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ON THE INTERSECTION OF INTERNATIONAL SECURITY, DEFENSE, AND CLIMATE CHANGE IN LATIN AMERICA AND THE CARIBBEAN

NA INTERSEÇÃO ENTRE SEGURANÇA INTERNACIONAL, DEFESA E MUDANÇAS CLIMÁTICAS NA AMÉRICA LATINA E NO CARIBE

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Abstract: The purpose of this article is to show how the worsening of natural disasters due to climate change is considered as a growing threat on the security and defense agenda. To this end, a literature review is initially carried out, showing that this agenda tends to give little or less importance to this threat, often ignoring them. Then, we carry out a case study of ten Latin America and the Caribbean (LAC) countries - Argentina, Brazil, Chile, Colombia, Cuba, Ecuador, Haiti, Mexico, Peru and Venezuela -, indicating evidence and future impacts of the worsening of this phenomenon at the regional level. The data are retrieved from EM-DAT, OCHA, UNDP, UNDRR, IPCC, WMO and World Bank, covering the 2000-2019 period. Finally, we accomplish a documentary analysis of these ten LAC countries analyzing how their main high-level official defense documents address issues related to climate change, natural disasters, and the environment. Although climate change requires that the governments adapt to more frequent natural disasters, we conclude that is not possible to argue that there is a close relationship between LAC countries that suffer most from such threats with how much high-level defense documents deal with it.
Keywords: defense; international security; climate change; natural disasters; environment; Latin America and the Caribbean.

Resumo: O objetivo deste artigo é mostrar como o agravamento dos desastres naturais devido às mudanças climáticas é considerado uma ameaça crescente na agenda de segurança e defesa. Para tanto, inicialmente é realizada uma revisão da literatura, mostrando que essa agenda tende a dar pouca ou menos importância a essa ameaça, muitas vezes ignorando-a. Em seguida, realizamos um estudo de caso de dez países da América Latina e Caribe (ALC) - Argentina, Brasil, Chile, Colômbia, Cuba, Equador, Haiti, México, Peru e Venezuela -, indicando evidências e impactos futuros do agravamento do fenômeno a nível regional. Os dados são retirados do EM-DAT, OCHA, PNUD, UNDRR, IPCC, WMO e Banco Mundial, cobrindo o período de 2000-2019. Finalmente, realizamos uma análise documental desses dez países da ALC, analisando como seus principais documentos oficiais de defesa de alto nível tratam de questões relacionadas à mudança climática, desastres naturais e

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meio ambiente. Embora as mudanças climáticas exijam que os governos se adaptem a desastres naturais mais frequentes, concluímos que não é possível argumentar que existe uma relação estreita entre os países da ALC que mais sofrem com essas ameaças e a quantidade de documentos de defesa de alto nível que lidam com ela.
Palavras-chave: defesa; segurança internacional; mudanças climáticas; desastres naturais; meio ambiente; América Latina e Caribe.

Introduction

As Moran (2011) says in his book, climate change may increase social inequality within countries, what is particular dangerous to countries that are already marked by an uneven structure of rights, opportunities and income as Latin American and the Caribbean (LAC) countries historically are. Rising temperatures, geological specificities or rising sea level may worsen floods, earthquakes, droughts, storms, volcanic activities, threats to agriculture, natural resource shortages, and displaced populations, which are country-specific, context-dependent, and time-sensitive in LAC countries.

In this region, '70% of the population lives in cities, and many of these cities (as well as critical infrastructure) are in coastal areas, intensifying populations' vulnerability to climate change' (IMCCS, 2020:87). This requires case study analysis, since each case depends on governance and institutionalization, state capacity, relevance that the armed forces give to the issue, financial resources, budget for conservation, mitigation and adaptation, and social resilience, as they have different impacts across and within these countries.

However, the political and academic debate about the intersection between climate change and conflicts still has some gaps. On the other hand, when it comes to the intersection between climate change and extreme weather phenomena, resulting from natural disasters, there is a more defined outline and with few gaps, which is why States can make political decisions with a greater degree of confidence in this last aspect, such as the militarization of disasters (BOENO, 2018). Precisely for this reason, the purpose of this article is on the intersection between defense/security and natural disasters raised by climate change. The relevance of the discussion is not only due to the growing importance of the climate on the international political agenda, but also due to the humanitarian nature of the theme.

Sendo assim, o artigo será estruturado da seguinte forma: primeiramente, faz-se uma breve revisão da literatura, evidenciando que a ameaça climática tende a ter pouca relevância na agenda de defesa/segurança. The next analyses the episodes of natural disasters that occurred in LAC, specifically in Argentina, Brazil, Chile, Colombia, Cuba, Ecuador, Haiti, Mexico, Peru and Venezuela between 2000 and 2019. From this analysis, natural disasters that happened in the region will be

presented, establishing a link with evidence and future impacts from a changing climate. Main data come from EM-DAT, OCHA, UNDP, UNDRR, IPCC, WMO and World Bank. Finally, we analyze how the official defense documents of LAC countries address their concerns about the environment and natural disasters, related to the climate issue.

On the intersection of defense and climate change

In the early 1990s, the debate about the security framework expands in favor of the non-continuation of the traditional military-centered conception and the incorporation of non-traditional security challenges, suggesting the enlargement of the scope of the area (HAGMANN, 2010). Despite this movement that is advancing in a marginal way, ignorance or even resistance to the incorporation of some themes in national or regional security and defense agendas, such as climate, environment, and natural disasters, is still visible today. Its impacts on society have been increasingly covered by the mass media, the focus varying depending on the development of the countries (SCHÄFFER *et al*., 2015).

In June 1992, the United Nations Conference on Environment and Development (UNCED) held at Rio de Janeiro (Brazil), well-known as 'Earth Summit', opened up space for a wide debate, which impacted the perception of security in the post-Cold War era beyond military issues. Although not all the environmental problems discussed at UNCED have had a direct impact on defense/security issues, the asymmetric impacts of this interrelation have been highlighted for almost thirty years, since developing countries feared possible restrictions and sanctions on their development by developed countries (TERRIFF, 1992).

In view of the expansion of the concept and narratives about international security, an environmental security agenda emerges with a close dialogue with development and policy agenda (RWABIZAMBUGA, 2007; RENNER, 2004; SEYMOUR; DUBASH, 2004), with a strong role for global climate change governance (KOROSTELEVA; FLOCKHART, 2020; FLOYD, 2015; MUNDY, 2006; NAVARI, 2000). There is a propose of a local to global perspective on resource governance and conflict covering a variety of actors, conflict intensities, types of resource governance, resources, policies, and world regions (SCHILLING; SAULICH; ENGWICHT, 2018: 450).

