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**Coca eradication programs and
environmental detriment in Colombia**

**Enviromentální bezpečnost v Kolumbii ve světle
programů zaměřených na eradikaci koky**

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Abstract

Conceived as U.S. assistance to Bogotá in combating Colombian drug cartels, Plan Colombia imposed the eradication of coca plants mainly through the fumigation with glyphosate. In the accusations against the Plan, human health issues largely surpassed discourses over environmental preservation. This thesis argued that the protection of biodiversity-rich Colombian ecosystems should be prioritized, hypothesizing harmful effects of Plan's implementation on flora and fauna. Building on the securitization theory, Colombian environmental detriment was proved to constitute a security issue. First, indeed, critical review of main toxicologists' studies on the matter revealed that the mixture used in fumigations deeply affects the ecosystems. Notably, a case study on Putumayo department emphasized damages on non-target vegetation and animals, which reduced to poverty the locals. Secondly, elaborating the data collected by the Integrated Illicit Crops Monitoring System (SIMCI) between 2001 and 2015, a comparative analysis between Putumayo and the Pacific region detected major crops displacement along the years, and, therefore, more and more forests cleared to grow coca. Finally, the last chapter described how, in the same period, the Plan was not redefined by environmental concerns, with political interests continuing to be sole drivers of Colombian antidrug policy till the halt of fumigations in 2015.

Keywords

Environmental Security, Securitization, Plan Colombia, Coca, Glyphosate, Displacement.

Range of thesis: 100.865 symbols.

Declaration of Authorship

1. The author hereby declares that he compiled this thesis independently, using only the listed resources and literature.
2. The author hereby declares that all the sources and literature used have been properly cited.
3. The author hereby declares that the thesis has not been used to obtain a different or the same degree.

Prague, 26/07/2021

Camilla Bregante

A handwritten signature in black ink that reads "Camilla Bregante". The signature is written in a cursive style with a large initial 'C' and a long, sweeping tail.

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1 Introduction

Instituted in 1999 under the government of Andrés Pastrana as a bilateral initiative with the U.S. Clinton administration (Conway, 2014), Plan Colombia was one of the most controversial anti-drug policies of all time. Naming it “Plan Colombia for Peace”, the Department of National Planning of Colombia (Departamento Nacional de Planeación, DNP) first described the Plan as a national strategy aiming to achieve peace through political negotiation with the communist Fuerzas Armadas Revolucionarias de Colombia (Revolutionary Armed Forces of Colombia, FARC), that held the illicit drug market in the country to fund their insurgency (Romero and Silva, 2009). However, nothing could be further from the reality, since military action constituted its major tool (Conway, 2014). The interest in combating the war on drugs worldwide, combined with the determination to fight the paramilitary group of FARC, led the United States to partner with Colombia in the Plan till its end in 2015.

Since 2000, the implementation of the Plan included the eradication of coca cultivations as a key component, mainly through the aerial spraying or fumigation with a chemical mixture containing glyphosate. This latter eradication method divided the international political arena and alarmed the environmentalists, supported by biological assessments on the toxicology of the glyphosate-based herbicide. However, despite all the efforts, this strategy has been considered unsuccessful and mostly ineffective in terminating the drug-trafficking in Colombia.

The relevance of this study is rooted in the fact that Colombia is the second most biodiverse country on the planet, being the first in bird diversity and orchids; second in amphibians, freshwater fish, plants, and butterflies; third in reptiles and palms; and fourth in mammals (Sistema de Información sobre Biodiversidad de Colombia). Interestingly, the aerial spraying of herbicides as main coca eradication method is controversial since its initial adoption in 1992 following the decision of the *Consejo Nacional de Estupefacientes* (“National Narcotics Council”) (Romero and Silva, 2009). Already the first years of Plan Colombia, implemented from 1999, knew an increasing number of studies aiming to demonstrate the glyphosate’s harmfulness on ecosystems and human health, especially when sprayed from long distance.

Building on the securitization theory, my work attempts to demonstrate that the environmental detriment due to coca eradication between 2001 and 2015 in Colombia

constitutes a security concern. In general, I seek to bring robust evidence in favour of the urgent necessity to securitize Colombian environment. Hopefully, furthermore, this research will help in overcoming the existing blind spot in the scholarship on the environmental and human security in Latin America by offering rich examples of environment-related security issues in Colombia (see Chapter 1.2). Since the country is internationally known for its biodiversity-rich rainforests, including the Amazon, I argue that damages to Colombian delicate ecosystems should be prioritized. Importantly, in the discussions about the negative effects of the aerial spraying, the harm on flora and fauna were largely surpassed by concerns on human health. Despite understanding the greater relevance of human over environmental diseases, I believe that, by approaching the Colombian environmental emergencies, both social challenges (e.g. hunger and forced migration) and global disasters (e.g. global warming) could be prevented. Therefore, I will investigate the impact of coca eradication policies on the flora and fauna alone.

My study is mainly related to Putumayo department and the Pacific region, that embeds the territory of Nariño, Choco, Cauca and Valle del Cauca. Presenting very low levels of coca growing, this latter department will cover a marginal role in the analysis. While at the beginning of the century, the major concentration of coca crops was in Putumayo department, over the years, the Pacific region seems to have replaced it. Therefore, a comparative analysis among the selected departamentos could lead to generalizations about crops mobility trends in the country. In addition, sharing similar geographical and meteorological conditions, both the Pacific region and Putumayo are covered by rainforests, including some primary forests, which confirms the need to protect their flora and fauna and allows important considerations about the toxicity of aerial spraying on the ecosystems.

After a review of the existing literature on the subject (Chapter 2), the present thesis is composed by three main sections addressing, respectively, three research questions. First, Chapter 3 intends to inquiry over the direct damage on the environment produced by the spraying of the glyphosate-based herbicide over the coca crops, assessing whether, and to what extent, the fumigations between 2001 and 2015 resulted in the detriment of the ecosystems. My hypothesis, namely that the fumigations produce negative effects on the ecosystems, found strong confirmation in the scholarship. A review of the studies in this field, indeed, detected a highly probable detriment to the biodiversity linked to the chemicals contained in the herbicide. Remarkably, some

comments are made on the doubtful independence and reliability of the studies conducted by the toxicologist Keith Solomon, who seems over-optimistic over the almost total innocuity of sprayed glyphosate. To bring actual evidence about the relevance of this study for future antidrug policy-making, I will analyse the case study of Putumayo, the first department fumigated in 2000. Importantly, indeed, some studies reported the complaints of local farmers about major damages to agriculture and livestock, on which they relied to live.

