenous agroforestry agents, must know and mitigate the unknown effects of the climate transition, as well as to reduce deforestation and environmental degradation in the Amazon. The ILs comprise 25% of the Brazilian Legal Amazon territory, and the historical rate of deforestation in its interior corresponds to 2% of its extension. Thus,

The National Policy for Environmental and Territorial Management in Indigenous Lands (PNGATI [in Portuguese]), established by Decree 7,747 of June 5, 2012, aims to promote the protection, restoration, conservation and sustainable use of natural resources of indigenous lands and territories. The policy also ensures the integrity of the indigenous heritage, the improvement of the quality of life and full conditions of physical and cultural reproduction of the present and future generations of indigenous peoples, respecting their sociocultural autonomy. That is, PNGATI aims to maintain the environmental services provided by indigenous peoples. Therefore, it is the main instrument for thinking and discussing PES

strategies in Brazilian indigenous lands. These instruments need to be used with skill by indigenous peoples, so that their rights are guaranteed, new alternatives for environmental and territorial management and future projects are designed with protagonism and autonomy. (FUNAI, 2015)

As the Huni-Kuin and Shipibo-Conibo cases demonstrate, indigenous peoples perceive the link between social vulnerability, environmental degradation and increased risks to their security (forced displacement, food insecurity, violence, etc.). And indigenous leaders demand public policies for prevention and mitigation. As institutions fail or aggravate stressors, they contribute to increased insecurity.

In this sense, the "disastrous scenario" of the current policies of the Brazilian federal government for the environment constitutes a threat to the security of the most vulnerable social groups. In addition to openly flirting with the crudest denialism about climate change, the Bolsonaro government systematically acts in favour of predatory interests (Trigueiro 2019). Suffice it to mention the deliberate weakening of the oversight and punishment capacity of the Ministry of Environment's bodies in 2019, the untying of the National Water Agency (ANA), the suspicion cast by the minister on all 334 Conservation Units in the country, the attempt changes in the way Indigenous Lands are instituted in Brazil, the denial of the criminal character of burning and the open defence of the end of legal reserves.

Even at the state level, the current government of Acre threatens to dismantle or divert the purpose of previously created structures such as the Institute for Climate Change and Environmental Services Regulation (IMC), created by Decree 1,471 / 2011. Bodies such as the BMI and institutions such as the Acre Indian Commission (CPI Acre, in Portuguese) interacted with civil society entities such as the Acre Indigenous Agroforestry Movement Association (AMAAIAC, in Portuguese), the Acre Indigenous Teachers Organization (OPIAC, in Portuguese) or the Huni Kuin Artists Movement (MAHKU, in Portuguese), for the development of projects and actions.

To exemplify the connection between local and international, it is worth highlighting an initiative of S.O.S. Amazon together with the Acre Pro-Indian Commission, supported by Amazon Cooperation Treaty Organization (ACTO, or OTCA, in Portuguese) and the Acre government between 2004 and 2012. Under that partnership, the project Strengthening Acre-Ucayali Border Integration was able to actively incorporate indigenous and agro-extractive community leaders (OTCA 2011). It also recognized the chain of causal links linking threats to human security from organized crime (loggers and drug traffickers), environmental degradation and lack of sustainable development. In Acre, eight Indigenous Lands and residents of four communities on the

banks of the Juruá River received support from that project. In Peru, the Pronaturaleza Foundation and the Universidad Nacional de Ucayali supported communities in the Abujão River Valley (SOS Amazonia 2012).

Such an initiative would hardly be supported by the current framework of institutional dismantling and threats to forest peoples. Suffice it to recall the failure of the ACTO, the difficulties in implementing the Paris Agreement and the crisis triggered by the burning of the Amazon region in 2019. Hence the importance of the leading role of indigenous people, social movements and citizenship.

## CONCLUSION

Climate change projections indicate an increase in the frequency and intensity of environmental hazards such as droughts and floods (Sherman et al. 2016). However, it is not yet possible to accurately predict the intensity and consequences of such risks (Nobre et al. 2007). Thus, the importance of understanding the vulnerability of indigenous and traditional communities in the Amazon rainforest in the face of extreme weather events grows (Bursztyn et al. 2012).

Based on an explicit model of the mechanisms causally linking environmental degradation, social vulnerability and insecurity, two cases of flooding affecting Huni Kuin communities in Acre and Shipibo-Conibo communities in Ucayali were analysed. Although it is the same type of weather event (flood) the lessons and implications of both events are distinct and complementary.

The Huni Kuin case demonstrates an event considered isolated by the municipal and state government. The individual consequences of people affected by the floods of the Jordan River are large for personal life, but it is not even considered as a problem by local and federal authorities. It thus represents the early phase of a chain of nonlinear

events that tends to result in insecurity. Bolsonaro government statements and actions amplified the chances of increasing risks being taken as fatalities or isolated cases. In the case of Shipibo-Conibo, research-reported food insecurity indicates a more advanced stage in the causal chain. Flooding, combined with weak local institutions, has enhanced the transformation of vulnerabilities into insecurity.

In common, both cases indicate how institutional neglect and failure to deliver consistent public policies over time can aggravate the links between social vulnerability and insecurity. On the other hand, it is extremely important that the proposals made by the indigenous leaders themselves in Acre and Peru are incorporated and prioritized as a way to reduce vulnerability and increase resilience. For example, in the Acre Indigenous Leadership Letter there is a demand for the restoration of indigenous health policies dismantled by the Bolsonaro government in 2019. In practice, indigenous health public policies are configured to mitigate environmental degradation because many of the problems of indigenous health are aggravated by climatic and environmental events on indigenous lands. The letter also mentions “disregard for the evidence

and impacts of climate change” on Amazonian lives. From the state government is required, among others, that programs, policies and actions for indigenous lands follow the National Policy for Territorial and Environmental Management (PNGATI). International cooperation is also requested that, in view of the political conjuncture described in the letter, consideration should be given to opening direct financing lines for indigenous associations as a way of contributing to the defence of rights and protection of the Amazon Forest and its biodiversity.

Events such as the ‘Meeting of Indigenous Peoples of the Border’ between Brazil and Peru, which promote cooperation between indigenous leaders of the region, residents of extractive reserves and institutions such as FUNAI, much to the contrary as “threatening Brazilian sovereignty and national security”, contribute to make effective the regional integration advocated in the Brazilian Constitution. For over ten years, the meetings have contributed to highlighting social and environmental issues, the situation of indigenous peoples and threats to territories (CPIAcre 2019). Similarly, the Working Group on Cross-Border Protection advocated that all border development actions be carried out with the full participation of the indigenous and traditional peoples of the region, based on the principles of sustainable development and forest conservation, respecting the territories and modes of life.

As is well known, the Intergovernmental Panel on Climate Change (IPCC) scenarios range from 0.3 to 1.7 ° C (lowest), or between 2.6 and 4.8 ° C (highest) for the planet as a whole. Even in the most optimistic scenario, rising sea levels and acidification, degradation of biomes, expanding deserts in tropical regions, recurrence of extreme weather events such as (droughts, floods, heat waves, storms), and biodiversity reduction are stressors that can create or sharpen violent conflict. In the case of indigenous peoples of the Amazon, particularly in the recent experience of the Huni Kuin of Acre and the Ucayali Shipibo-Conibo, it was possible to verify the mechanisms through which prior social vulnerability, combined with extreme weather events, institutional failures and predatory behaviour of dominant social groups, tend to turn into insecurity. In documents and testimonies prepared by indigenous leaders, it was also clear that the social groups most affected by climate change themselves are able, when supported, to build consistent and sustainable responses to mitigate risks and mitigate negative effects. The fight against global warming and the improvement of human security stand together for the indigenous people of the Amazon.

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Storm in Manaus. Photo: Lubasi

# CLIMATE EVIDENCE-BASED POLICING: THE INFLUENCE OF RAINFALL ON THE CRIMINAL DYNAMICS OF THE CITY OF MANAUS

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## ABSTRACT

The Welfare State promotes the common good and public security as of great relevance and essential for the life in society. Violence is a problem that affects all societies in the world. Therefore, Public Security cannot be studied in isolation, otherwise it will only stick to the technicality present in the execution of police's security actions. In this scenario, the analysis must transcend the purely criminal issues reaching the various factors - such as rainfall occurrences - that can influence social activities, as well as the criminal dynamics. Thus, the study of the spatiotemporal distribution of the frequency and

intensity of rainfall is relevant since its understanding is extremely important for monitoring both natural disasters and aspects that may pose risks to the population. Evidence-based policing stands out as a management model in which data analysis, intelligence gathering and intelligence production are essential for the decision-making process while elucidating and deterring crime in predetermined areas. The analysis presented in this paper represent an initial attempt to define whether there is a connection between rainfall and criminal dynamics over a defined time and space.

Keywords: **Public Safety, evidence-based policing, rain and crime, Criminal dynamics, rainfall and crime.**

# INTRODUCTION

Violence is a problem that affects all societies in the world. There is a clear challenge in achieving the welfare state when it comes to crime in contemporary societies. In this sense, the *locus* of violence is the city whereas the subject is the individual devoid of protection and security, who at every moment perceives himself as secluded from the Social Contract that is forged in the right to life, property and security.

Thus, Public Security cannot be studied in isolation, otherwise it will only be limited to the technicality present in the execution of security actions where the State seeks to fulfill the process of affirmation of this fundamental right. In this scenario, the analysis must transcend purely criminal issues by reaching the various factors that may influence social activities as well as criminal dynamics.

There is a consensus in the public security specialized literature that crime intensifies as temperature increases and decreases as the amount of rainfall or cooling increases.

Consequently, the study of the distribution and frequency of rainfall is relevant since its comprehension is extremely important not only for the monitoring of natural disasters (which does not constitute the objective of this research), but also for other aspects in social dynamics that may bring risks

to the population, such as the occurrence of crime.

The present study has the main objective of establishing whether or not there is an apparent correlation between climate and crime, by comparing the climate parameter of rain and the crimes reported as robbery on public roads in the city of Manaus. The selected criminal reports were delimited to the type of robbery on public roads due to its great expressiveness in records found during the studied period.