Moran (2011) edits a book narrowing the focus of analysis on the intersection between climate change and national security by analyzing the case of forty-two countries plus the EU by 2030, highlighting the need to expand the capacities of states and regions to face the challenge. Although there is no clear scenario of climate change to ensure the case studies provided by the different authors allowing a systematic comparison (KALPAKIAN, 2015), Latin American countries finish the book with only two chapters. Brazil is the only Latin American country analyzed in detail, since Bolivia,

Colombia, Ecuador, and Peru were put together in the Northern Andes frame – despite the strong relationship between climate/environment issues and defense/ security in the region. However, despite the diversity of spectra related to the impact of climate change in national security, the book very much focuses only on water scarcity (GUNTER JR., 2012).

Analyzing the Switzerland case, Hagmann (2010) argues that the 1990 doctrine added different sorts of shortages and natural disasters as a national security challenge. Evaluating the elite perspectives on relevance of current security threats, the author shows that beyond the traditional themes such as organized crimes, international terrorism, civil and interstate wars, and domestic violence, there is a predominance of a non-traditional security issues, such as energy, water and food shortage, and global climate change. Notwithstanding, it is interesting to note that in the case of non-traditional security issues, the military segment considers such threats to be less relevant. As will be seen in the following sections, this reality is not specific to the country, but it seems to be reproduced in different countries around the world.

Focusing on the case of weak and failed states, Newman (2009: 430) highlights that the conflict in Sudan can be understood as the first conflict motivated by climate change, since the government has been unable (or even unwilling) to face the competition over resources in Darfur. Besides, the author stress that 'climate change was not taken seriously as a security challenge, despite the much greater threat it represents.' (p. 439). Analyzing the case of the U.S., Paskal (2010) and Floyd (2010) reinforce the relationship between environment and security, the first tying the theme with 'global warring' and the second with the theory of securitization.

Boeno (2018) focuses on Ibero-American countries (Argentina, Brazil, Chile, Spain, and Portugal) and concludes that the military sector contemplates the climate issue as a threat to state security in all its dimensions. Furthermore, the author realizes that the 'militarization of disasters' could cause a reduction in the operationality of the armed forces, even if it benefits from the use of dual technologies and regional approaches to face challenges that are not limited to national borders. He adds that scenarios of chaos, such as disasters and conflicts, tend to require the performance of institutions whose characteristics are the counterpoint of disorder, so that the armed forces are a natural choice for such a context. Indeed, this does not mean that the armed forces are the only ones with the right, duty, or capacity to act, however they play an important role in this process, being an essential player.

In February 2019, at a security conference in The Hague, in the Netherlands, it was announced the creation of the International Military Council on Climate and Security (IMCCS). The agency is a kind of umbrella network formed by veteran military leaders around the world who will produce an

annual report on climate and security, in addition to assuming a communication and development role for national, regional, and international policies that favor security actions in relation to climate change. However, once again it is important to note that the relationship between security and climate change transcends the military field.

Despite the different possibilities of dealing with the causes of these natural disasters and the environmental catastrophes motivated by climate change, it is undeniable that the impacts are diverse. In addition to the problems and externalities, the effects on communities are uneven, impacting more heavily the portion of the population which is already more vulnerable (CHANDLER, 2019). Thus, it is essential to promote governance in risk reduction and disaster management (WORLD BANK, 2018; RODIN, 2015; AHRENS; RUDOLPH, 2006), stressing the role that security exceptionalism has in this agenda (BEST, 2017) and the need to reflect on financialization of disaster management (GROVE, 2012).

In view of the complexity and particularity of each case, there is a discussion about promoting governance (often regional) on climate/environment. In the scope of this article, we very much focus on its intersection with defense/security, especially due to natural disasters. At the Latin American and the Caribbean (LAC) level, institutions such as the Organization of American States (OAS), Conference of Ministers of Defense of the Americas (CMDA), Inter-American Defense Board (JID) and Inter-American Treaty of Reciprocal Assistance (TIAR), Amazon Cooperation Treaty Organization (ACTO), and Union of South American Nations (UNASUR) have alerted its members to the threats arising from climate change; globally, the inclusion of the climate issue on the agenda of multilateral institutions such as the UN Security Council and North Atlantic Treaty Organization (NATO) also stands out.

In 2019, the Organization of American States (OAS) and the UN Security Council held conferences in the LAC tying up climate change/disasters and impacts on defense/security and evidencing a recent movement by countries in the region to effectively contemplate these threats. ‘However, the defense and security domains have yet to join the discourse in ways that demonstrate a serious appreciation of the severity of the risks posed by climate change not only to military facilities, but also to national, regional and global law and order processes of which they are important stakeholders.’ (IMCCS, 2020: 96).

Different countries in LAC have extensive literature on their natural resources, often associated with booms and busts or resource curse/blessing cycles (Sinnott et al., 2010) due to the volatility of commodity prices and how much the region’s economy depends on the export of these resources; however, few studies have evaluated the relationship between natural resources and climate change, particularly through natural disasters. ‘Latin America is particularly vulnerable to the impacts of

climate change as it is a region rich in natural resources. It houses 25 percent of the Earth's forests and arable land, as well as more than 30 percent of the world's water resources' (STUDER, 2019). Given the fact that these natural resources are unevenly distributed, ECLAC supports an effective and democratic governance to reach the 2030 Agenda of Sustainable Development aspirations.

In addition to the impacts of natural disasters resulting from climate change, climate has effects on patterns of violence and social tensions in Latin America as well (ABDENUR, 2019). Especially in coastal cities, where most of the defense, transportation, water supply, energy and sanitation infrastructure has been designed for climatic conditions, damage to infrastructure has economic, social, and environmental costs, and its functionality and operability must be re-evaluated (BÁRCENA *et al*., 2020).

In the regional context, it is worth mentioning that the LAC armed forces often already have a dual role, in the sense that they do not only perform combat activities. Therefore, it is important to consider not only these different actions in the region, but, above all, the territorial extension, and borders of some countries (such as Brazil, Argentina, Peru, Colombia, Venezuela, and Chile). For this reason, rather than proposing how the armed forces should act in these conflicts, the following sections will map out what events have occurred recently in the region, detailing how official high-level defense documents in these countries address the issue.