Through the next section, Chapter 4, my focus shifts on the indirect impact on forests occurring when both manually and aerially eradicating coca crops. As emphasized by other scholars (see Chapter 2), indeed, even when eradicating by manually pulling the roots of coca plants, environmental degradation (deforestation) takes place because of the replanting of crops in new areas, which constituted my hypothesis. Data collection will allow me to show whether and how the illicit crops displaced to different regions in the area under study due to the implementation of the Plan. In this respect, the comparison of the coca cultivations' movements, both within the same department and between bordering regions, suggests that frequent displacement indeed occurred.

Finally, Chapter 5 consists in an evaluation of the policy implications derived from concerns about the negative effects of the eradication tools between 2001 and 2015. The assessment is made through the lens of the securitization concept, examining whether the environmental detriment connected to coca eradication was securitized in Colombia. First, based on the fact that, in 2007, President Uribe declared its willingness to sharply reduce fumigations, it will be discussed whether this promise was met. Then, some comments accompany the antidrug policy of President Santos, who vocally stood against the war on drugs till the halt of fumigations in 2015. Interestingly, furthermore, the role played by the United States in the Colombian policy-making is examined. Final remarks concern the willing of the current President Duque to resume the eradication programs, which alarms the international community and confirms the urgency of securitizing the Colombian environment.

1.1 Data and methods

This work is the result of quantitative and qualitative research. In both cases, information and data were evinced from existing literature and databases.

As far as Chapter 3, it was not possible to analyze quantitative data by myself mainly due to difficulties in finding online sources. Also, the highly specific language, belonging to the biology field, stood too far from my education. Last but not least, then, in describing the impact of the fumigations on the organisms, my security approach, distant from a biological one, allows policy-related conclusions. Therefore, with a critical eye, I combined the results of previous relevant research conducted by toxicologists. In general, the objective was to investigate over the correlation between aerial spraying with glyphosate and environmental detriment, in order to check the presence of a causal relationship between the two phenomena.

In Chapter 4, Integrated Illicit Crops Monitoring System (*Sistema Integrado de Monitoreo de Cultivos Ilícitos*, SIMCI) constituted the source of the data analysed. Specifically, data gathered by SIMCI were cited in several reports issued by the United Nations Office on Drugs and Crime (UNODC) between 2001 and 2015 monitoring the coca cultivations in Colombia. The information collected were elaborated through a comparative analysis, and then summarized in tables and graphs to make them more accessible.

Finally, Chapter 5 is both descriptive and analytical, combining facts and some literature review with my critical perspective.

1.2 *Securitizing the environmental degradation*

This thesis constitutes an attempt to prove that environmental concerns should be included in the strategy of governments and international bodies when shaping antidrug policies, so that the eradication practices would be avoided in favour of non-polluting and more effective tools such as interdiction. In this sense, my argument will rely on the theory of securitization, including the attention paid to the policy implications of the eradication practice. In other words, I argue that deforestation and damages to ecosystems should be securitized in the national and international arena, especially in relation to the eradication efforts.

Before penetrating the heart of the securitization theory, it is necessary to clarify the concept of “security issue” and its development. In International Relations theory there is a long tradition according to which security is something about the survival of political communities (Procacci, 2011). The global scenario in the aftermath of the collapse of the Soviet Empire, and the easing of tensions between East and West, led to a structural change in international relations and a consequent acceleration of globalizing processes. The conceptualization of security was influenced by the new and changing historical and socio-political context. As a result, the international law began to change. It historically concerned the relations between states regarding certain areas, such as war and diplomacy, and was closely linked to their sovereignty and territorial borders. At the end of the 20th century, international law became an instrument for addressing new issues and for cooperation in new areas, such as the environment and human rights. Suddenly, states found themselves having to weigh the costs and benefits of the loss of autonomy that these developments implied, struggling in the identification of new threats, priorities and strategies to follow. Consequently, the studies in this field were forced to innovate in order to strive for new solutions (Cuccu, 2018).

In this new globalized world, it was necessary to rediscover what characteristics made the old concepts of security different from other political categories, in order to recover the urgency and regulatory weight present in them. First of all, therefore, academics aimed to identify certain requirements and criteria that distinguish security issues from the regular dimension of political practices (Procacci, 2011).

Among the new approaches, Ole Waever in 1995, and then Barry Buzan and Jaap de Wilde, proposed the securitization theory as a useful tool for the understanding of non-traditional aspects of security (Milani, 2018). These scholars were members of

the so-called Copenhagen School, that dealt precisely with the expansion of the notion of security, focusing in particular on non-military aspects. In the critical theory of the Copenhagen School a twofold necessity was outlined: first, to overcome the coincidence between security and national security, and then, to extend the concept of security to other sectors, such as the political, economic, social and environmental sectors (Monteleone, 2012).

The method employed by the Copenhagen School highlighted how a common problem can evolve into a security problem. The securitization of an issue is understood as a transitive act comprising three phases (Does, 2013). Initially, society perceives a given situation as problematic, but the latter is not yet politicized: the state does not deal with it and the topic is not included in the public debate. At a later stage, the issue becomes an interest of the state, which begins to act according to standard risk management procedures. The argument is finally securitized when it is classified as an existential threat, in the name of which the government can use extraordinary tools, both political and legislative (Procacci, 2011). Historically, after all, the invocation of security has been the key to legitimizing the use of force, but also to allow the state a capacity to mobilize or use special powers that it otherwise would not have. Security therefore designates an emergency condition in which any means necessary to counter existential threats can be used (Buzan, Waever, and de Wilde, 1998).