The other types of reports (homicide, theft, rape, murder), as well as the other climate parameters (temperature, relative humidity) will be studied in a next phase of the research which proved to be necessary in order to establish an applicable model to the Amazon region.

Accordingly, this study is intended to support the government in the decision-making process so as to achieve better planning and greater efficiency in the implementation of security actions based on climate evidence. Moreover, it may be encouraging for more research to be carried out in this subject's universe, which has revealed a lack of studies on climate as an influence factor to human behavior and, therefore, criminal dynamics.

# THE EFFECTS OF CLIMATE ON CRIMINAL DYNAMICS AND THE TECHNIQUE OF CLIMATE EVIDENCE-BASED POLICING

## *The Influence of Climate on Human Behavior*

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Climate is one of the environmental components that stands out. It affects the processes of soil formation, the growth and development of plants, but also the main bases of human life, such as air, water, food and even the shelter or habitation of man (Ayoade 2003).

Toledo (2008) states that extreme cold, extreme heat or a storm makes humans, like other living things, tend to take shelter. Therefore, assuming that weather and climate have a direct influence on life in society, the author recognizes the influence of climate on human behavior.

For this reason, Beltrando and Chemery (cited in Mendonça 2001:36), when conducting studies in Europe and the United States, showed that violence is related to the seasons in their results: crimes against individuals increase in summer and property crimes increase in winter.

Anderson and Anderson (1984), in turn, concluded in a survey conducted in two different cities in the United States that the number of violent crimes is directly related to the rise in temperature. However, regarding nonviolent crimes, they could not demonstrate the existence of this correlation.

Although there are not many studies related to the subject, Francisco Mendonça, a Brazilian author, has already developed a work in this area. Mendonça (2001) compared temperature with crime rates over ten Brazilian cities. The author found that in the northern portion of the country, where climate variability is not significant between Manaus and Belém, only Manaus showed a good correlation between temperature increase and crime increase. For this reason, Manaus proves to be a fertile territory to conduct this research, considering the climate factor of rain.

# Climate Evidence-Based Policing

According to Muniz (2010), the phenomenon of policing has its comprehension articulated to the notion of social control and its discontinuous dynamics in social life. That is, in order to carry out social control, the State must undertake activities such as overseeing, regulating, imposing, supervising, patrolling, guarding, containing, among others that are useful for maintaining public order, ensuring the Constitutional provision contained in Article 144 of the Brazilian Constitution.

Policing is conceptualized in Muniz as a pragmatic, functional, utilitarian and invasive form of how to sustain the submission, under some consent, to the rules of the game, viewed as the object of law enforcement, or the imposition of an order, agreed or not, with the use of force-based coercion. (Muniz 2010)

Evidence-based policing thus emerges as a management model in which data analysis, information gathering and intelligence generation are essential for an objective decision-making model that supports the identification and deterrence of crime in predetermined areas (Azevedo et al. 2011).

This model challenges the fundamental beliefs, attitudes, and convictions of managers in public security institutions over what constitutes effective policing, since the strategies and tactics employed historically in the public security system have always been based on anecdotal reflections.

For this reason, Sherman (1998) states that day-to-day policing activities, strategies and tactics should be driven by analytical intelligence, criminal analysis and maps, use of hot spots, criminal densities, systematically collected observations or results-related

performance measures.

The use of maps for the study and understanding of social phenomena enables the identification of where the incidence of phenomena occurs – for example, the old paper maps and pins, used in various moments by security institutions in their planning and management of daily activities.

Claudio Beato (2008) states in his work *Compreendendo e Avaliando Projetos de Segurança Pública*:

The simple visualization of information on a map allows us an easier understanding, thus presenting a greater possibility to share information. This property is essential for anyone wanting to develop crime prevention projects and programs, as maps can be an easy way to design, visualize and analyze a problem. (Beato 2008: 16)<sup>1</sup>

Supporting this understanding, Freitas (1991) states that there are several possibilities resulting from this type of analysis:

Crime Hot Zone Analysis (areas of high level of crime incidence are not determined by administrative boundaries); Analysis of the direction, distance and recovery time of robberies and thefts; Identification of gang territories; Automatic calculation of road networks; Planning of police barriers; Fast location of vehicles; Time Mapping (selecting and displaying on maps every crime occurring at a particular time, day, month and year); Space mapping (selecting and displaying on maps every crime in a certain neighborhood of the city); Mapping by recorded characteristics (any time, space, victim, suspect and modus operandi characteristics can be established). (Freitas 1991: 3)<sup>2</sup>

1 “A simples visualização de informações em um mapa nos permite uma compreensão mais fácil, apresentando, conseqüentemente, melhor possibilidade de compartilhar informações. Essa propriedade é essencial para quem quer desenvolver projetos e programas de prevenção de crimes, pois mapas podem ser uma maneira fácil de conceber, visualizar e analisar um problema.”

2 “Análise de Zonas Quentes de Crimes (áreas de alto grau de incidência de crimes não são determinadas por limites administrativos); Análise da direção, distância, e tempo de recuperação dos roubos e furtos; Identificação de territórios de gangues; Cálculo automático de redes viárias; Planejamento de barreiras policiais; Localização rápida de viaturas; Mapeamento de tempo (selecionar e visualizar em mapas todos os crimes ocorridos em determinada hora, dia, mês e ano); Mapeamento do espaço (selecionar e visualizar em mapa todos os crimes ocorridos em determinado bairro da cidade); Mapeamento por características registradas (pode-se estabelecer qualquer característica de tempo, espaço, vítima, suspeito e modus operandi).”

Hence, the tools of the geographic information system appear in an integrated and systemic way within a spatiotemporal analysis, in support of the evidence-based policing model and through the management of the trends and patterns of the various phenomena involving criminality.

Sherman (1998) believed that information resulting from systematic or scientific investigation as well as crime analysis should be used regularly by the police to make strategic and tactical decisions, because

the strategies and tactics that are generated from information and based on scientific knowledge are more likely to reduce crime when employed.

In this sense, the following analyzes represent an initial attempt to define if there is a relationship between the occurrence of rainfall and the concentration in criminal dynamics, observed over the defined time and space.

## METHODOLOGY

This study used monthly reports' data held in the Integrated Public Security System (SISP, in Portuguese) and made available by the Assistant Executive Secretariat of Intelligence (SEAI, in Portuguese) of the Secretariat of Public Security of the state of Amazonas (SSP/AM, in Portuguese), from January 1<sup>st</sup>, 2013 to December 31<sup>st</sup>, 2018, in the city of Manaus. Climate data related to rainfall were obtained through the Civil Defense of the state of Amazonas (DCEA, in Portuguese) and the National Institute of Meteorology (INMET, in Portuguese), with information for the same period, from January 2013 to December 2018.

After preliminary analysis of the data, the reports of robbery within a generic public place were selected. These reports were compared with the rainfall rates observed in the city of Manaus during the study period.

The selected time segment was 6 years because it is the period in which it was possible to collect georeferenced reports in the city of Manaus. There was also a division of the months in the study, divided into two annual periods based on the disposition of the seasons, which in the Amazon region are characterized as being a rainier and a less rainy time in the year. According to Table 1.

**Table 1:** Monthly Seasons

Season	Less rainy months	Rainy months
1 <sup>st</sup>	June to November 2013	December 2013 to May 2014
2 <sup>nd</sup>	June to November 2014	December 2014 to May 2015
3 <sup>rd</sup>	June to November 2015	December 2015 to May 2016
4 <sup>th</sup>	June to November 2016	December 2016 to May 2017
5 <sup>th</sup>	June to November 2017	December 2017 to May 2018

Source: National Institute of Meteorology (INMET).

The comparison between the climate parameter of rain and the criminal reports is shown in bar graphics. It is not possible to work a more accurate statistical model or treatment due to the lack of basic data related to the distribution of the rainfall, since it was not possible to gather georeferenced rainfall data by zones or neighborhoods, except in the city in general, that being a limitation coming from the responsible agencies that also represented one of the difficulties faced in the research.

Criminal maps of robbery reports were analyzed using Arcgis geoprocessing software. The symbology standard was adopted as the 15-layer equal interval class, with a color spectrum ranging from green to red (green for low robbery concentrations and, as the red gradation approaches, robbery concentration increases). For better viewing, we adopted the default of 45% transparency on the overlaying in the map.

# UNIVERSE OF ANALYSIS

## *Climate and Location of Manaus*

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The Amazon Basin has an estimated area of around 6.3 million square kilometers. According to the Brazilian Institute of Geography (IBGE, in Portuguese), the Legal Amazon area in Brazil comprises 5,032,925 km<sup>2</sup>, which includes the states of Pará, Amazonas, Rondônia, Roraima, Acre, Amapá, a part of Tocantins, Mato Grosso and Maranhão. The remaining area is divided between the countries of Bolivia, Colombia, Ecuador and Peru.

The Amazon Rainforest is also the largest rainforest on Earth and has a wide biological diversity, containing about 30% of the planet's total biomass. Consequently, it has the ability to act as a climate regulator on a global scale, an important regulator of water and energy balance (Marengo and Nobre 2009).

This region has a warm-humid equatorial climate, with an average annual rainfall of around 2300 mm and temperatures ranging from 24°C to 28°C, a vital characteristic to the maintenance and balance of the Amazon's climate. This factor is closely related to the high rate of evapotranspiration, which makes the forest a strong influencer to the rainfall and also to the regional circulation of people.

The city of Manaus, which is the focus of the study, is the capital of Amazonas and is located in the middle of the Amazon Basin (the largest hydrographic basin in the world), presenting the aforementioned climatic characteristics. Manaus has high rainfall rates throughout the year, with only two well-defined seasons: dry (less rainy) and rainy. Some authors consider this classification with the nomenclature of "rainier" and "less rainy" periods.

The rainy period is observed from December to May, while the less rainy period is from June to November. March and April are the months with the highest rainfall and August and September with the lowest rainfall rates.

According to the weather data of the National Institute of Meteorology (INMET), as of 2009, the city had an average annual rainfall rate of 2,307.4 mm. These values are observed as an average for following years, and may exceed 2700 mm, as observed in 2013.



# DESCRIPTION AND ANALYSIS OF RESULTS

## *Description of Rainfall Data*

Data on rain precipitation shown in Table 2 were provided by the Civil Defense and the National Institute of Meteorology.