Evidence and Future Impacts

Latin America and the Caribbean (LAC) is the second disaster-prone region of the world (OCHA, 2020). A large portion of its population is at climate risk, which vary greatly according to each national context. Therefore, this session undertakes to analyze natural disasters that have occurred over the last twenty years as well as future forecasts on climate extremes, considering the intrinsic vulnerabilities of each country.

It is estimated that climate related events add up to US$ 78 billion in total damages from 2000 to 2019 in the whole LAC. Regarding the population contingent, the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) also reported that 152 million people were affected by natural disasters in the region between 2000 and 2019 (OCHA, 2020). Figures 1 and 2 help understanding the dimension of natural disasters in 10 LAC countries (Argentina, Brazil, Colombia, Chile, Cuba, Ecuador, Haiti, Mexico, Peru, and Venezuela)

Figure 1: Economic loss from natural disasters in selected LAC countries, 2000-2019, in US$ bi. Source: The authors, based on EM-DAT (2020).

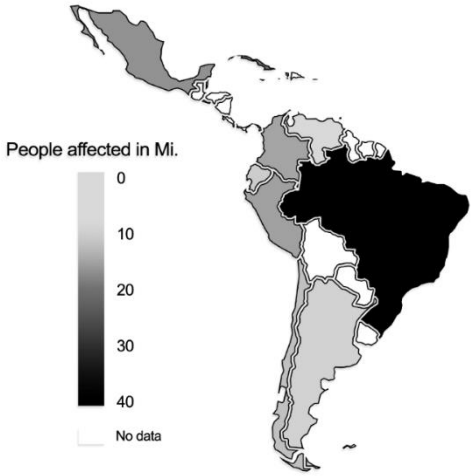

Figure 2: Number of people affected in selected LAC countries, 2000-2019, in millions. Source: The authors, based on EM-DAT (2020)

Regional Extreme Phenomena: Evidence

The importance of taking extreme events into account in a risk management approach is warned. As a result, this subsection is an attempt to clarify the occurrences of natural phenomena in selected LAC countries. It is important to state that some data may be unavailable due to the country's inability to measure these events. Figure 3 highlights the natural disasters reported in LAC countries from 2000 to 2019.

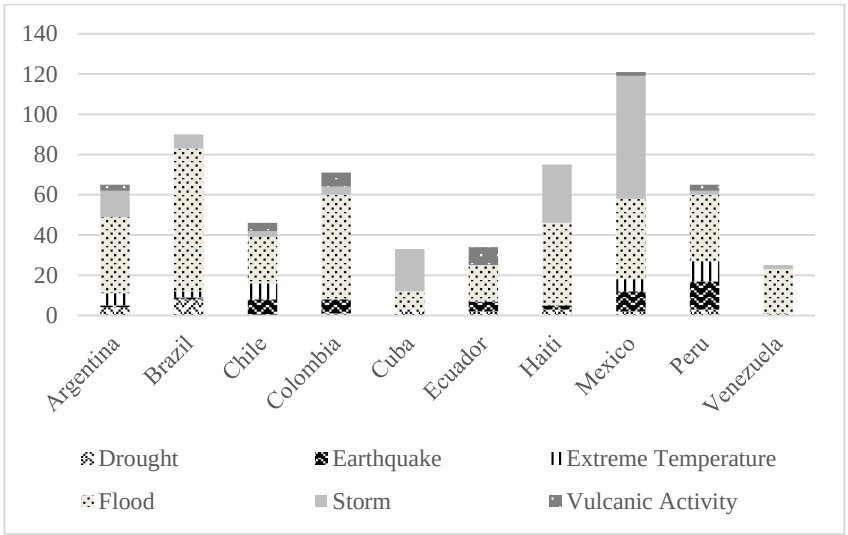

Figure 3 - Incidence of natural disasters by selected LAC countries, 2000-2019. Source: The authors, based on EM-DAT.

There is a scientific consensus, formed by the Intergovernmental Panel on Climate Change (IPCC), that the accelerated emission of CO2eq has transformed the rainfall pattern, the level and

acidification of the oceans, the global temperature, and the extreme climatic events. However, before focusing on the effects caused by human action, we will focus on the non-anthropogenic phenomena. They exist because of natural variations of the Earth and can affect the environment on a large scale. Due to their geographical location, extreme events of natural causes that impacts most the LAC region are volcanic activities, earthquakes, and the phenomenon *El Niño* Southern Oscillation (ENSO), occurring in the Pacific Ocean.

As Central America and the west South America coast are situated along an active continental margin, geophysical phenomena will always be a concern for the region. Between 2000-2019, LAC experienced 75 volcanic eruptions and earthquakes which caused approximately US$ 54.3 billion in total damages and affected at least 14.2 million people (OCHA, 2020). Its impacts were felt totally different in each country since it depends on the capability to quickly respond and/or create strategies to adapt from events or its long-term issues. For example, although Mexico had a significant loss of US$ 6 billion in one single event of earthquake occurred in 2017 (WMO, 2020), Haiti alone sustains 98% of deaths and 15% of total damage in the entire region, mostly because of the earthquake in 2010 (OCHA, 2020).

Meanwhile, phenomena known as *El Niño/La Niña* occur in the Equatorial Pacific Ocean and its adjacent atmosphere. They are antagonistic events of the same ENSO phenomenon, making the waters of the Equatorial Pacific Ocean warmer (*El Niño*) or colder (*La Niña*) than the normal historical average. This change in ocean temperature affects regional temperature and precipitation patterns. *El Niño* episodes typically leads to droughts in Andean zones of Ecuador, Peru, Bolivia, central America and northeastern Brazil (Grimm et al., 2000). Precipitation tends to be reduced in Colombia and Venezuela, but heavy rainfall and flooding due to ENSO can also happen, especially on the coasts of South American countries (WMO, 2014).

Furthermore, anthropic actions are worsening extreme natural events. Researchers say that climate change could double the intensity of ENSO, which has already increased 20% in frequency since the beginning of the century (CAI *et al*., 2014). *La Niña* events of 2011 led to the worst drought in Northeast Brazil in 30 years (MARENGO *et al*., 2013). Generally, ENSO changes the resource availability in populations that are dependent on fishing, such as Peru and Venezuela (OCHA, 2020). However, in recent years, the ENSO phenomenon, reinforced by climate change, has also impacted strategic areas such as agriculture and water supplies. States of emergency due to water shortages were declared and over 4.3 million people in Caribbean countries were placed at risk (HARE *et al*., 2017).