In sum, the Copenhagen school believes that the military security agenda can be extended to the defence of states and governments against non-military threats. In the environmental sector, for example, the agenda includes issues such as ecosystem degradation (global climate change, deforestation, desertification, etc.), energy problems (access to natural resources and inequality in distribution), demographic issues (unsustainable development, epidemics, uncontrollable migration, etc.), economic questions (unsustainable production activities, structural asymmetries and inequalities) and civil damage (environmental damage caused by war and violence linked to environmental degradation) (Monteleone and Rossi, 2008). From this list it seems evident how the environmental issues can seriously undermine the well-being of people. This means that environmental security is deeply linked to the larger paradigm of human security. It is undeniable, indeed, that global and environmental changes threaten the humanity in the same way that environmental disasters pose risk to the safety of entire communities, given the dependence of humans on natural resources (O'Toole, 2016).

In general, human security emerges as the most recent line of studies which aims to establish an operational agenda for states and multilateral organizations. Since nowadays internal conflicts are much more numerous than interstate conflicts, and that 90 percent of wars are registered among civilians, human security shifts the attention from the state entities to the individual human being and his needs. While the list is long, the threats can be classified into seven categories: economic security, food security, health security, environmental security, personal security, community security, and political security (UNDP, 1994). As alluded before, indeed, threats to human security include not only violent death, dehumanization, drugs, discrimination, internal disputes, proliferation of weapons, but also diseases, natural disasters, the disasters deriving from human action, population displacement and environmental degradation (Bajpai, 2003).

In the Human Development Report (HDR) 1994, the United Nations lists the environmental security among the emerging challenges to human security, especially in the form of deforestation, that causes very intense drought and floods. (UNDP, 1994).

The heated debate around the concept of environmental security arose at the end of the Cold War, with the emergence of global issues such as the ozone depletion and the global warming. From one side, the new concept was welcomed as an attempt to better depict these new types of vulnerabilities, and, consequently, to get an account of the potential conflicts that could be linked to them (Trombetta, 2008). Furthermore, Homer-Dixon (1991) argued that environmental degradation, including scarcity of resources, could be connected to the rise of conflicts. On the other hand, however, the critics argued that the security concept regards the sphere of the state and the military, in which the environmental debate should not be included. Deudney (1999) expressed the concern that, if embedding the environmental security concept in our system, new nationalistic waves could rise aiming to protect the national environment. Consequently, by incorporating environmental concerns in the national strategy, the necessary cooperation between states in facing the environmental issues could be undermined (Trombetta, 2008).

As far as the repercussion on the political arena, Mikhail Gorbachev, the last leader and of the Soviet Union, at the United Nations General Assembly in 1988 stressed that the most urgent threat for humans was no longer constituted by missiles but by global warming. The argument of Homer-Dixon guided the Bill Clinton administration (1993-2001) in shaping the foreign policy as well as a proactive

environmental policy. Moreover, environmental concerns were included in the cooperation for development programmes by the European commission. The debate on this new area of security occurred also in 2007 in the United Nations Security Council, when there was no agreement among the state representatives on the possibility of referring to environmental detriment as a security issue (Trombetta, 2008).

Interestingly, Gavin O'Toole, expert in Latin American politics, argues (2016) that Latin America and the Caribbean represent a blind spot in research in the talks about the human and environmental security. The author emphasizes how the natural threats can undermine the economic and living conditions also by mentioning that, between 2002 and 2011, the average number of people affected by natural disasters was 124.5 million per year (O'Toole, 2016). Clearly, natural hazards deeply impacted on the development of Latin America and the Caribbean. Although this region has faced issues of environmental and human security, the English-language literature seems to lack on this matter. O'Toole contends that, indeed, since the end of the Cold War, the security concept continues being described by discussions around the political order and the state power. Also, most importantly for this thesis, Latin America and the Caribbean are apparently not included in any debate about environmental and human security, despite the region largely addressed related problems. Notably, the region covers a globally prominent role in the discussions about climate change, given, among others, the concerns about the loss of the rainforest, especially in Amazonia (O'Toole, 2016). My work lies within this blind spot, contributing to the redirection of the concept of security to new perspectives. The harmfulness of the eradication methods on the environment in Colombia, being the focus of my thesis, caused the displacement of coca cultivations, and, therefore, of peasants relying on them, as well as damages to licit agriculture and livestock activities, reducing local communities to poverty (see the case of Putumayo, Chapter 4.2). These are only some examples of how the Colombian context offers rich elements to consider the environment a security issue, who needs the attention of scholarship.

Despite concerns about climate change were somehow successful in the introduction of environmental issues into the security agenda, the environmental change is still overlooked until this day in favour of traditional threats (Trombetta, 2008). Nevertheless, in the last part of this work it will be shown that in Colombia some actions were actually taken to avoid the negative effects of aerial spraying on human health and biodiversity. Starting from 2007, indeed, President Uribe decided for a shift

in the techniques, with an increasing resort to manual eradication at the expenses of aerial spraying. Furthermore, with the creation of the National Comprehensive Program for the Substitution of Illicit Crops (*Programa Nacional Integral de Sustitución de Cultivos de Uso Ilícito*, PNIS) in 2017, two years after the stop to fumigations, the government promoted the voluntary substitution and the alternative development programmes, in the hope of efficiently fighting the illegal market without unwanted consequences for the health of people and the ecosystem. In other words, drawing on the theory of securitization, in Chapter 6 it will be investigated how environmental concerns linked to the aerial spraying led to a partial redefinition of the eradication policies in Colombia.