Table 2: Pluviometric Precipitation of the Period (mm)

	2013	2014	2015	2016	2017	2018
Jan	314.60	253.30	303.70	129.60	402.10	215.30
Feb	342.10	245.40	214.00	234.00	257.40	331.40
Mar	427.40	527.70	373.70	277.00	270.00	242.90
Apr	420.60	255.00	165.50	309.10	338.40	280.80
May	238.40	425.00	280.80	83.40	135.80	179.40
Jun	32.30	211.70	83.90	118.10	126.50	188.60
Jul	167.10	66.10	47.30	103.20	75.70	54.10
Aug	53.00	32.20	10.70	46.60	20.10	19.50
Sep	121.00	0.60	15.80	73.60	166.40	80.80
Oct	193.00	190.90	31.30	165.90	148.10	56.70
Nov	312.20	196.00	91.30	221.60	287.70	148.40
Dec	101.30	173.80	154.20	518.80	414.90	349.70
<b>Total (mm)</b>	<b>2723.00</b>	<b>2577.70</b>	<b>1772.20</b>	<b>2280.90</b>	<b>2643.10</b>	<b>2147.60</b>

Source: Civil Defense of the State of Amazonas (DCEA) and National Institute of Meteorology (INMET)

Preliminarily, it can be observed that the city of Manaus has a high record of pluviosity. During this period, this city presented a daily average of 6.46 mm of rain per day.

Espinoza (2014) classifies rainfall on a scale from “very weak” to “extreme”, ranging from 0.2 mm of rainfall to “> 18.3”. In this approach, the rains would be classified from moderate to strong. However, the phenomenon that is observed in the city of Manaus is the hot and humid equatorial climate, with days of

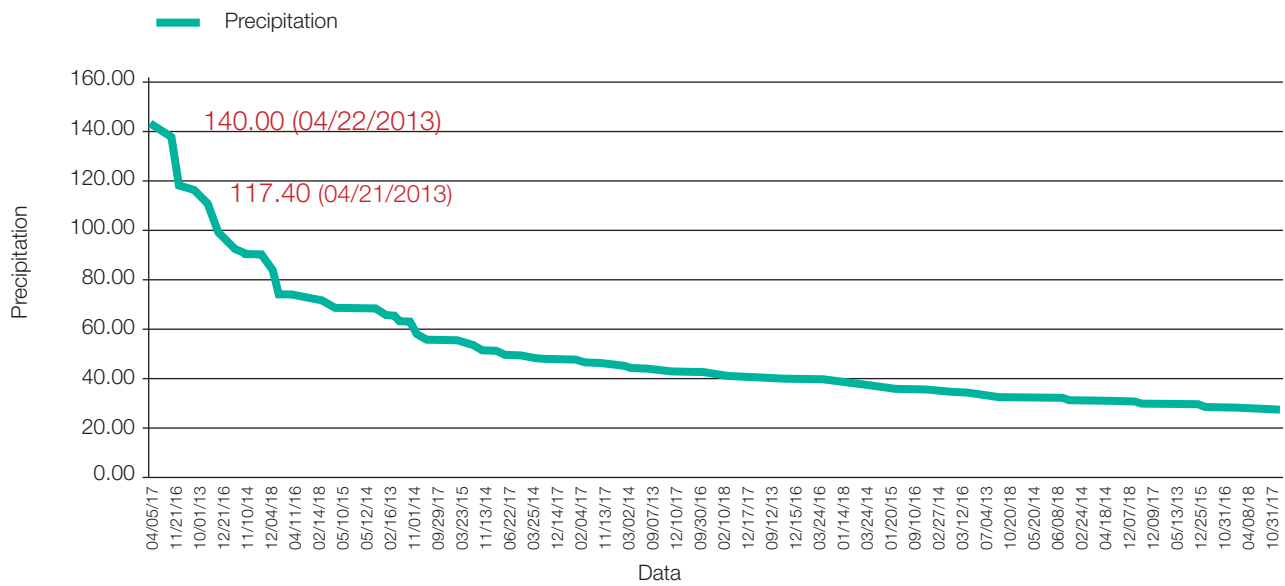
rainy periods that can exceed expressively 140 mm. On the other hand, it can be noted that for several weeks the record was 0.00 mm of rain in the dry or less rainy season.

Detailed charts of the annual rainfall records for the period studied can be observed through the reports of the Manaus weather station, contained in Appendix 1 of this article.

In order to analyze the existence of any specific pattern and aiming to find out if there is a connection between an intense rainy season and a possible reduction in robbery records in the city of Manaus, the days that presented the highest precipitation rates during that period were highlighted.

In this matter, each day with a record of rainfall during the studied period was listed in a comparative ranking and it was found that, from the 2,190 days analyzed from January 2013 to December 2018, only 142 days were responsible for concentration and accumulation of 50% of the rainfall for the whole period, as shown in Graphic 1.

**Graphic 1:** Days That Presented 50% of the Rainfall in the City of Manaus from January 1st, 2013 to December 31st, 2018



Source: Civil Defense of the State of Amazonas (DCEA) and National Institute of Meteorology (INMET)

It is possible to infer from this graphic that from the 142 days with the highest rainfall records, the closest days and those with the highest precipitation concentration were April 21<sup>st</sup> and 22<sup>nd</sup>, 2013, both classified as the 2<sup>nd</sup> and 5<sup>th</sup> days respectively with the highest incidence in the given years. The sum of both

days showed 257.40 mm of rain, a value equivalent to 9% of all rain cataloged for the year of 2013. This was the year with the highest rainfall in the last decade, with 2,723 mm of rainfall.

## Description of Criminal Reports' Data

The data refer to the crime of robbery in the period from 2013 to 2018. They were provided by the Assistant Executive Secretariat of Intelligence (SEAI) of the Secretariat of Public Security of the state of Amazonas (SSP/AM) and are shown in the following Table 3, arranged month by month, in each year of study.

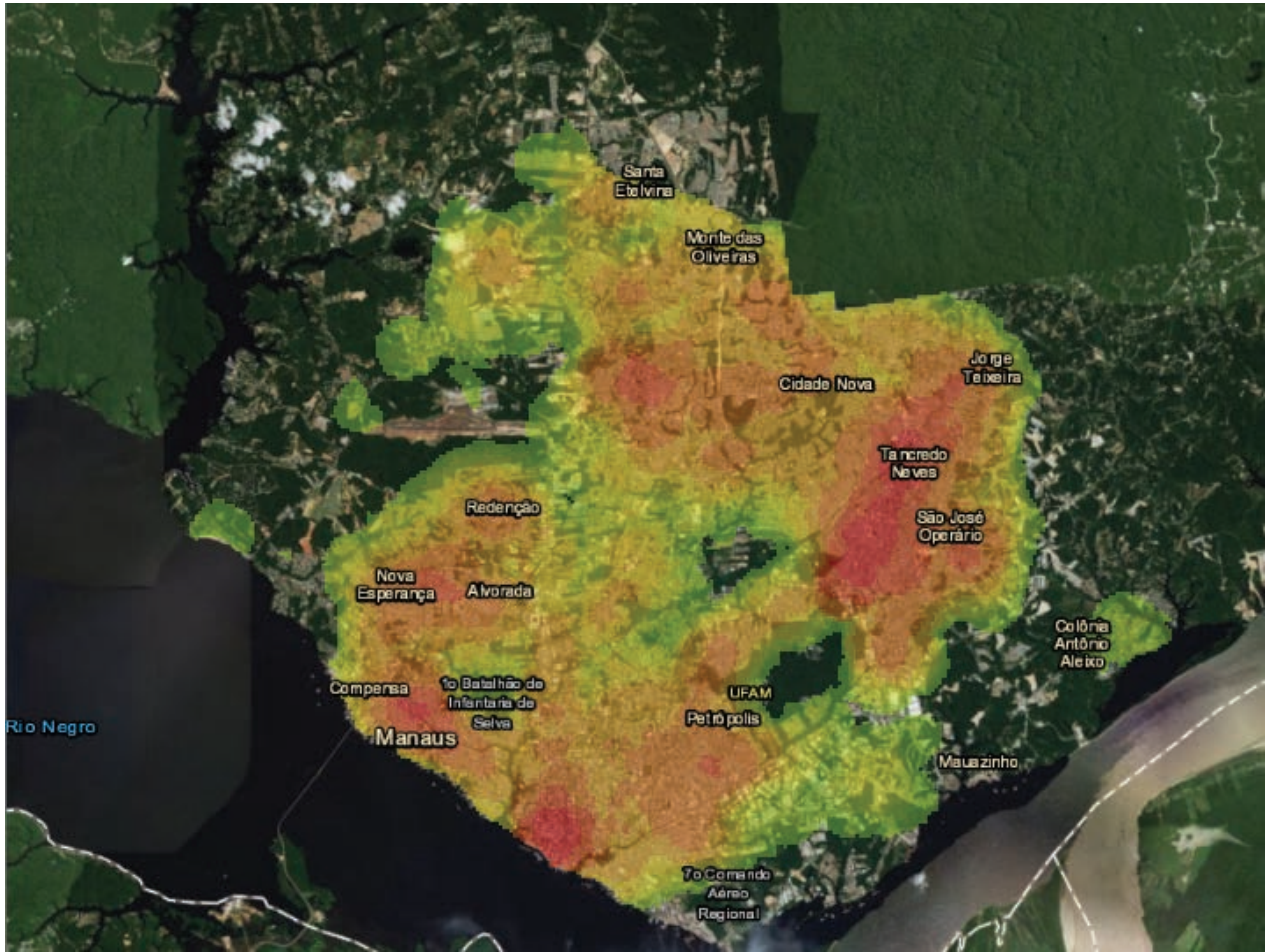
**Table 3:** Robbery Reports in Manaus (2013-2018)

	2013	2014	2015	2016	2017	2018
Jan	2122	2610	3211	3387	3668	3883
Feb	1916	2545	3408	3056	4083	3607
Mar	1987	2881	3807	3355	5052	3883
Apr	2080	2882	3832	3229	4401	4038
May	2216	3008	3604	3410	4604	4153
Jun	2132	2629	3638	3462	4176	3740
Jul	2279	2877	3310	3493	4031	3802
Aug	2312	2694	3230	3733	4443	3820
Sep	2107	2755	3266	3513	4012	3305
Oct	2149	2858	3425	3548	4287	3457
Nov	2372	2959	2895	3378	4134	3624
Dec	2022	3001	3295	3287	3418	3598
<b>Total</b>	<b>25694</b>	<b>33699</b>	<b>40921</b>	<b>40851</b>	<b>50309</b>	<b>44910</b>

Source: Assistant Executive Secretariat of Intelligence – SEAI/SSP/AM

It is possible to observe through the disposition of the data in Table 3, that the records of reports increased considerably over the years of the study in the rainy periods as well as in the less rainy periods.