Droughts driven by ENSO are increasingly impacting power generation in intensive hydroelectric states, especially Venezuela and Brazil. In Venezuela, it is suggested that the 2013-2016

El Niño driven dry period impacted. Hydroelectric generates approximately 70% of Venezuela's electricity (ABDENUR *et al*., 2019). A study produced by the Center for Climate and Security (CCS) suggests that within only the last five years, both Brazil and Venezuela have experienced significant underproduction of their main hydroelectric facilities due to water depletion across major reservoir systems (BARRETT, 2018).

Heavy storms are both impacting and common for the region. These events are significatively felt in Central America and the Caribbean, where they are becoming increasingly intense and more frequent. Especially in the Gulf of Mexico and the Caribbean, tropical cyclones play a key role. Since 2000, Cuba, Mexico and Haiti were the most affected countries by storms. There were 5,000 deaths, 29 million people affected and US$ 39 billion in total damages only in these 3 countries. It is important to state that more than 85% of those deaths were in Haiti, the most vulnerable country of the region (OCHA, 2020).

Hurricanes are the most severe disaster in Central America (WMO, 2014). They caused the greatest economic losses of all climate-related disasters both in absolute terms, lethality and as a percentage of gross domestic product UNDDR (2018). Moreover, three of the five most costly storms in the past 20 years occurred in 2017 (CRED, 2018), indicating a strong relationship between climate change and extreme events.

Generally, we can assume from the events that global tropical cyclone activity is increasing in both frequency and intensity. In 2019, the Southern hemisphere suffered 27 cyclones, the highest number from one season since 2008–2009 (WMO, 2020). One of the most intense Tropical Cyclones of 2019 was Dorian. It remained over the Central America as a category 5 system for about 36 hours (OCHA, 2020). Due to its action, more than 60 deaths and scarcity of water, electricity, shelter, and sanitation were reported. The economic losses estimated only from this single Dorian event were more than US$ 3 billion (WMO, 2020).

Drier than normal conditions are also being felt, especially in the Dry Corridor of Central America and the Caribbean., 2019 had also the longest period of consecutive dry days (CDD) in South America (WMO, 2020). Those events led to fires which caused adverse effects on crops, deforestation and contributed to the drying up of some rivers of the region of Central America (OCHA, 2020). Lake levels fell significantly following below-average rainfall in Panama, leading to shipping restrictions in the Panama Canal (WMO, 2020).

Apart from infrastructure issues, droughts are also multiplier of vulnerabilities - such as energy scarcities Brazil, the most hydro-dependent country among the selected of the region, had also water stresses in the past. Brazilian and Argentinian future scenarios indicate a lack of power generation in

the Caatinga region (NOBRE *et al*., 2016; ABDENUR *et al*., 2019) and Pampa region (IPCC, 2014). Water and food security issues are also reasons for concern

As we can state from the Figure 4, flood was the most common disaster reported in LAC. Regarding its impacts, floods caused the greatest number of casualties and economic loss. It has affected a significant population, although the number of deaths caused by flooding is low. According to OCHA (2020), Colombia, Brazil, Peru and Mexico add about 27 million people affected by floods in the last twenty years.

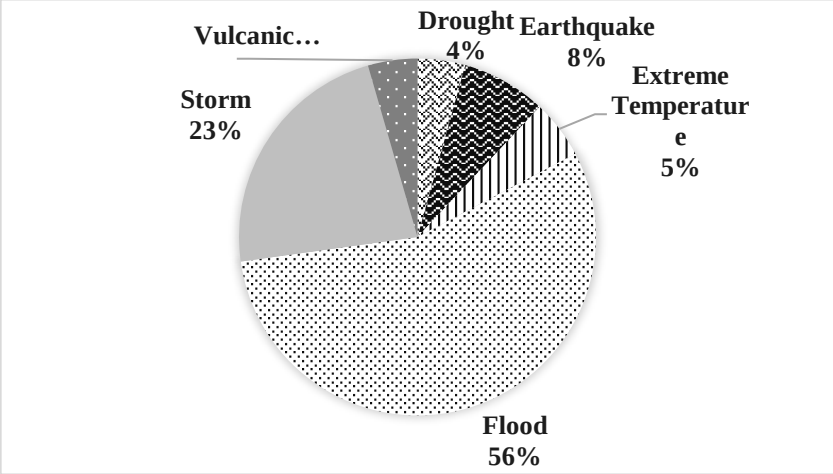

Figure 4 - Share of occurrence of natural disasters by selected LAC countries, 2000-2019, in %. Source: The authors, based on EM-DAT.

Flooding is the most impacting event in South America, although felt differently according to geographical location. In Bolivia, at least once a year rainfall has been heavier than usual since 2014, causing flooding and destroying the country's infrastructure (UNDP, 2011). Regions close to rivers or urban centers suffer from greater risks and frequency of flooding. Therefore, the Amazon rainforest totally irrigated by rivers, suffers severely, causing serious consequences for the region. More than 42,000 habitants of Amazonas, Brazil, were displaced due to flooding in June 2019 (WMO, 2020). During summer of 2017, heavy rain caused floods and landslides in Peru and Colombia that resulted in almost 500 people killed and billion-dollar losses (MUNICH RE, 2018).

The worst is yet to come: Future Impacts

Negative effects of climate change are already being experienced in the region, such as intense flooding in Colombia, intensifying cycle of hurricanes and storms in Central America and the Caribbean, prolonged droughts in Central America, Brazil, and Pampa region (OCHA, 2020; MUNICH RE, 2020; ABDENUR *et al*., 2019; WMO, 2014; IPCC, 2014). Regarding climate change, the IPCC (2018) states that the region will be severely impacted, even if the global temperature

increases by only 1.5ºC compared to the pre-industrial era. Thereby, while Figure 5 demonstrates the natural disasters already reported in the ten countries considered by this article, Figure 6 draws attention to the main future impacts predicted with climate change. Considering that there is great uncertainty about how much the Planet will warm, it is not possible to state with complete certainty when the predicted events will occur.