Although the Copenhagen School warned about the risks of securitization, linked to the emergency measures that it implies (Buzan and Hansen, 2009), this research argues that the environmental detriment issue, consequent to the anti-narcotics policies, should be securitized in Colombia. As stated in the Chapter 5, I believe that the securitization of the environment could help in prioritizing it in the political debates on security. However, from my perspective, the use of force would be counterproductive in addressing environmental issues. Therefore, I also agree with adopting international cooperation and the intervention of transnational organizations as main tools to achieve the environmental security. Indeed, the loss of primary forests, that cover large areas of Colombian territory, is a phenomenon of global concern, contributing to the extinction of rare species but also to the increase of greenhouse gases in the atmosphere (Pachamama Alliance, n.d.). The urgency of the prioritization of the environment in Colombia stems from the fact that the aforementioned efforts to combat the illicit drugs market without jeopardising the citizens' health and the ecology risk being erased by the current Colombian presidency. Therefore, exceptional measures taken by international organizations against the eradication policy itself are desirable and necessary, since the current Colombian government appears not to be really aware of the severe side effects produced by the aerial spraying, both locally and globally. In fact, the President Iván Duque Márquez, in office since August 2018, announced the resume of spraying herbicides over the coca plantations, ignoring not only the peace agreement stipulated with the paramilitary group FARC, but also the long documented damages for the environment and the health of people. My analysis of the side effects that coca

eradication methods produced in the period between 2001 and 2015 could highlight the ineffectiveness of such tools, and, most importantly, their harmfulness.

2 Literature Review

As emphasized in the World Drug report in 2015, it has been long documented that illicit crops and drug production are important causes of deforestation in Latin America and Southeast Asia (UNODC, 2015). This assumption finds support, among others, in the research of Jaime Escobar Triana, professor of bioethics, dated 2003. First, coca cultivation requires the expansion of the agricultural frontier, through the cutting down of forests and the use of chemicals to make land suitable for coca crops. Secondly, moreover, toxic waste is dumped into water sources (Escobar Triana, 2003).

Several studies have been published around the issue later on, confirming what theorized at the beginning of the twenty-first century. In 2015, for instance, McSweeney states that pollutant chemicals necessary for the production of drugs deeply affect ecosystems, contaminating the soil and water sources (McSweeney, 2015). The necessity of an antidrug policy providing for the eradication of illicit crops is rooted in this discourse, namely the notion that drug production is devastating the Colombian environment.

After some years of implementation of Plan Colombia, scholars researched about the effectiveness of the eradication measures and their side effects. A partially positive insight is given by Romero and Silva (2008), holding that crop eradication caused a substantial reduction of hectares cultivated until 2006, even though it was followed by a considerable increase in 2007. Both Conway (2014) and Rincón-Ruiz et al. (2016) share their vision, showing that Plan Colombia did actually result in a decrease of the level of coca cultivation. Nevertheless, Conway stresses the need to consider also the interdiction efforts as major part of the policy implementation, instead of referring to the eradication program as the sole factor. This mistake would make troubling the interpretation of data, as well as challenging the efforts to find causality between the phenomena. In other words, if, from one side, Conway observes some decrease in the cultivation due to the eradication policies, from the other, he finds very hard to decouple them from the multitude of factors and operations included in the plan. In addition, he highlights that the areas cultivated may have become less, but the plots became more productive due to new technologies. In fact, one unintended consequence of Plan Colombia was peasants, backed by paramilitary groups, cultivating smaller plots but more productive due to improved technologies but also increased labour. Furthermore,

the author notes that illicit crops began to be mixed with legal cultivations in order to minimize the possibilities of detection by the state's forces (Conway, 2014).

In this regard, the international security expert Felbab-Brown (2020) warns that these expedients would severely reduce the effectiveness of the eradication efforts. The coca growers, indeed, learned how to overcome the law enforcement's detecting operations by mixing illicit crops with legal cultivations and/or moving to very remote (and biodiversity-rich) areas. Then, he regards aerial spraying as a more ineffective method comparing to manual eradication since coca growers learnt to wash the plants from the chemicals. Importantly, Felbab-Brown expresses his concerns even about glyphosate's destructiveness on the forests and legal cultivations, which contributes to considering manual eradication by far the best and most durable solution. It is underlined, moreover, that any accidental spraying on legal crops leads the indebted farmers to switch to illicit crops. Nevertheless, in general, the author is skeptical about the success of the eradication policy since a short-term reduction in incomes do not deter the cocalers from continuing their gold-salary activity (Felbab-Brown, 2020).

In a report by Transform Drug Policy Foundation (2016), it is contended that justifying the eradication programs with ecological concerns related to the production of drugs is nonsense. In fact, what is underlined is that the eradication efforts magnify the environmental detriment, that occur at much higher speed than when the law enforcements do not intervene. Harshly criticizing every aspect of the Plan in its attempt to handle the drug issue, the report denounces the destructiveness of the glyphosate, especially when applied aerially from long range with high risk of spraying the wrong areas. Also, it condemns the decisions for having sprayed the glyphosate-based herbicide on tropical forests even if the U.S. Environmental Protection Agency prohibits to release such substance near waterways. This is emphasized as an unacceptable mistake, since the water contamination put in danger not only the growth of vegetation, but also the health of the animals drinking that water (Transform, 2016).

According to Escobar Triana, drug production together with government's eradication efforts produce the so-called "triple deforestation". In this respect, we can observe three different stages of deforestation: first when the forests are cut down to make them suitable for illicit cultivation; second, the damage caused by fumigations; third, the new cycle of deforestation when new coca crops originate in the neighbouring regions (Escobar Triana, 2003). This last is known as "balloon effect", being generally understood as one major factor undermining the effectiveness of antidrug policies. In

this regard, even the geographer Kendra McSweeney highlights that, given the “eradication-inspired mobility”, or the “displacement effect”, both aerial and manual eradication seem to provoke severe consequences for the forests and the biodiversity. As will be deepened in this thesis, the author is mainly concerned by the fact that, when moving to other areas, drug cultivations affect new forests and green areas, incrementing the affected hectares. She also suggests that the given the infinite possibilities of finding new areas for cultivations, as long as there will be eradication, displacement will occur (McSweeney, 2015).

As far as the link between the balloon effect and the effectiveness of the Plan, in the World Drug Report (2015) is stated that the eradication efforts provoke the displacement of coca cultivation to remote areas where there is wealth of resources, beyond the reach of the government. Consequently, not only biodiversity-rich areas would be contaminated, but also the antidrug policy would lose its effectiveness. Among others, indeed, Romero and Silva describe the balloon effect as main factor because of the Plan was not able to reach the set objectives, such as reducing crops by 50% throughout the country (Romero and Silva, 2008).