**Map 1:** Kernel Density in Robberies in the Period of 2013-2018



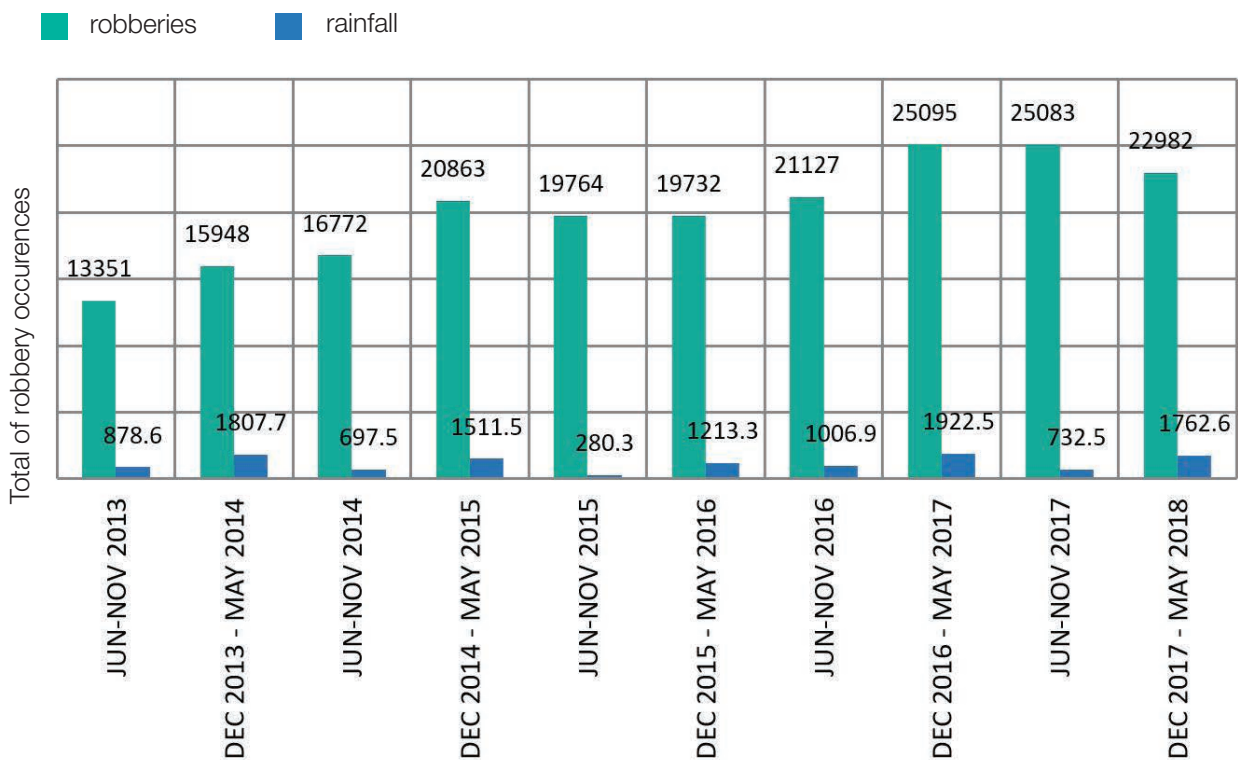
Source: Assistant Executive Secretariat of Intelligence – SEAI/SSP/AM

Map 1 georeferenced all reports of robbery in the period from January 2013 to December 2018.

# The Connection between Rainfall and Records of Criminal Reports

Graphic 2 shows crime records in orange and rain records in blue. Within the time periods during the months with little rain and a lot of rain, it was observed that the greatest precipitation was from December 2016 to May 2017, with a precipitation of 1,922.50 mm. And the period with the lowest rainfall was from June to November 2015, with 280.30 mm of precipitation.

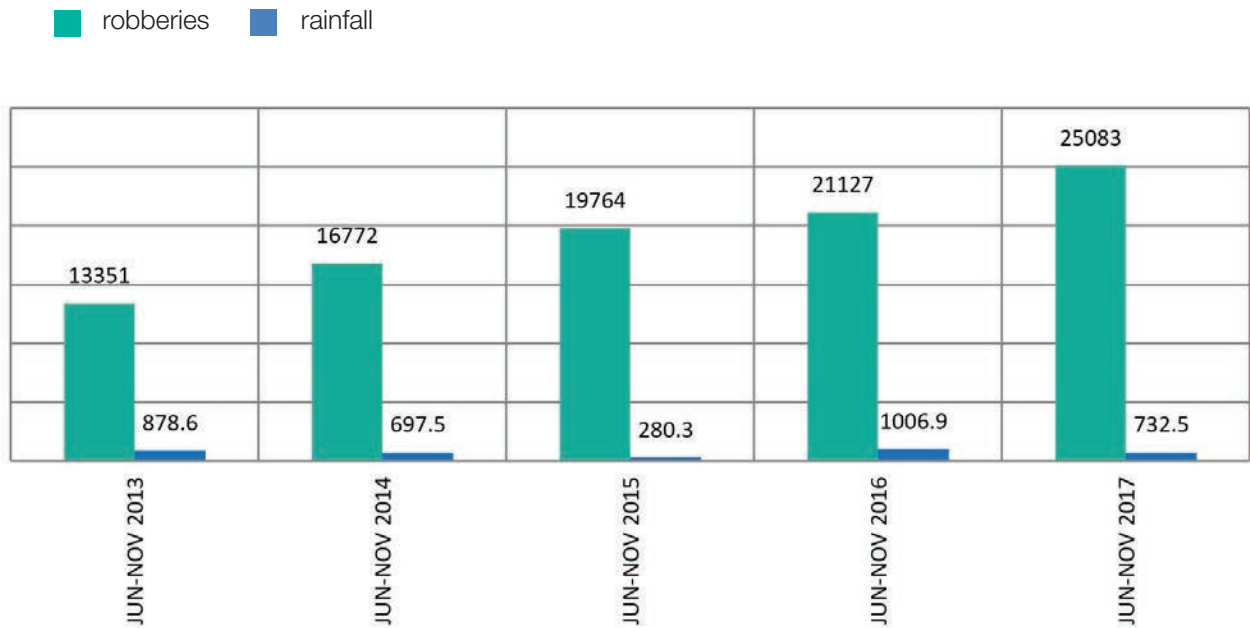
**Graphic 2:** Robberies by Rainfall Periods in Manaus City



Source: Assistant Executive Secretariat of Intelligence – SEAI/SSP/AM

When analyzing the robberies presented in Graphic 2, it can be observed that in the rainier period of 2014, with a measure of 1807.7 mm of rain, there was a record of 824 fewer reports than in the less rainy period. This phenomenon is again observed in 2016, when in the rainier period there were 1395 fewer reports compared to the period of lower rainfall rates.

By isolating the months with less rainfall (June to November), it was observed that the robbery records only increased with each new presented period, as shown in Graphic 3.

**Graphic 3:** Robberies by Rainfall Periods in Manaus City during the Less Rainy Months (June to November)

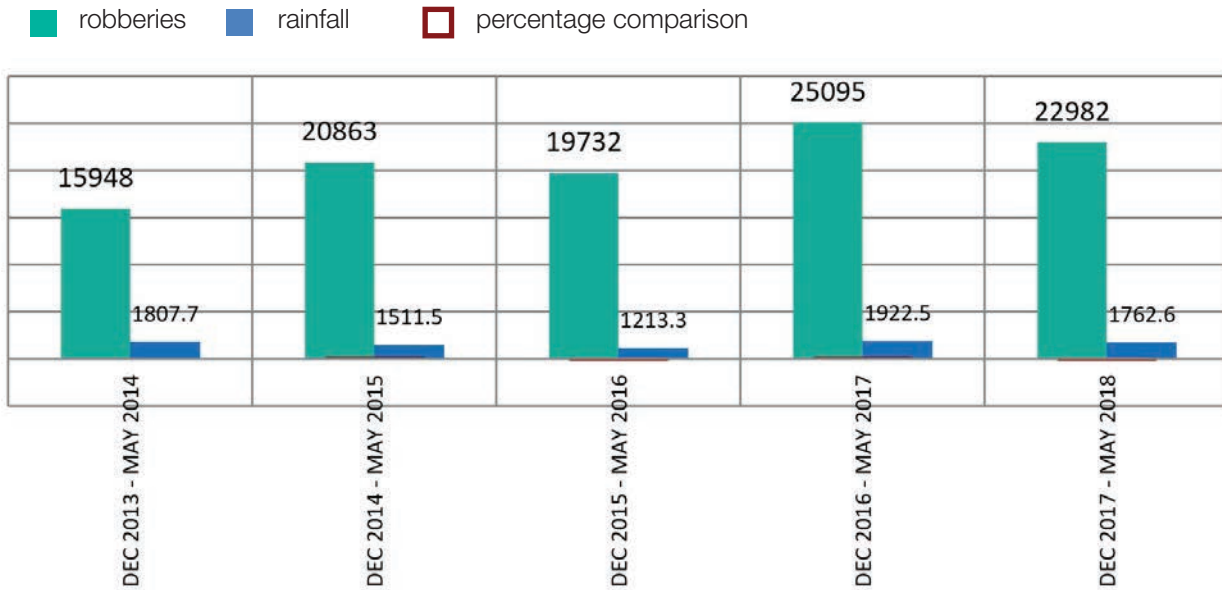
Source: Assistant Executive Secretariat of Intelligence – SEAI/SSP/AM

Therefore, it is possible to observe a growing number of robbery records (in blue) from June 2013 to November 2017, during the less rainy period.