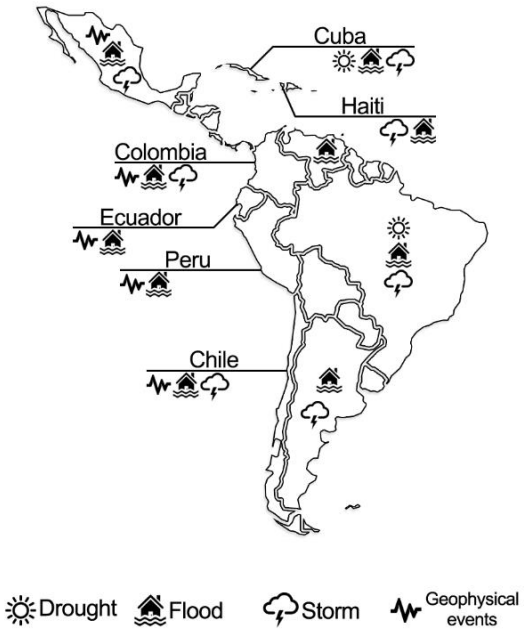

Figure 5 – Natural disasters reported by selected LAC countries, between 2000-2020. Source: The authors, based on EM-DAT.

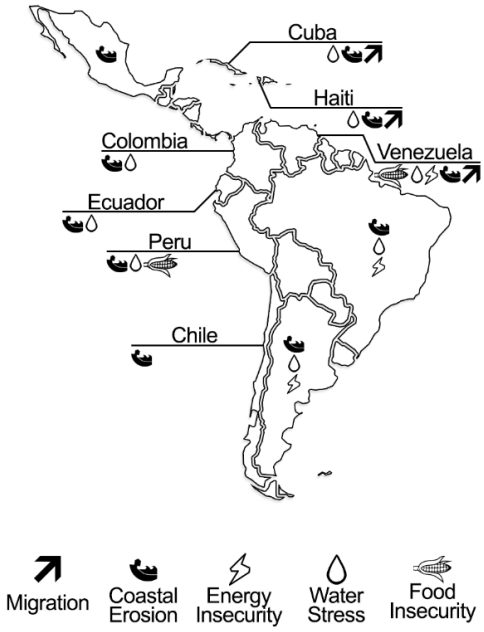

Figure 6 – Expected future impacts in selected LAC countries. Source: The authors, based on Abdenur et al. (2019), Hare et al. (2017), IBGE (2017), IPCC (2018), Nobre et al. (2016), PBMC (2014), and World Bank (2012)

Projections sustain that a 4°C warming by 2100 is likely to double the present economic damage from the increased frequency of high-intensity tropical cyclones accompanying global warming, with most damages concentrated in the Caribbean and Central American region. Flooding, the most impacting issue of the region, is also expected to increase. Of the impacts projected for developing countries, ten cities account for two-thirds of the total exposure to extreme floods. Those highly vulnerable cities are in Mexico and Venezuela (WORLD BANK, 2012).

Although some parts of the Amazon will suffer from flooding, in other regions droughts will worsen. Run off is expected to decrease in a 2°C world by around 40% in the Amazon River basin (IPCC, 2018; WORLD BANK, 2012). The decreased rainfall pattern also contributes to it. Reduced atmospheric humidity tends to damage vegetation cover, which will increase the intensity of the dry

period and, consequently, the frequency of wildfires. This phenomenon reduces soil moisture and even if the rains do not decrease significantly, it can trigger the replacement of the existing biomes by others more adapted to climates with lower water availability (e.g. savannas replacing Amazon rainforest) (PBMC, 2014). Given this scenario, it is predicted that about 43% of the plant species in the region may be extinct by the end of the century, thus diminishing biodiversity (NOBRE *et al*, 2016).

Food insecurity also tends to increase. The rise of temperatures, in combination with change of precipitation patterns, cause reductions in yields of maize, rice, wheat, and potentially other cereal crops (IPCC, 2014), which are already being felt particularly in South America, tropics and subtropics (MARENGO *et al*., 2013).

Meanwhile in the coastal zone, in addition to rising sea levels, coastal erosion and the frequency and intensity of extratropical cyclones are expected. This leads to an increase in the occurrence of extreme environmental, social, and economic damage. Sea-level rise is likely to be 15-20% larger in the tropics than the global mean in 2050, expecting to 'more than double the frequency of extreme water-level events in the Tropics, impairing the developing economies of equatorial coastal cities and the habitability of low-lying Pacific Island nations' (IPCC, 2014). This is a reason for concern since the countries analyzed have together nearly 50 thousand km of coastline, where most of the population lives, scattered over several strategic cities from the political-administrative and port/trade balance point of view. Seaports are an example of an initial point where a disruption in infrastructure facilities could trigger impacts even in distant locations, since our dependency on infrastructure to consume is only expected to increase in an even more globalized world (IPCC, 2014). Therefore, the data regarding coastal disasters in Brazil alerts to the growing vulnerability of this area (IBGE, 2017).

The projected impacts can lead to adverse consequences for human security, economic systems and displacement of populations (World Bank, 2012). Faced with this serious - but still silent - problem, we must ask ourselves about the capacity of national agents to be prepared to deal with the adversities inherent in accentuations of natural disasters. This is the focus of the next section.

Latin American Countries Analysis

This section is divided into two parts. The first part analyzes how issues related to climate change, natural disasters and the environment are dealt with in the main high-level defense documents of the ten selected LAC countries (Argentina, Brazil, Chile, Colombia, Cuba, Ecuador, Haiti, Mexico, Peru and Venezuela). These countries were chosen because they have the largest defense budgets in the region, or because they deal with many natural disasters occurring in their territories. The second part of this section presents two tables with information on the country's normative organization in

defense, and on the presence of keywords related to the environment, climate change and natural disasters in documents that can be compared between countries. Afterwards, brief considerations are made about it.

Argentina

Contemporary Argentine Defense rules are organized around the National Defense Law (1988). The main subsequent documents are the National Defense Policy Directive (2009, updated in 2014) and the National Defense White Paper (1999, updated in 2010 and 2015).

While the National Defense Law (1988) and the National Defense Policy Directive (2009) do not mention climate change, the 2014 version of the Policy Directive mentions the importance of contemplating and weighing a set of circumstances and events, resulting from climate change from different areas and perspectives. The White Paper (1999) emphasized the constant interrelationship between the Ministries of Defense and the Interior, for the support of the Armed Forces in cases of natural disasters. But both this document and its most recent version (2015) do not mention concern about climate change. However, the White Paper (2010: 27) stated that 'climate change and ecological and environmental degradation can also cause disruptions in the international scenario, as, consequently, food production may be affected or the extinction of freshwater courses, causing massive migratory flows or conflicts over food and drinking water resources.'