In order to evidence the displacement phenomenon, the authors confront the variations in hectares illegally cultivated in the regions over the first years of Plan Colombia. They take as an example the Putumayo Department, which in 1999 had 58.279 cultivated hectares of coca and in 2006 12.254 hectares, reflecting the exacerbation of the eradication efforts since 1999. However, if there is a quite considerable decrease in Putumayo, it is registered an increase of greater proportions in Nariño (Romero and Silva, 2008).

A sceptical position is held also by Rincon-Ruiz et al. (2016) that, although claiming the success of the Plan in decreasing the hectares cultivated, recognize that, over the years, the illicit crops displaced to other Colombian areas, and mostly to the Pacific region, whose rich biodiversity is internationally known.

When evaluating the success of the eradication policy, the study of Conway focuses specifically on the economic aspects of the antidrug policy. Performing a cost-benefit analysis of Plan Colombia, the author concludes that the costs of the eradication efforts exceed the positive outcomes. In comparison to the interdiction operations, indeed, the eradication would be less effective especially if considering all the unwanted consequences such as the displacement of coca production, its increasingly intensive cultivation, and the environmental detriment (Conway, 2014).

The 2016 report by Transform Drug Policy Foundation expresses similar concerns, defining futile the illicit crops eradication, since it failed to produce the desired outcome of limiting the drug trafficking. From an economic point of view, it is then argued, the eradication efforts only make the illicit market more profitable, given that the rise in drug prices was not accompanied by a decrease in the demand (Transform, 2016). In addition, Felbab-Brown highlights that the armed groups controlling the drug trafficking are able to switch to other illicit markets, such as mining, illegal logging and poaching, that can cause much greater and deeper environmental detriment (Felbab-Brown, 2020).

In sum, several researches proved that the eradication policies are socially and environmentally extremely cost-ineffective, wondering why the government decided to continue till 2016 employing eradication, and particularly fumigations, as major tool in the war on drugs. Apparently, under Pastrana's administration there was already official knowledge about the possible environmental negative impacts of fumigations. Indeed, according to a study carried out by the Ministry of the Environment in the Pastrana government, glyphosate was not the most appropriate method for the eradication of coca crops. Among the factors that led to such statements, there is the risk that, when spraying areas of high jungle density, the chemicals would not properly fall on the sites identified with illicit crops and, therefore, other areas would be contaminated (Sánchez, 2005). However, such warnings have fallen on deaf ears. Strong of the studies about the destructiveness of coca production, environmental considerations continued to justify the eradication, with no mention to the greater risk of deforestation, especially subsequent to the balloon effect. Furthermore, McSweeney underlines that the pollutant chemicals necessary for producing drugs, are largely used by the authorities when eradicating, emphasizing the nonsense of justifying this policy also through environmental discourses (McSweeney, 2015).

These premises led the scholars to believe that political concerns were key drivers for the eradication policy building and implementation. Significant contradictions can be detected between the many studies that denounced the harmful consequences of fumigations, and a government-sponsored research conducted by CICAD that states their innocuity. The policy is imposed vertically, with no regard to the empirical evidence against it. In general, it is assumed a strong pressure from the United States to achieve rapid results in the war on drugs, regardless of the social (and environmental) costs (Ospina, 2015). Felbab-Brown reiterates that the social and

environmental concerns are somehow surpassed by political affairs. Colombian government, in fact, cared mostly about its reputation in the eyes of the United States, reporting to Washington the desired outcomes in terms of hectares eradicated, with no reflection on the sustainability of such policy in the long term (Felbab-Brown, 2020). The cruciality for Bogotá of achieving the set goals was reinforced by Trump's menace of decertifying Colombia for not meeting the expectations, which would mean the imposition of sanctions and the suspension of most U.S. assistance. Such circumstances led Bogotá towards aggressive eradication efforts, that, however, apart from producing countless negative social and environmental effects, did not result in durable declines in drug cultivation (Felbab-Brown, 2020).

3 Aerial spraying and the environmental degradation

In the literature review, through the report by Transform Drug Policy Foundation (2016), as well as the work of Conway (2014), I introduced the idea of linking ecological issues in Colombia with the chemicals sprayed by the government when eradicating coca plants. Along these lines, the present chapter provides technical information about whether and how the eradication programs through aerial spraying constituted a menace for Colombian flora and fauna. To be more specific, in this section it will be investigated whether coca eradication through aerial spraying worsens, improves, or makes no difference on the environmental conditions in Colombia. In other words, this analysis aims to answer to the research question whether the implementation of Plan Colombia, between 2001 and 2015, coincided with an increasing loss of biodiversity. A case study on Putumayo department, then, will underline how the damages to non-target vegetation and animals can also affect the living conditions of the local communities.

In the next subsection I will summarize the findings of previous research in the interest of providing a comprehensive analysis of the risks associated with the aerial spraying in Colombia. Among the others, I will rely particularly on the works published by Caroline Cox and Keith Solomon, who stay at the opposites in their evaluations over the toxicity of glyphosate. While Caroline Cox's publications on pesticides constituted a fundamental source for several subsequent studies on the matter, Keith Solomon is regarded with suspicion as far as the independence of his research. The environmental toxicologist, indeed, was financially supported by Monsanto, the company producing the herbicide used in Colombian fumigations (Corporate Europe Observatory, 2017; Lubick, 2007).

Finally, being the first region where Plan Colombia was implemented, Putumayo department will constitute my case study. In particular, I will examine the effects on agriculture and pasture reported by the inhabitants of Putumayo as well as by the Ecuadorian border communities.

3.1 Glyphosate, deforestation and loss of biodiversity

This sub-chapter holds a prominent position in my thesis, since it shows to what extent Roundup, the herbicide used in Colombia during the fumigations, damages non-target organisms. Proves of high harmfulness on the ecosystems could support my thesis on the emergency of introducing environmental menaces in the security realm.

Damages to biodiversity species due to aerial spraying is highly likely in Colombia, since the illicit crops are normally located in biodiversity-rich ecosystems (Red por la Justicia Ambiental, 2015).