On the other hand, when analyzing the rainy months (December to May), it was possible to observe that the records of robbery vary from one year to the next, unlike the phenomenon observed in the periods of less rainfall, where the reports indicated a linear increase from 2013 to 2018.

In Graphic 4, it is possible to observe that, even though there is a general increase in the number of robberies recorded (Table 3), and a growth in the less rainy periods of each year (Graphic 3), in the less rainy periods there is a reduction in absolute numbers and percentages in the period of Dec 2015 - May 2016, when it is possible to verify -5.4% of reports in relation to Dec 2014 - May 2015, and also a reduction in Dec 2017 - May 2018 in the order of -8.4% in comparison to Dec 2016-May 2017.

**Graphic 4:** Robberies by Rainfall Periods in Manaus City During the Rainier Months (December to May)

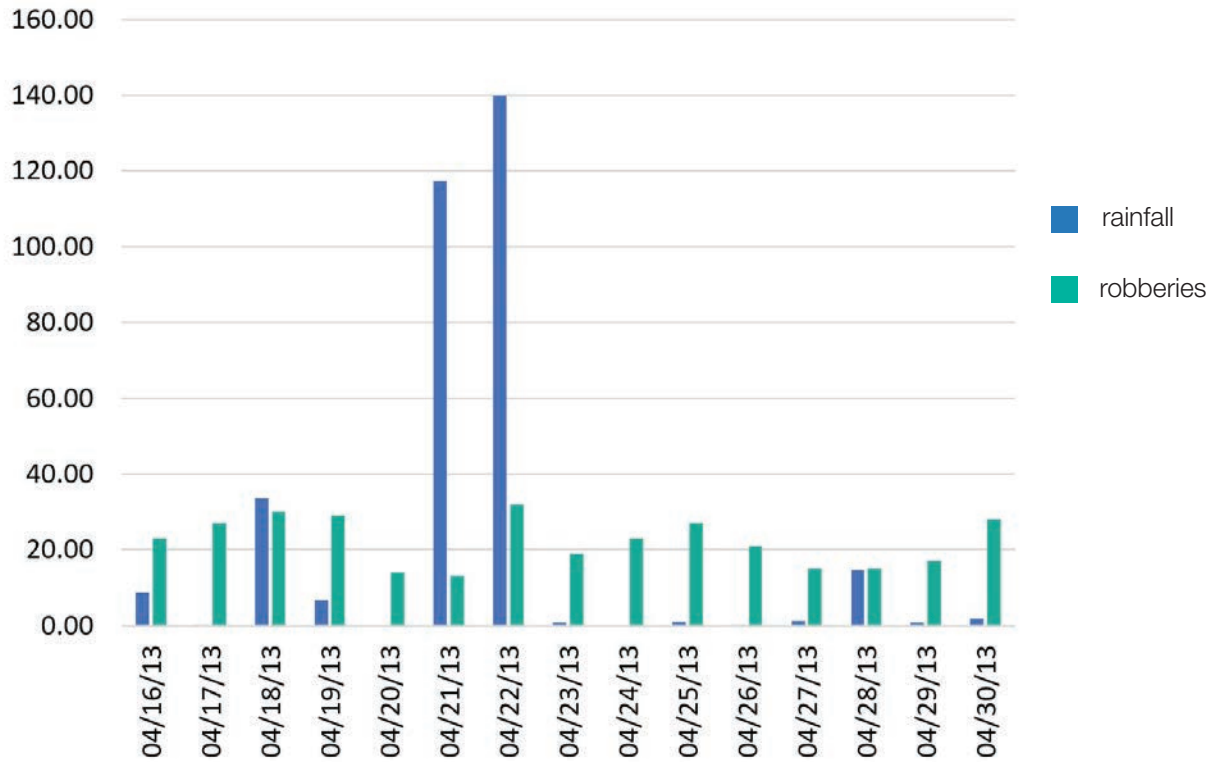


Source: Assistant Executive Secretariat of Intelligence – SEAI/SSP/AM

In this sense, considering that in general there was growth according to the analysis of Graphic 1, the crimes committed in public roads that could suffer with greater incidence the effects of the interference of rainfall were isolated, presenting the rain as a discouraging factor or obstacle to committing such a crime.

Still, according to Graphic 1, the fortnight of 16 April 2016 to 30 April 2013 presents the days that had the highest precipitation rates in recent years. Namely, the consecutive days that rained the most were April 21 and 22, 2013.

For this reason, the impact that the rain had on these two days was analyzed, as well as in the second half of April 2013, and its correlation with the increase or reduction of robberies, compared to the other years of the study as shown in Graphic 5 and following. Moreover, the analysis of the period demonstrated by heat maps, which are present in Appendix 3 of this article, was also performed.

**Graphic 5:** Robberies in the Fortnight from 04/16/2013 to 04/30/2013 in Manaus

Source: Data on Crimes - Secretariat of Intelligence SSP/AM; Meteorological Data – INMET

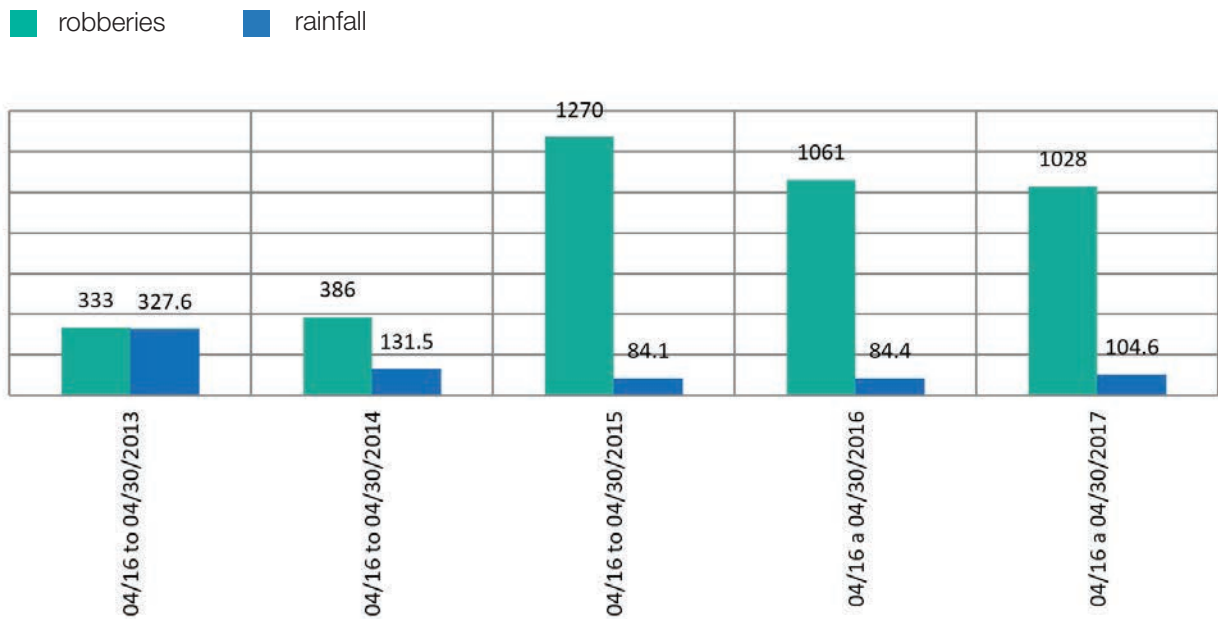
It is apparent from Graphic 5 that during the days when there was considerable rainfall (in blue), the records of robberies were lower and during the days when there was no rainfall or on those days when the rates were lower, the amount of robberies (orange) was higher or increased.

In order to verify if this phenomenon was repeated as a pattern, an analysis of the same period that includes these two fortnights of April in the following years was performed, for they also presented considerable rainfall rates within the rainy periods of their respective years.

Thus, it is possible to verify through Graphic 6 the amount of precipitation and reports of robbery observed on public roads from the 16th to 30th of each year of the study. It is concluded that the same pattern occurs on days when rainfall records are higher, the amount of robberies is lower or reduced, and on days when rainfall is reduced, there is an increase in reports, as observed in 2015, 2016 and 2017. There seems to be a connection between criminal dynamics and rainfall, in which crime reports' growth is inversely proportional to the levels of rainfall.



**Graphic 6:** Robberies in the Fortnight from 04/16 to 04/30 of 2013, 2014, 2015, 2016, 2017 in Manaus



This fact is also observed when studying in isolation the days that had the highest rainfall rates. As rainfall intensifies, there is a slight or significant reduction in reports of robbery, and as rainfall decreases, there is a slight increase in these reports.

# CONCLUSION

Public Security cannot be studied in isolation, otherwise it will only stick to the technicality present in the execution of state security actions. In this scenario, the analysis must transcend the purely criminal issues reaching the various factors that can influence social activities, as well as the criminal dynamics.

Thus, regarding climate-based policing, it becomes justified as a important support for police practices in detriment of informal methods and traditional anecdotal reflections, since strategies and tactics that are generated from information based on scientific knowledge are more likely to reduce crime when employed.

In this new way of studying, research is conducted in order to examine and understand why crime occurs in specific places under certain conditions, whether these are traditional conditions contained in the analysis of criminologists such as the offender, the victim and the proceeds of crime, or factors related to climate conditions, such as rain, the object of study in this article.

In this sense, regarding the climate factor, there seems to be a connection between criminal dynamics and rainfall, in which crime reports' growth is inversely proportional to the levels of rainfall. A simple yet reasonable explanation is that rain is a discouraging factor on many occasions as people tend to avoid leaving home on heavy rainy days, thereby reducing the number of potential victims, as well as the number of criminals on the streets. This explanation is grounded in the Routine Activity Theory.

Regarding the difficulties encountered, as previously discussed, it was not possible to correlate rainfall and crime data in order to establish an applicable model for measuring crime increase/decrease. After all, to make this possible, it would be necessary the use geo-referenced rainfall data by sectors, zones or even neighborhoods, considering that Manaus is a city with more than 60 neighborhoods and approximately 2 million inhabitants.

It was found that there is a limitation in the rainfall measurement capacity, and it is not possible to know the amount of rain that was poured by locality, but only in general in the whole territory of the city of Manaus. The correlation between the rainfall data provided and the records of criminal reports was then sought through simple statistical analysis and the disposition through the geoprocessing of the data, allowing to produce and visualize some heat maps in the study.