The first two versions of the Argentine White Paper featured chapters on the environment; Chapter VII (The Main Fields of Action, item 5: Regarding the Environment), on its first version, and Chapter XXIV (Environmental Policy), on the second version. However, these chapters have been removed from the 2015 document version. Thus, there is a setback in Argentina's main defense rules regarding the interrelation between Defense and the Environment, particularly on the possible impacts of climate change on society and national security.

Brazil

Since its first versions, the Brazilian Defense documents hardly mention the consequences of climate change for national defense and security. In 2012, the National Defense Policy (PND, in Portuguese) highlights for the first time the possible impacts of climate change when analyzing the international environment, stating that these have 'serious social consequences, with repercussions on the state's capacity to act and on international relations.' This concern reappears broadened in the PND 2020 version, emphasizing that the 'impacts caused by climate change or pandemics may have serious environmental, social, economic and political consequences, demanding a prompt response from the State.'

However, the quotes about climate change and its consequences did not gain the attention of the National Defense Strategy (END, in Portuguese), demonstrating the lack of depth of the theme in the preparation of actions to reach the National Defense Objectives (OND, in Portuguese) and the correspondence between policy and strategic action. The White Paper mentions this issue only in 2012, and repeatedly, so that there is no progress on the matter. The growing mentions found in the White Paper about the possibilities of occurrences of natural disasters in the country have little to do with the effects of climate change. Therefore, the absence of mention of disasters in both Defense Policies and Strategies suggests little concern by the Armed Forces with respect to risk reduction and disaster management.

Interestingly, the document 'Defense and the Environment,' also known as 'Green Paper,' does not mention climate change or its impacts, nor concerns about the occurrence of natural disasters, losing the opportunity to advance in understanding these phenomena little discussed in the PND, END and the White Paper. In general, the Green Paper focuses not only on the sustainable management of the Armed Forces, but on the history of operations in defense of the environment.

More than just quantifying the number of words in each of Brazil's high-level defense documents related to the issues, this method was used to identify low mention as a proxy to highlight the little relevance given to the themes. In addition, there is a significant mismatch between mentions in the PND and their respective END on topics such as climate change, natural disasters, and sustainability, so it is important that there is a proper correspondence between policy and strategic action. This reveals a discursive intentionality for this environmental and climate agenda; however, it lacks strategies to face such challenges and threats, running into the dilemma between text and practice.

Chile

The law N. 20,424/2010 enshrined the relevance of environmental issues to the Ministry of National Defense. The environmental variable was incorporated by the military institutions in their operations, to allow the development of international cooperation actions. The Ministry participated in the first National Action Plan for Climate Change, that covered the period from 2008 to 2012. It is a document that was first updated in 2014 by the Council of Ministers for Sustainability and Climate Change, and later by the Ministry of Environment, for the 2017-2022 period. It defined specific environmental attributions for the Armed Forces.

According to this new focus, climate change has been considered an eventual source of conflict, associated with the scarcity of resources, with environmental degradation, melting ice, the increase in migration, the 'blurring' of borders, changes in sea level, and the proliferation of diseases, among

others. The new Defense Paper (2017) reflects the evolution of the most recent public policies that are being developed in the sector. For the first time in its history, the Ministry of Defense began to prepare a policy that will allow it to contribute organically to national efforts to mitigate and adapt to the effects of global warming and climate change, an effort carried out jointly with the Ministry of the Environment.

Regarding the Defense Policies and Instruments developed to deal with natural or anthropogenic disasters, the participation of the Armed Forces is limited to the establishment of the National Civil Protection System to prevent, mitigate, and respond to disasters. The future Civil Protection Law foresees the creation of an agency to deal with emergency issues, establish a National Civil Protection Council and a National Civil Protection Strategy to coordinate interinstitutional efforts in the phases of disaster prevention and response. In view of the references analyzed, it is possible to infer that since the Bachelet government, climate change and the environment concern have taken new spaces in national politics, especially in the Defense sector, which corroborates with the country's Ministry of Environment in mitigation of the effects of natural disasters and climate change.

Colombia

The main defense documents of the Colombian government are the White Paper on Security and Defense Statistics (2014), the Army's Institutional Strategic Plan (2020), Comprehensive Security and Defense Policy for Prosperity (2011), and The Defense and Security Policy (2019). The documents generally do not pay much attention to climate change and the consequent disasters. According to Catarious and Espach (2009), Colombian citizens will be affected by extremely frequent and intense natural disasters and by a change in patterns of agriculture, migration, and poverty, which can lead to an increase in the country's crime levels.

In the Colombian Defense White Paper (2014), there is no clear definition of the country's objectives in the area, as the document focuses on a quantitative analysis of the data. Although within the crimes mentioned in the document are encompassed those against the protection of natural resources and the environment, there is no reference to climate change.

The Army's Institutional Strategic Plan (2020) sectorizes specific issues to be addressed from campaign plans, one of which is the campaign plan 'Mayor Artemisa', which deals specifically with the environment, and aligned with it, points to the existence of the Army's Environmental Management Plan. In turn, the Comprehensive Security and Defense Policy for Prosperity (2011) sets out six strategic objectives to neutralize the four main risk factors for the country: armed groups outside the law, crimes against citizens, external threats, and natural disasters. Within the objectives set by the

document to achieve prosperity, is the sectoral strategy of 'contributing to timely attention to natural disasters and disasters.'

Finally, the Defense and Security Policy (2019) brings the great deforestation that occurs in the country for coca planting as the big environmental problem. In addition, the document cites the threats related to climate change, natural and anthropic disasters, and the environment, highlighting the possibility of future resource shortages and the challenge this would pose to Colombia.

Thus, although the absence of the importance of climate change in the documents can be explained by the fact that the body responsible for acting in case of environmental disasters is civil defense and due to the severity that drug trafficking represents for the country, such a posture is worrying, as it can generate even greater problems.

Cuba

The main Cuban norm of National Defense is the National Defense Law (1994), which regulates the declaration of exceptional situations and their effects; the organization of the Defense Councils, and their functions, as governing bodies of the country in exceptional situations; the forces participating in the defense using the means of armed combat; the fundamental elements of military service that Cubans must provide; the essential issues of military patents; and the country general principles of defense preparation (Law N. 75 of National Defense).