Glyphosate is not normally used "as is", but needs to be dissolved in other compounds, called adjuvants or surfactants, which allow the herbicide to penetrate the plant leaf, as well as to increase dispersion. The herbicide used in the aerial spraying in Colombia is a mixture of glyphosate and the surfactant Cosmo-Flux, called Roundup and produced by Monsanto (Nivia, 2007). While some studies focused on the impact of glyphosate alone, it was hypothesized that surfactants could deeply worsen the effects of glyphosate, which encouraged research and experiments specifically on the mixture used in Colombia (Lubick, 2007).

Water

Although the government officially declares to not fumigate the surface water, and, therefore, despite surface waters are not deliberately sprayed by pilots, fumigations may occur over small streams and banks of rivers or lakes (Solomon et al., 2005).

Since most of scholars agrees that glyphosate strongly and immediately binds to soil particles, consequently its chemical characteristics would prevent it from seeping into the ground nor surface water, which includes streams, rivers, lakes, and wetlands. Nevertheless, traces of glyphosate have been found in surface water, indicating that, if not directly, the herbicide can contaminate water through different mechanisms. In particular, one option for glyphosate to move into surface water would be the washing of soil containing glyphosate into waters. In any case, even when this occurs, glyphosate persists in water for a shorter time than in soil, while its presence was found to be longer in sediments (Cox, 1995).

Aquatic organisms and amphibians

As far as its toxicity on aquatic species, it is indicative that the Monsanto company, producer of Roundup, prohibits its use near or over bodies of water. In order to investigate the toxicity of the mixture of glyphosate and Cosmo-Flux, as used in Colombia for eradication, the study led by Solomon et al. (2005) demonstrated that this mixture is more toxic to the aquatic organisms, especially amphibians, than the formulations without the addition of surfactants and adjuvants. In other words, the toxicity of glyphosate itself to aquatic organisms has been shown to be very low (Solomon and Thompson, 2003) but, when mixed with some surfactants and adjuvants, toxicity may increase consistently. The effect of these formulations on aquatic life covers the entire spectrum of the food chain starting with algae and plankton, continuing with invertebrates (including crustaceans), fish, amphibians, insects, and others (Vargas, 2004).

In particular, the herbicide Roundup seems to be highly toxic to fish. It was proved that, when the water temperature increases, the toxicity of glyphosate also increases, which makes Colombian environment particularly vulnerable due to its tropical climate. In addition, killing the shadowing vegetation, the spraying of glyphosate herbicides causes an increment in water temperature, increasing the toxicity of the following applications. The side effects of glyphosate formulations on fish include the erratic swimming, labored breathing and, more in general, behavioral changes that increment the possibility of being eaten by a predator (Cox, 1995).

As far as amphibians, one major issue is that they reproduce in temporary ponds that could be as little as 15 centimeters of water. Therefore, it would be impossible for pilots of government's aircrafts to avoid spraying such shallow waters when they are in close proximity to coca cultivations (Red por la Justicia Ambiental, 2015). Unfortunately, amphibian larvae were found to be more susceptible to the glyphosate formulation than other aquatic animals (Howe et al., 2004). Due to their close dependence on the physicochemical conditions of the water, amphibians constitute a group that is particularly vulnerable to pesticides such as glyphosate (Reylea, 2005a) comparing to other aquatic animals. This is particularly revealing considering that amphibians are indicators of the general health of ecosystems, in a way that impacts on amphibians can identify negative effects on the entire ecosystem (Red por la Justicia Ambiental, 2015). Although amphibians play an ecologically relevant and irreplaceable role, agrochemicals producers are not required to provide for amphibian toxicity data

(Bernal, Solomon, and Carrasquilla, 2009). In the early 2000s most of experiments seeking to observe the interaction between amphibians and glyphosate were conducted in the laboratory, which may have undermined the reliability of the results (Relyea, 2005b). It was proved, indeed, that the soil present in nature rapidly absorbs the glyphosate, restricting any harmful effect to a short-time period. However, further research showed that this process is not enough to minimize the lethal effect of the herbicide. For example, in his experiments Relyea (2005b) observed that high concentrations of Roundup meant the death of the majority of North American tadpoles even after the addition of soil and loam. He hypothesized that the amphibians died in the short time window before the herbicide was absorbed by the soil. Nevertheless, the researcher was not able to attribute such lethality to glyphosate or instead to the surfactant (Relyea, 2005b). Moreover, some studies indicate that concentrations of glyphosate below lethal may still have non-visible effects that end up reducing the probability of survival of the affected amphibians, resulting in long-term fatality (Relyea and Edwards 2010). Similarly, further research concluded that glyphosate influences different life aspects of amphibians, such as growth, metamorphosis size, duration of the larval stage, and detection of predators, which affects their probability of survival (Cabido et al. 2012).

Soil and vegetation

The strong and fast union of glyphosate herbicides with the soil causes readily the loss of biological activity. In general, glyphosate seems to bound immediately to the soil, and just as quickly it unbinds from soil particles (desorbs) (Cox, 1995). However, a research conducted in European environment showed that the degradation of what remains from the initial breakdown seems to be slower, which means the long persistence of glyphosate residues in the soil. Also, this study found glyphosate to be highly mobile in soil (Cox, 1995). This last statement, however, met strong opposition in other studies, where it is argued that its specific physicochemical properties allow glyphosate to be almost immobile in soil (Solomon et al, 2005).

As I will show with the case study on Putumayo department, there is strong evidence that the fumigations significantly damaged non-target vegetation, including food crops, on which many communities depend for their subsistence (Red por la Justicia Ambiental, 2015). This happens because the aerial spraying from fixed-wing aircraft comports long drift distances. This drift refers to the unwanted movement of the

herbicide after its application. While this phenomenon interests all the pesticides, glyphosate seems to damage more extensively and more persistently, since it moves fast within the plant (Cox, 1995). In three studies promoted by the Canadian agricultural ministry, it was detected presence of glyphosate 200, 300 and 400 meters away from the target areas. Another study, conducted in California, found traces of glyphosate up to 800 meters far from an aerial spraying. Regarding the unwanted ecological effects, plants were affected 100 meters away from the application. The Canadian studies calculated that, in order to avoid unintended damages on non-target fields, buffer zones of 75 to 1200 meters would be necessary (Cox, 1995).