Regarding the next steps the research should take, future work should aim to explore the connections between various climate factors, such as air humidity and temperature, and extend to other types of criminal reports through the development multiple regression models, considering that crime is multicausal.

Therefore, this research has demonstrated the indispensability of the production of new studies related to the subject, since crime is a complex and multi-causal phenomenon and rain is only one of the external factors that can influence criminal dynamics.

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Puerto Rico hurricane disaster. Photo: U.S. Coast Guard - Vicente Vélez.

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

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## 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)<sup>1</sup>
- 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)<sup>2</sup>
- 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

1 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.

2 Data from 2012.

3 Data from 2014.

4 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.

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Rio Amazonas. Photo: Taxis en rio Amazonas, Leticia Departamento del Amazonas.

# THE 'BOOMERANG EFFECT' AND THE UNINTENDED SIDE EFFECTS OF CLIMATE ACTION: EVIDENCE FROM BRAZIL'S INTERVENTIONS IN AMAZON RIVER BASIN

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Larry Swatuk

Lars Wirkus

## ABSTRACT

This paper concerns the “boomerang effect”, defined as the largely unanticipated and unintended negative consequences of climate change adaptation and mitigation policies and programs on domestic non-state actors that result in negative feedbacks on the state. Questioning the drivers, the decision-making process, and the negative feedbacks on local and state levels, this article presents a preliminary assessment of Brazil's actions undertaken at its neighboring countries – Peru and Bolivia – within Amazon river basin in order to produce hydropower. In Peru, dam projects are already in operation, while in Bolivia there are ongoing projects where Brazilian actors (state or non-state) intervene by finance,

construction and management of hydropower plants,. Although dam building projects started as development enterprises, during the first decade of 21st century, they were “greenwashed” by technological changes and redefined as suitable alternative to fossil-fuels, hence presented as climate actions. Amazon's dams have negative feedbacks on local level that threaten environmental, food and water security of affected population, which spread along the river basin. Moreover, in Peru, the misconduct of diplomatic, business and political ties among non-state and state actors imperil state legitimacy and security. Finally, some attentive elements for future actions in Bolivia are presented.

*Keywords:* **climate change, boomerang effect, Amazon river basin, maladaptation, dams.**

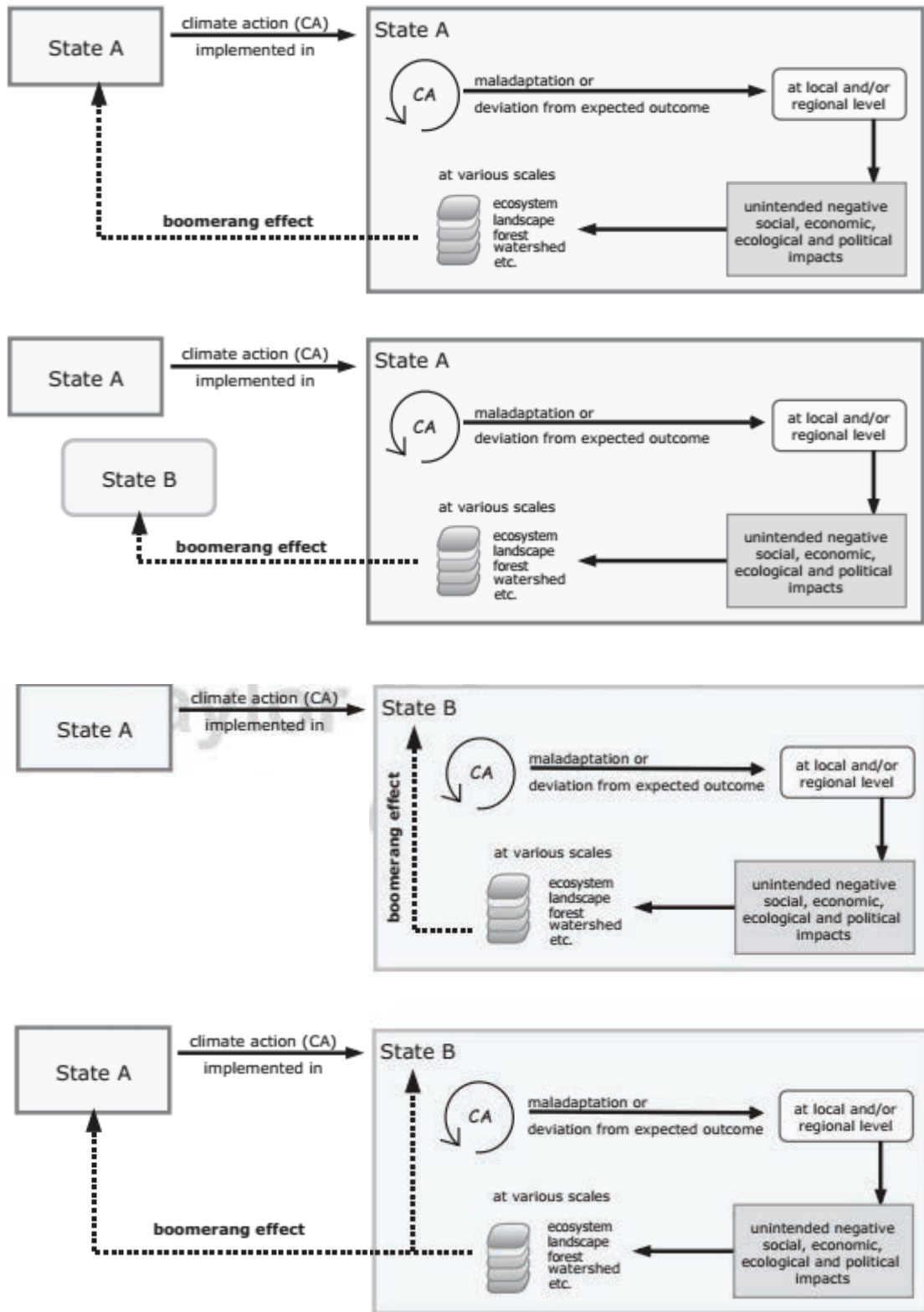
# INTRODUCTION

This article concerns the “boomerang effect”, defined as the largely unanticipated and unintended negative consequences of climate change adaptation and mitigation policies and programs on domestic non-state actors that result in negative feedbacks on the state. This paper draws on the theoretical findings presented in Swatuk et al. (2018) and is based on desk research, thus its findings are more indicative rather than definitive.

The rush to action to adapt to or mitigate the effects of climate change present the danger of generating unanticipated and unintended negative impacts at the site of the intervention, what we label as Local Level Side Effects (LLSE), which may be regarded as synonymous with maladaptation (e.g.

Barnett and O’Neill 2010; 2013; Magnan 2014; Magnan et al. 2016). However, the distinguishing idea of the “boomerang effect” framework is the specific consideration of negative feedbacks upon state actors on different levels (municipal, regional and national boomerang effects) at various scales (watershed, forest, landscape, ecosystem), thereby creating (economic, political, societal, environmental) risks to state sustainability. These negative side effects are labeled as State Level Boomerang Effects (SLBEs), or simply “boomerang effect”. According to some scholars, these negative local level side effects may have transboundary characteristics, particularly where populations are mobile, political economies are overwhelmingly informal, and states are weak (Swatuk 2007).

**Figure 1:** The “Boomerang Effect”



Source: Swatuk et al. 2018: 4

Figure 1 illustrates how climate change actions can develop unintended and unanticipated negative side effects at local and state's levels. This paper presents an analysis of the negative effects of Brazilian actions on Peru and Bolivia, while aiming to increase the production of hydropower, thus attaining greenhouse gas emissions reduction. Those initiatives are being implemented in South American Amazon river basin (Fearnside 2014; Latrubesse et al. 2017; Anderson et al. 2018)

On the one hand, Amazon river basin has important roles on climate change mitigation and adaptation policies in a global scale. It held roughly 10-15% of global biodiversity, and its rivers discharge approximately 15% of total global fresh water input into the ocean (Nobre et al. 2016). On the other hand, Amazon river basin has been suffering by intensive land cover and land use changes, related with development projects that threaten its socially diverse population and its natural systems, more severely over the last 50 years. One of the most pervasive drivers of change within the Amazon river basin is the construction of hydropower plants. Amazon's hydropower projects encompass many complexities connected with the region's peculiarities. Local level side effects are well documented, including deforestation, interruption of the fluvial systems, change in water quality, proliferation of diseases, displacement and resettlement, and threats to the rights of native population (Schaeffer et al. 2013).

Moreover, Amazon river basin is included among Brazil's climate change hotspots, where IPCC's climate models predict raising temperatures but an uncertain outcome in its rivers outflow, thus affecting the Amazonian countries' energy security. The vulnerability of hydrological balance on climate change and its effects on river dependent dwellers tend to increase the social responsibilities of power plant's towards dam's affected people (Soito and Freitas 2011). Finally, the insecurity related with hydrological cycle changes and the negative local level side effects of dams can scatter through a wide area, crossing international boundaries and following the fluvial network. Therefore, acknowledging the local and state level side effects of climate actions, specifically the building of dams to produce "green" energy, can underpin policy formulation, state and non-state actions within Amazon river basin.

Given the boomerang effect framework presented here and the security issues at stake in Amazon's hydropower projects, the paper examines real and potential unanticipated and unintended negative effects regarding Brazil's actions in Peruvian and Bolivian Amazonian region. Evidence is drawn from critical readings of secondary (academic) and grey (government-related) literature. Therefore, the case investigates four main research questions:

- What are the (social/economic/ecological/political) drivers behind a particular development or climate intervention?
- What is the decision-making process that leads to this specific climate action or development intervention?
- What are the LLSEs (social/economic/ecological/political) of the action? and are any of these unintended and/or unanticipated and negative in consequence?
- What are the Boomerang Effects felt by the state?

The chapter is structured as follows. The next section describes the boomerang effect framework, presenting the different pathways that it can take, with a focus on blue water actions. In this paper, regarding dams and investments on hydropower, the main concern is on the use and allocation of blue water for energy. The second section presents Brazil's actions on its neighboring countries. The first case is presented as a known case of negative effects of hydropower plans at the local and the state level, then, in Bolivia, it is assessed how the Peruvian case can be used as an example of the challenges at stake while building new dams in consortium with Brazil. Finally, the paper addresses how these cases can shed some light on the effects of climate change actions.