Due to its insular condition and geographical location on the Caribbean Plate, the country presents conditions of risk of disasters of great magnitude, being necessary a careful formulation of contingency plans to reduce the impact of climate changes, which can cause adverse effects on the human and material country resources, key assets to its national defense policy. Although natural disasters are cited nine times, the National Defense Law does not mention climate change or terms related to the environment, so there is little normative guidance in this regard.

The Decree-Law N. 67/1983, which deals with the Organization of the Central Administration of the State, defines that the Ministry of the Revolutionary Armed Forces is the body responsible for exercising the command of the Armed Forces and Civil Defense, with the duties of organization, preparation, and employment. Decree-Law N. 170/1997, on the civil defense measures system, establishes the head of the army as the coordinating authority for this system, which aims to reduce the consequences of natural disasters. None of the decrees lists climate change as vectors that cause natural disasters, nor measures to adapt the Armed Forces to deal with this phenomenon.

Ecuador

The main defense documents of Ecuador are the National Defense Policy of Ecuador (2002), the White Paper of Ecuador (2006), the Political Agenda of National Defense, in the versions of 2008, 2011 and 2014, and the National Defense Policy of Ecuador, also known as the White Paper (2018). From the analysis of specific terms in the mentioned defense documents - the Political Agendas of the National Defense of 2008 and 2011 were not found - there is a growing concern with climate change and natural disasters. Indeed, Ecuador is a country with a high vulnerability to disasters, as it is in one of the areas of greatest tectonic complexity in the world, at the meeting point of the Nazca and Sulamericana plates (2019).

The latest version of the Political Agenda addresses the relationship between climate change and natural disasters, 'and the environmental context, climate change alters the composition of the atmosphere and affects climate variability and the deterioration of the quality of air, land and water, because of high concentrations of pollutants, threatening the survival of life in the planet. This constitutes a problem from which multiple consequences and phenomena arise from which natural disasters are derived that affect safety.' (2018, p. 39).

Floods, landslides, land, and forest fires were natural disasters identified in this document (2018). In these cases, the attention to the population, and the installation and construction of infrastructure for the implementation of solutions is a responsibility of the Engineering Corps of the Ecuadorian Army (2018). In this context, the document presents as a defense strategic objective the support for institutions in protecting the population in their rights and freedoms, in the face of serious situations of internal commotion and disaster situations (2018).

Haiti

The Republic of Haiti is one of the most vulnerable countries to climate change according to the Global Climate Risk Index (2019). Its most critical areas are food security and environmental disaster risk management, problems that are already faced and that will be further aggravated by climate change.

Despite its complicated history, the country has been drawing up plans for change, which considered defense sector reform part of Haiti's reconstruction effort (Mendelson-Forman, 2006), culminating in the preparation of the Defense White Paper (DWP) (2015). One of the national interests to be preserved, according to the DWP, is environmental durability. In addition, natural disasters, deforestation, and climate disasters are presented as risks to the country. Thus, climate change is mentioned several times as a worrying factor for the country and should be tackled through public

policies (HAITI, 2015). Compared to documents from other LAC countries, environmental and climate issues are considered extremely important for national security.

The main objective established in the DWP is the creation of a new Defense Force, which is also important to deal with the climate change consequences, given the support it will provide in case of environmental disasters. Thus, in 2019, there was a meeting of the Inter-American Defense Board to verify the implementation of the Haitian Defense White Paper (JID, 2019). In such an event, Haiti's defense minister said the country is taking the document's recommendations as a priority, with the creation of a new defense force that aims to be a modern army and to have as its main task the aid of the population in case of natural disasters, border protection and infrastructure construction. Therefore, it is possible to affirm that despite the major obstacles faced by the country, efforts to implement what is described in the official documents are present.

Mexico

Missions, in case of disasters, can be carried out by the Army and the Air Force, by themselves or in conjunction with the Navy or other dependencies of the Federal, State or Municipal Governments, all as ordered or approved by the President of the Republic, during the exercise constitutional powers. Mexico has 7 White Papers, divided by theme, but only 3 address the environment and/or climate change - although there are no details about the environmental approach.

The country has a recent Climate Change Plan (2019), little detailed, which assigns some responsibilities to the Department of Defense. In accordance with the policies and measures for the prevention and mitigation of greenhouse gas emissions, the National Defense Secretariat carries out different activities, namely: encouraging the specialization and professionalization of military personnel in environmental matters, giving lectures and courses on the subject; participation in fighting forest fires; application of the Climate Change Plan, helping the population in cases of disasters anywhere in the national territory, in order to contribute to the national effort to preserve people, their properties and their environment; and apply tree production and reforestation programs.

It is possible to infer that although the Department of Defense of Mexico mentions and addresses climate issues, there is still little, if any, approach to natural disasters affected by climate change and how it directly affects National Defense.

Peru

The Peruvian Defense White Paper (2005) has no reference to climate change and does not place natural disasters among the main threats. Only within the third objective for national defense

policy, the creation of 'economic-strategic conditions that ensure peace, integration and prosperity,' the protection of the population from natural disasters appears as a subtopic.

Even in Peru's Third National Communication on Climate Change (2016) or the National Strategy for Climate Change (2014) no intersection with the country's defense is presented at any time. Thus, from the main defense document of the country and from the documents on government climate action that the understanding of climate change as a threat factor does not exist.

As shown in previous sections, according to the IADB (2011), Peru is one of the most vulnerable countries in the world to climate change, with 72% of its natural disasters between 1970 and 2010 being caused by climate change. Therefore, considering existing risks, a greater preparation of the country to deal with natural disasters should be presented.

Venezuela

Venezuela's defense policy is not concentrated in just one document and is based on the Socialist Strategic Defense Sector Plan (2016) and the 'Organic Law on National Security' (2002). The last document presents in article 12 the importance of natural resources for the country's security, but does not specifically address climate change.

In its Strategic Plan (2016), the Venezuelan government presents as the great national historical objective 'to contribute to the preservation of life on the planet and the salvation of the human species' having as one of its subobjectives 'contribute to the formation of a large global movement to contain the causes and repair the effects of climate change that occur because of the capitalist model of predator'. In addition, Venezuela has as a differential the existence of a Sustainable Defense Sector Development Plan 2017-2026, although its existence is not consolidated, because, despite appearing on the official website of the Venezuelan government, it is not available for public access.