Terrestrial organisms

As far as the harmfulness of glyphosate on terrestrial organisms, research in New Zealand showed that glyphosate had significant effects on the growth and survival of common earthworms (Diamand and Barron, 2001). Although there is no research on this specific matter in Colombia, this study highlights the possibility of actual harm occurring also when spraying glyphosate on Colombian earthworms.

As concerns the fungi, the majority of scientific literature agrees that glyphosate increases the growth of pathogenic fungi. Consequently, these fungi release their own toxins (mycotoxins), which are toxic to several life forms, including mammals (Bigwood, 2002; Vargas, 2004). Importantly, moreover, glyphosate intervenes in the mycorrhizal relationships between fungi, nutrients, and plants. The mycorrhizal relationship is a symbiotic association between the cell body of a fungus and the roots of some plants, which provides an exchange of nutrients and water that benefits both the plant and the fungus. Several plants rely on this relationship to survive (Bigwood, 2002; Vargas 2004).

Beneficial insects

In the research led by Salomon is investigated the toxicity on honeybees of the mixture of glyphosate and Cosmo-Flux. The results demonstrated that the exposition to the herbicide mixture is not acutely toxic to honeybees, since no stress behaviors nor death was detected in the 48 hours following the application. By extrapolation (maybe too simplistic), Salomon concluded that these results could be generalized to the other benefic insects (Solomon et al., 2005). However, according to a research by the International Organization for Biological Control, when exposed to Roundup, more than

50 percent of three species of beneficial insects (parasitoid wasp, lacewing, ladybug) died, while the lethality was above 80 percent for the predatory beetle. Among others, a field study conducted in Carolina confirmed this trend, observing that the population of beetles recovered only after 28 days. Aquatic insects seem to be in danger too, even though the lethal effect of glyphosate on them varies widely, also depending on the water hardness (Cox, 1995).

3.2 Case Study: Putumayo Department

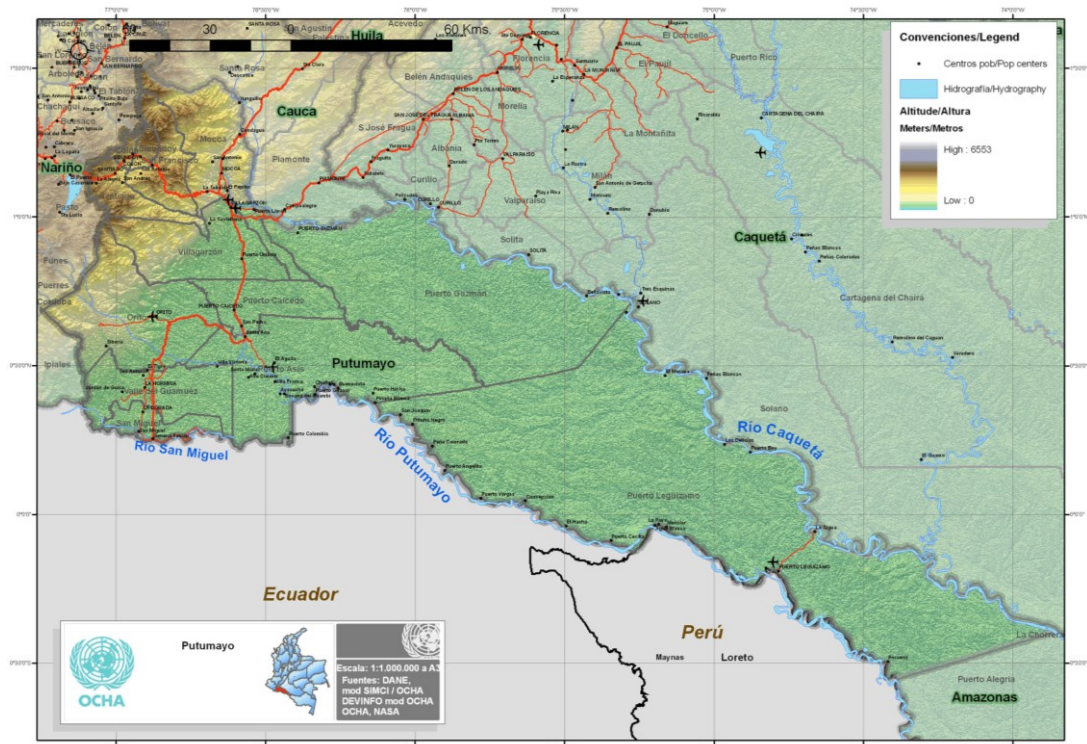


Figure 3.1: Physical map of Putumayo department. Source: DANE.

The department of Putumayo is located in the Amazonia region, on the border with Ecuador. While being the only department object of my work that is not included in the Pacific region, Putumayo shares fundamental ecological, geographical, and economical elements with it, which, to some extent, allows to generalize the research results concerning this area to the rest of the territory under study. As the Pacific region, indeed, the department is characterized by a humid and rainy climate, with tropical forests and several waterways. Being mainly flat, moreover, Putumayo's morphology is comparable to Chocó department, while shares the same economy based on livestock and agriculture as Cauca. Most importantly, then, known for hosting more than a

thousand of species of bees, Putumayo's forests contain a rich biodiversity and some natural parks, as well as the Pacific region.

During the 90s, coca crops spread in the region until they represented, in 1999, one third of the total hectares cultivated throughout the country (Rivera, 2005). As a consequence, the eradication program of Plan Colombia in its first stage began in this area, where, from December 22, 2000, to January 28, 2001, 25.000 to 29.000 hectares were sprayed out of 66.000 hectares cultivated. The mixture used in the aerial spraying was Roundup-Ultra, normally containing glyphosate with the addition of Cosmo-Flux 411F as surfactant (Maldonado, 2001).

The Health Department of Putumayo promoted the evaluation of potential negative effects of fumigations on the health and environment, following the Resolution 0005 and 017 of the National Department of Anti-narcotics on mechanisms of control and monitoring of the environmental and health impact generated by the fumigation of the area with glyphosate for the eradication of crops for illicit use. Under the direction of Diva Revelo, the team inquired through three different investigations the effects of the plan to eradicate crops for illicit use by aerial spraying with glyphosate. Although major attention was paid on the health status of the population, my intention is to illustrate exclusively the effects on both food crops and animals. The third of the aforementioned studies investigated about the health issues manifested by the inhabitants after the aerial spraying, with no mention to the damages on plants, therefore I will exclude this last work from my analysis (Revelo, 2005).