# THE BOOMERANG EFFECT PATHWAYS

The Boomerang Effect can travel through two kinds of pathways: through a “green water pathway – e.g. biofuels development and REDD+ – and through a “blue water pathway” – e.g. dam building for “green” energy.

It’s argued that better information must be made available to inform decisions at various stages and of various stakeholders. Important is the distinction between green and blue water. Green water is water that is utilized by plants from the soil directly following rainfall. Productive green water is defined as that which transpires through a plant creating biomass. Unproductive green water is defined as rainfall which evaporates directly back to the atmosphere. Blue water is that which is available as run-off after rainfall. It takes the form of surface water (rivers, lakes, streams, impounded behind dam walls) and readily accessible sub-surface water, i.e. groundwater (through borehole/well technology) (Falkenmark and Rockstrom 2004). Swatuk et al. (2015) further refine unproductive green water into a “socioecological unproductive pathway”, meaning

water that is productively used by plants that either (i) are destructive of the local ecosystem (e.g. alien or invasive species); and/or (ii) ultimately benefit only a few users (e.g. privately owned sugar cane plantations exploiting land and labor for profits accruing to the few).

It is generally agreed that climate change will lead to more extreme events. It also will lead to more water in some places and less water in others; and to widely fluctuating hydrological cycles that will be increasingly unpredictable. To ensure water security for human activities, therefore, this unpredictability must be dealt with through infrastructure development – what Conca (2006) calls, “damming, diverting and draining”. This is primarily an adaptation pathway, though multipurpose hydraulic infrastructure often claims mitigation elements as well, where, for example, hydropower displaces thermal power as a primary means of electricity generation.

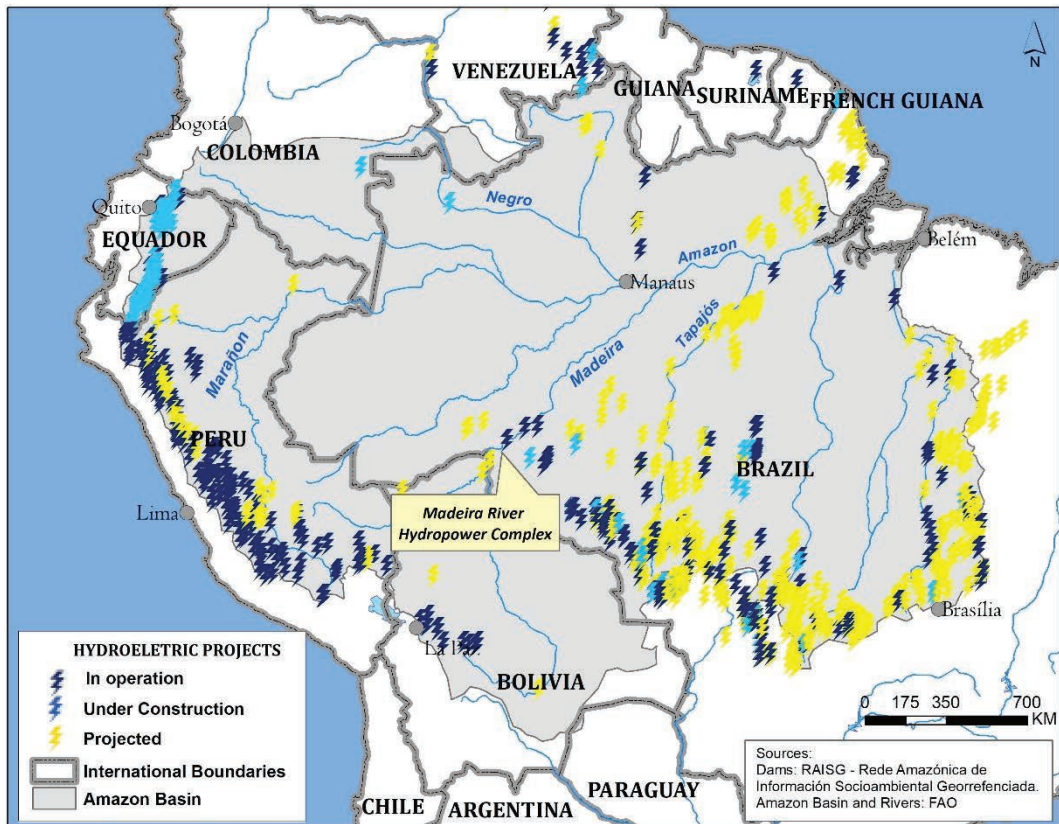
# BRAZIL'S INTERVENTIONS IN AMAZON RIVER BASIN

Adding an important perspective in examining the negative side effects of climate change actions and its transboundary features is analyzing Brazilian investments in its neighboring countries during the first decade of 21<sup>st</sup> century. Brazil, as the biggest economy in the region, has a central role to play in neoextractivist projects, with financing and building expertise. Stemming from a period of strong economic growth along the first decade of the 21<sup>st</sup> Century, a political engagement in regional integration, the boost of commodity prices at the international market and the increasing concerns on climate change actions, Brazil has carried out foreign direct investments with public support. The progressive political and economic affinities among South American governments have set in motion a process of increased extraction of their natural resources, however, with a range of compensation measures created in order to assure poverty alleviation and social legitimacy, thus defined as “neoextractivism” or “neodevelopmentism” (Gudynas 2012).

The neoextractivist policies have created a new demand for energy across the continent in order to foster agricultural and mining projects, many of them in Amazon. Hydropower plants were among the big infrastructural projects envisioned during middle of the 20th century in South America; however, Amazon river basin kept its rivers without dams, because of environmental and social concerns. At the beginning of the 21st century this perception had changed. Various governments and financial institutions have pushed for construction of big dams as a viable way to supplant fossil-fuel (International Rivers 2014), so using the climate change mitigation narrative as a support for relatively traditional developmental practices. An iconic example of the rush for hydropower was Belo Monte dam, in Xingu river, which was built neglecting all the judicial and international complaints regarding its aggressions on indigenous rights and environmental laws (Durst et al. 2018).

Peru and Bolivia were chosen as case studies because of the different stages that Brazilian actions had reached in these countries and their willingness to engage climate change actions through investments in hydropower. Starting in the 2000s, Amazon river basin became the target of several hydropower projects. Brazilian economic growth and the availability of undammed rivers set the Amazon river basin as the final frontier for hydropower plants in 21st century South America (Anderson et al. 2018; Fearnside 2014; Brasil 2017).

According to the network Amazonia Socioambiental (RAISG), within Amazon river basin there are more than 134 constructed and under construction dams, and 140 planned installations (Figure 2). It is predicted that a chain of hydropower plants is going to disrupt the geomorphologic and ecological connectivity between the headwaters, and the floodplains, therefore cutting the annual pulse of sediments, nutrients and organic matter that feeds a diversity of natural habitats (Anderson et al. 2018; Finer and Jenkins 2012). Those habitats are related with many local based and traditional uses of land and water, thus the connectivity along the river basin is responsible for a complex set of hydro-social cycles (Tundisi et al. 2014). With documented cases of involuntary resettlement, logging, pollution and violence are some of the main impacts related with hydropower, thus bringing social insecurity issues to Amazon region (Fearnside 2014; Latrubesse et al. 2017).

**Figure 2:** Proliferation of Hydropower Plants within Amazon River Basin

Peru was one leading foreign investment target of Brazil, due to its very open market for neoextractivist projects during the first decade of 21st century. Brazilian private investors and the government have taken part in this process through financing works, via such entities as the National Economic and Social Development Bank (BNDES) and by increasing the share of Brazilian companies in Peru, in a strategy of intensifying its regional hegemony in South America. Therefore, Peru and Brazil created an entangled relationship connecting diplomacy, business and environmental strategies (Gaspar 2017). At the local level many of these projects had negative effects, such as resettlement, pollution and increasing poverty (Medina et al. 2014). At the state level, connections of Peruvian projects with the “Car Wash” criminal investigation and its spillovers in Latin American countries led to corruption and enduring political instability (G1 2017; Gaspar 2017).

In contrast to Peru’s “open door” policy, Bolivian policymakers have taken more nationalistic measures regarding natural resources and

extractivist investments. During Evo Morales’ first term that began in 2006, the Bolivian government implemented substantial changes, such as the direct control of its oil and gas fields. For that reason, new infrastructure projects such as hydropower plants had less presence in Bolivia than in other South American countries. However, since around 2010, Bolivia has been experiencing the tensions and contradictions of the commodity price crises that hit the region and the growing influence of an economic liberal opposition. At this moment the projects of hydropower plants in the Amazon river basin in consortium with Brazil gained new importance. Along the Brazil-Bolivia border the Madeira river sub-basin is the target of new developments in hydropower. Two already existing dams (Santo Antônio and Jirau), situated in Madeira river, within Brazilian territory, added with two projected dams (Guajará-Mirim and Cachuela Esperanza) would form the Madeira river hydropower complex, with huge impacts predicted along the Amazon river basin (Fearnside 2014; Pires do Rio et al. 2015).



## *Brazilian Actions in Peru and its Negative Side Effects*

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Peru is one of the main foreign direct investment partners of Brazil in South America since the 1970s, when neoliberal policies had opened the country for foreign direct investments, mainly due to its natural resources (Metaxas and Kechagia 2017). Brazilian companies have taken this opportunity to engage in Peruvian market, especially through construction companies. One of them, Odebrecht S.A., the biggest Brazilian construction company, has played a key part in the growth of investments in Peru by participating in more than 40 projects, including hydropower plants, irrigations systems, highways, and subways, thereby becoming the biggest construction company working in Peru (G1 2017; Gaspar 2017).

Brazilian investments in Latin American economies have changed their pattern since 2000. In the political sphere, the rise to power of a group of left-wing governments, including Brazil and Peru, strengthened affinities among South American countries. Simultaneously, across the global economy the appreciation of commodity prices directed investments towards economic growth based on developing mineral and agricultural activities (Gudynas 2012). Peru was riding this wave by investing in hydropower projects and including new areas for its agricultural crops. Brazilian private investors and the government have taken part in this process through financing works, via BNDES, and by increasing the share of Brazilian companies in Peru, in a strategy of intensifying its regional hegemony in South America.