In addition, the Second Communication on Climate Change (2017) reaffirms the Venezuelan government's concern of military intervention in its country since there is a great defense of the country's environmental sovereignty (p. 5). In the document, we can observe measures taken by Venezuela as a form of action against climate change, such as the elaboration of security and defense laws that control the use of wood, soil and water (p. 98). The Venezuelan government also relies on the use of satellites to assist in decision-making in strategic areas, one of which is environmental disaster management (p. 112). Therefore, it is possible to state that there is an effort to implement the commitments made in its official documents.

Table 1 sought to sum up the most recent defense documents from the ten countries under analysis, divided into four categories of documents, as well as year of its last edition. The selected categories are Defense Policy, Defense Strategy, White Paper, and Green Paper. This understanding

follows the Brazilian normative logic, which presents them in this way to their society. This analysis is important to understand how countries present their documents to their societies. It is clear that, with the exception of Cuba and Venezuela, all the analyzed countries recently published white papers on national defense - documents that summarize their views about the national and international security context, as well as their objectives, and/or national defense strategies.

Countries	Defense Policy	Defense Strategy	White Paper	Green Paper
Argentina	2014	-	2015	-
Brazil	2020	2020	2020	2017
Chile	-	-	2017	-
Colombia	2019	-	2014	-
Cuba	1994*	-	-	-
Ecuador	-	-	2018*	-
Haiti	-	-	2015	-
Mexico	-	-	2017	2009
Peru	-	-	2005	-
Venezuela	-	2016	-	2017*

Table 1: Types of most recent defense documents, by country and year. Source: the authors, based on Argentina (1988, 2014, 2015), Brazil (2010, 2012, 2017, 2020a, 2020b, 2020c), Chile (2010, 2017), Colombia (2011, 2014, 2019, 2020), Cuba (1983, 1994, 1997), Ecuador (2014, 2018), Haiti (2005), Mexico (2009, 2017), Perú (2005, 2014), Venezuela (2002, 2016, 2017). * The document is not presented to its society with the same category's name, but has a similar function to it. The documents are (by year): 1994 - the Cuban National Defense Law; 2017 – the Venezuelan Sustainable Defense Sector Development Plan 2017-2026; and 2018 – the Ecuador's National Defense Policy – "White Book."

Table 2 presents a comparative analysis between the countries' national defense white papers, based on keywords related to the environment, climate change and natural disasters. The comparative analysis is based only on the White Paper because this is the most similar national defense document among all countries. That is why Cuba and Venezuela were excluded from this analysis. Since the countries have different languages, Portuguese, Spanish and French, more than one keyword was used to search for the same expression. Thus, the terms 'ambient' and 'environnement' looked for references to the environment in these defense documents. The terms 'desastre' and 'catastrophes' looked for references to natural disasters, meanwhile 'clima' searched for climate change.

	"ambient"		"environnement"		"clima"		"desastre"		"catastrophes"	
Countries	Total	Environment	Total	Environment	Total	Climate Change	Total	Natural disasters	Total	Natural disasters
Argentina	28	13	-	-	8	0	43	10	-	-
Brazil	49	18	-	-	0	0	8	5	-	-
Chile	121	115	-	-	91	76	32	18	-	-
Colombia	14	13	-	-	0	0	0	0	-	-
Cuba	-	-	-	-	-	-	-	-	-	-
Ecuador	29	22	-	-	7	7	5	4	-	-
Haiti	-	-	7	0	8	2	-	-	23	17
Mexico	14	11	-	-	3	0	9	3	-	-
Peru	21	17	-	-	11	0	10	3	-	-
Venezuela	-	-	-	-	-	-	-	-	-	-

Table 2: Presence of keywords in National Defense White Papers by country. Source: the authors, based on Argentina (1988, 2014, 2015), Brazil (2010, 2012, 2017, 2020a, 2020b, 2020c), Chile (2010, 2017), Colombia (2011, 2014, 2019, 2020), Cuba (1983, 1994, 1997), Ecuador (2014, 2018), Haiti (2005), Mexico (2009, 2017), Perú (2005, 2014), Venezuela (2002, 2016, 2017).

Argentina, Brazil, Mexico, and Peru have concerns about the environment and the occurrence of natural disasters in their territories. However, they ignore the impacts of the effects of climate change on the security of their societies and infrastructure. By not mentioning climate change in their main defense documents, these countries do not relate the possibility of disasters to climate change. In opposition to these countries, Chile, Ecuador, and Haiti express concerns about the effects of climate change and the possibilities of natural disasters. However, while the first two are concerned with protecting their countries' environment, Haiti does not express the same concern.

Conclusions

Based initially on the literature review, it became clear that defense and security areas tend to resist or even ignore the climate agenda, often without mentioning 'environment,' 'climate' and/or 'natural disasters.' For this reason, it was necessary to analyze the case of the LAC countries to identify whether, despite the great catastrophes already experienced and the scenarios of worsening of these events in the near future, they have contemplated such threats in their high-level defense documents.

From the analysis of episodes of natural disasters that occurred specifically in the selected LAC countries, natural disasters had already caused billion-dollar damages, costed many lives and only tend to increase for the next decades. From all the incidences, Mexico suffered most with natural disasters, followed by Brazil, Colombia and Peru and flood is the most occurred condition of the region. Although the number of deaths caused by flooding is low, it has caused the greatest economic loss of the region. Other reported natural disasters include drought, storm and geophysical events.

From the documental analysis of each case, we could observe that the date of publication of defense documents is a more relevant factor than the vulnerability in the concern of each state with the consequences of climate change for the security of their country, although it is not a determining factor. The most recently published documents are from Brazil (2020), Ecuador (2018), Chile (2017) and Mexico (2017), and two of these (Chile and Ecuador) are part of the group of countries most engaged with climate change according to our study. In addition, among the most vulnerable countries (Haiti, Peru, and Colombia), only Haiti highlights the relevance of climate change to its security.

From the key terms analysis, Argentina, Brazil, Mexico and Peru have concerns about the environment and the occurrence of natural disasters in their territories, although they ignore the impacts of the effects of climate change on the security of their societies and infrastructure. By not mentioning climate change in their main defense documents, these countries do not relate the possibility of disasters to climate change. In opposition, Chile, Ecuador, and Haiti show concerns about the effects of climate change and the possibilities of natural disasters.

Even though climate change requires that the governments adapt to more frequent natural disasters and future threats, it is not possible to affirm that there is a close relationship between LAC countries that suffer most from such threats with how much high-level defense documents deal with it. However, it is important to consider that the number of natural disasters may not be a sufficient variable to understand how the defense and security perspective faces these threats, since LAC countries differ greatly in size, population, and suffered impacts.

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