Two projects are emblematic of this moment. The first is the Chaglla dam, situated at the Huallaga river, at the bottom of Andes mountains. This is the third biggest dam in Peru, responsible for roughly 13% of the energy produced in the country. It was built by a co-financing of Interamerican Development Bank (IDB), Development Finance Corporation (DFC) and BNDES, requiring more than US\$ 1.2 billion and it started its operation in 2016. The second is the Special Project of Irrigation and

Hydropower Olmos. This project encompasses the production of hydropower at the Limón dam, and the transposition of Huancabamba river waters through a 20 kilometers tunnel under the Andes mountains in order to irrigate 43,500 hectares of arable land for agro-industrial development. Both activities were conceded to Odebrecht S.A. by the Peruvian government, then creating the companies Concesionaria Transverse Olmos (CTO) and the H2OLMOS.

The roll out of these projects illustrates how Brazilian actions, whether for construction or financing, do not comply with international environmental and social standards. On one hand, Chaglla dam is emblematic of BNDES's requirements to change its procedures since the project was financed in partnership with IDB, which has much stricter safeguards and transparency norms (Medina et al. 2014). On the other hand, Olmos project symbolizes a case of land grabbing with concession of public waters and land for private companies, causing dispossession and impoverishment.

The apex of Brazilian-Peruvian partnership and neoextractivist policies was set in 2009 when Luiz Inácio Lula da Silva, for Brazil, and Alan García, for Peru, signed an agreement supporting the joint construction of six dams within Peruvian Amazon forest. Moreover, in 2011, Peru signed a law declaring the construction of 20 dams in the Marañon river as "national interest", then opening the way for damming the Amazon river main source (Hill 2015; Fearnside et al. 2014). These movements would promptly fulfil Brazilian companies' appetite for new constructions with lower environment and social requirements.

Many reasons would justify the non-completion of these projects. Environmental and social concerns are well documented in many press and scientific documents (Finer and Jenkins 2012; Fearnside 2014; Tundisi et al. 2014; Hill 2015; Latrubesse et

al. 2017). However, the main action that took hold of these projects was the Brazilian Car Wash criminal investigations and its spillovers in Latin America, Africa and United States. This money laundering and bribery investigation discovered how construction companies have used corruption in order to get contracts in public services. The same scheme employed in Brazil was applied in at least fourteen other countries, but none of them with the same consequences as Peru. Since the beginning of the investigations every Peruvian president that were in office during the bonanza years were accused of corruption. Since the beginning of investigations, Odebrecht S.A. was precluded from tendering for

or participating in any other project and has been receiving fines at the figures of more than US\$ 3 billion. However, Peru has not promulgated its sentence yet. Meanwhile, the company is selling its assets in Peru, in order to pay its duties with banks and justice. For instance, the operation of Chaglla dam was sold to the China Three Gorges Corporation (CTG), and the companies responsible for operation and maintenance of Project Olmos (CTO and H2OLMOS) were sold to Brookfield Investments and Suez.

## *The Negative Effects of Brazilian Actions in Bolivian Amazon*

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During the period of augmentation of Brazilian investment in its neighbors and the increasing of Brazilian private participation in South American economy, Bolivia stayed apart from this process. One reason was the nationalization of Bolivian gas and oil sector, in 2006, which alienated private investments. The importance of Bolivian oil reserves has diminished the thrill to invest in hydropower. RAISG's data shows that there are only 11 existing dams in Bolivian Amazon, contributing with 1,010 MW.

Along the Brazil-Bolivia border, the Madeira river sub-basin has a huge importance for Amazon hydropower plans given its geotectonic diversity. This sub-basin is the main tributary of Amazon river in terms of drainage area, flux of water and sediment discharge, and it is aimed for future hydropower projects, namely 25 at its Andean section, 56 at its plateau and two at the transition between the plateau and the floodplains (Latrubesse et al. 2017). Those two last projects (Guajará-Mirim and Cachuela Esperanza dams) would be in the border region between Brazil and Bolivia and built by a Brazil-Bolivia consortium. Combining with two already existing Brazilian dams (Santo Antônio and Jirau) they would form the Madeira river hydropower complex (Pires do Rio et al. 2015).

Santo Antônio and Jirau dams, situated at Madeira river, are near the city of Porto Velho, capital of Brazilian state of Rondônia. They were built by Brazilian initiative but have effects in Bolivian territory. According to Fearnside (2014) the Madeira river project was made in 1987, predicting just one dam that would flood an area of approximately 254 kilometers along Madeira river, thus, flooding areas of Bolivian territory. For this reason, the original project was changed in order to build the actual two dams. Nevertheless, in 2004, along the process of environmental licensing, Jirau's project had to be changed in order to decrease its reservoir average level, so ensuring that the Bolivian territory would not be affected. Even though, in the project, Jirau's reservoir starts at the Brazil-Bolivia boundary its effect is felt into Bolivian territory because of the sediment deposition at the bottom of the reservoir. This sedimentation has created a not admitted "backwater stretch" (Fearnside 2014). However, during the exceptional floods of 2014, Bolivia stated formal complaints for Brazilian dam effects within Bolivian territory.

The Madeira River Hydropower Complex project was envisioned almost 40 years ago, in 1980, when the national governments started to assess the feasibility of these works but, at that time, Bolivia

lacked political and economic conditions to engage in these works (Costa et al. 2014; Lanza and Arias 2011). In 2007, Brazil and Bolivia signed a diplomatic memorandum in support of mutually beneficial energy development; and, in 2016, they agreed to accomplish the inventory studies needed to realize joint dams and transmission lines. Moreover, Bolivia agreed to export 7,500 MW of energy to Brazil,

1,500 MW from the binational projects. Since 2016, the inventory of binational hydropower plants is held by state-led energy companies: Eletrobras, in Brazil; and ENDE, in Bolivia; financed by the Development Bank of Latin America (CAF) (Brasil 2017; Costa et al. 2014; Lanza and Arias 2011).

## DISCUSSION

The cases discussed in this paper indicate the negative side effects of the relationship between state and non-state actors on fulfilling development and climate change projects. Peru's and Bolivia's hydropower plans are driven by the willingness to increase the participation of renewable energy in their energy mix. In a first sight, those projects are not related with climate change actions; however, the justification of reducing the use of fossil-fuels and the implementation of new turbine technologies opened the Amazon river basin for the rush to hydropower. In Peru's case, despite well documented and ubiquitous negative local effects of dams in such a vulnerable environment as Amazon, the simultaneity of political affinities among South American countries and economic bonanza set the momentum for the association with Brazil's state and market actors to fulfill its goals (Medina et al. 2014). Those conditions are becoming present in Bolivia currently, given the disposition to attract more foreign direct investments inflows to the country.

Concerning the lessons learnt from the hydropower plans' decision-making process, the relationship between market and state actors must be scrutinized and its security outcomes elucidated. Odebrecht S.A. actions inflicted extensive impacts on local level in Peru by its works on hydropower and agriculture. Although these outcomes demand in depth research at the local level, it is worth noting that the company have "greenwashed" its actions, through participation on Global Climate Action

scheme, where it includes its actions as emission reduction projects. This raises the questions of the role of market actors on the achievement of greenhouse emissions reduction. Chan, Brand and Bauer (2016) criticize the expectancies created by the participation of non-Party actors on climate actions after 2016's Paris Agreement, and the Peru case illustrates how the lack of transparency in the mutual influence between companies and state can jeopardize the development and climate change actions. Odebrecht S.A. scandals in Peru are having consequences to the national stability that are making a shift in the set of stakeholders engaged in national projects, raising issues of legitimacy and accountability in managing projects in Amazon river basin. In Bolivia, a new set of companies, from China and Brazil are already investing in hydropower projects, but this country remains a stronger nationalistic approach on its energy market investments. Therefore, realization of climate change actions must embrace transparency and evaluation of individual actions, in order to assess its consistency with global goals and guarantee its legitimacy at the local level.

The consequences of building dams in Amazon river basin are manifold (social, economic, ecological and political), spread from local to national levels, and affect the basin scale. Ecologically, the retention of sediments by dams produce a chain effect along the whole basin, cutting the pulse of nutrients that sustain a set of natural habitats periodically flooded

by rivers and hydro social - formations that depends on rivers (Tundisi et al. 2014; Latrubesse et al. 2017; Anderson et al. 2018). Therefore, water, food and environmental security are jeopardized along the track of changes caused by dams. Energy security is not accomplished by changing the prevalence of mix

of sources to hydropower (Soito and Freitas 2011; Schaeffer et al. 2014). Finally, the boomerang effect is felt by state through the strong increase of political and social instability where the project was carried out and caused by cunning interactions among state and private actors.

## CONCLUSION

The application of the boomerang effect framework in Brazil's actions at its neighbors provides analytical lenses to assess the unintended consequences of climate actions in Peru and Bolivia. In Peru, the ties with Brazil in order to build infrastructure works had local level side effects, such as impoverishment, resettlement, violence and land grabbing, increasing the risks to social and water security. Moreover, state level boomerang effects, such as the outcomes of corruption scandals and the current political instability in Peru and Brazil are unintended and unanticipated consequences of such investments, creating risks for both national security and government legitimacy. A critical assessment of potential consequences of climate change actions should take into account non-climate-related issues because, at the end of the day, the social outcomes of climate actions do not happen in a vacuum.

relations between climate actions, local negative side effects and their upscaling towards state level boomerang effects. Notwithstanding, this first approach is helpful in evaluating the unintended and unanticipated consequences of development projects that become climate related through "greenwashing".

In the Amazon river basin scale more consequences are predicted. The systemic effects of damming Amazon's rivers stem from the aggregation of local effects that extrapolate along the river system. In an extensive and complex system such as the Amazon river basin, the anticipation and prediction of action outcomes are a challenging albeit necessary. Regarding Brazil and Bolivia hydropower projects, boomerang effect framework can help to envision possible consequences in the Bolivian state and the border region shared between the two countries. The challenge, therefore, for decision-makers is to avoid committing the same mistakes in future.

The findings presented in this paper do need to be statistically tested, in order to address the causal

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