The first work, analyzing the fumigations performed between November 2000 and February 2001, aimed to esteem the negative effects on people, cultivations, and animals in three municipalities of Putumayo: Valle del Guamuéz, San Miguel, and Orito. The research team relied on the information delivered in complaint forms filled out in the Valle del Guamuéz and San Miguel by the head of the family, including the number of people, animals and hectares sprayed, as well as on the information obtained directly by the Technical Assistance Unit (UMATA) of Orito. The results were worrying. It was estimated that 12.836 hectares were sprayed with glyphosate herbicide, including not only coca crops, but also hectares planted with stubble, banana, corn, yucca, fruit tree, and pasture. This latter counted 4.954 hectares affected, which alone corresponds to the 38% of the fumigated area. As far as the animals, the numbers suggested a high toxicity of glyphosate, since 373.944 animals, including fish, chickens, cows, horses, ducks, pigs, dogs, rabbits, pigeons, turkeys, and cats became ill and died

as a result of the aerial spraying. The fish were the one affected in a greater proportion (around 81%) (Revelo, 2005).

The second work was performed on the basis of the information obtained during the aerial spraying occurring between November 2001 and February 2002. The conditions regarding the receipt of complaints changed in relation to what was observed during the previous inquiry, since the resolution 017 of December 2001 of the National Department of Anti-narcotics established that the complaints could only be accepted by people who own licit crops showing the title of ownership of the land, the latter requirement not available by most of the landowners in this area. Similarly to the previous study, the data derived from the complaint forms consigned to the municipal authorities, filled out exclusively by licit cultivations' owners resident of 50 villages in the municipalities of Orito, Valle del Guamuez, San Miguel, and the inquiry only regarded the damages on the crops. Out of the 189 complaints submitted, around 94% (177) referred to damages to the agriculture. The total amount of area affected by aerial spraying was 1.094 hectares, meaning the 52% of the 2.098 hectares cultivated. According to the submissions, moreover, the highest proportion (around 35%) of affected hectares corresponded to pastures used for feeding livestock, followed by corn, banana and yucca crops. The study also revealed that 82% of the people affected in their crops were signatories of social pacts, which means that products financed by the government through projects destined to support those who committed to manually eradicate coca, were also sprayed with glyphosate (Revelo, 2005).

With his report, published in 2001, Maldonado aimed to document the impact of aerial spraying on border communities. Beside the objective of identifying the most frequent health problems reported by the population after the fumigations, the study intended to investigate the impact on the agriculture. The selected communities were divided in three groups according to the distance from the area sprayed (taking the border as a reference). Group 1 counted 15 families less than 2 km away from the fumigation areas, Group 2 included 11 families located 5 to 6 kilometers from the border, while Group 3 comprehended 6 families settled 9 to 10 kilometers from Colombian border (Maldonado, 2001).

As far as the first group of families, the indigenous and peasant communities living close to the San Miguel River (up to 2 km far from it), declared to be mostly concerned by the poultry breeding. They reported that during the aerial spraying a large number of chickens and turkeys suffered a kind of plague, whose symptoms included

shortness of breath, going blind and finally dying. It was recorded that, out of 339 individuals, 266 (80%) died during fumigations (Maldonado, 2001). Regarding the second group of families, distant 5 to 6 kilometers from the fumigation area, the toxicity of fumigations caused the death of cows, pigs, goats and horses. In particular, six families that owned cows reported the death of twenty-five calves and the abortion of all the cows that were pregnant during the fumigations, and some others died shortly. One mare aborted too. Four families having pigs reported losing 37 of them. In addition, other four families lose 36 chickens that died with a kind of plague, whose symptoms included getting blind (Maldonado, 2001). Surprisingly, the group of families settled 10 kilometers away reported death of animals too, especially cows and chickens. Two families lose 7 cows out of 11, while three families reported the death of 100 chickens out of 140. Furthermore, all the fish of two ponds died (Maldonado, 2001).

As far as the cultivations, all the groups complained about significant damages to crop. The research team verified the information provided with a tour in the area, collecting the following information. Both the coffee and cocoa plantations were found with empty fruits, and dried leaves. The banana trees tended to rot, becoming black without growing nor bearing fruit. While both the cane and the yucca presented with black and dry stem, the first had tasteless flavor, whereas a black stain on the flesh of yucca roots gave it a bad taste. Finally, the rice turned yellow and dry, without growing. According to the peasants, the rice production reduced by 90% due to the aerial spraying, which, combined to the burnt and empty fruits of the other plants, made them fear of suffering from hunger shortly (Maldonado, 2001).

3.3 Conclusions

The studies aiming to assess the impact of glyphosate on Colombian flora and fauna demonstrated that it is potentially dangerous to some species. As far as the aquatic organism, it is worrying that the highest intoxication is suffered by the amphibians, since Colombia ranks second in the world in diversity of amphibians (Red por la Justicia Ambiental, 2015). Although their protection could be considered matter on national interest, the government did not take any action to preserve these species, continuing aerial spraying over the territory despite not getting amphibian toxicity data from the companies producing the herbicides.

Moreover, it is a major cause of concern the detriment of non-target vegetation, occurring when spraying from fixed-wing aircrafts. Considering that the majority of illicit crops are located in dense forests hosting biodiversity-rich ecosystems, indeed, the potential harm is alarming. Furthermore, as confirmed by the case study of Putumayo, damages to licit cultivations force local communities relying on them to their knees. This last eventuality, a party from taking away any legitimacy of the state at the eyes of population, is counterproductive for the effectiveness of the eradication program, since it could induce the poor peasants to start producing coca leaves in order to survive.

Finally, the toxicity index seems to be high for beneficial insects, whose loss would comport an ecological disaster due to their fundamental role, among others, in the reproduction of plants. In this regard, I would like to remark that the study led by Solomon et al. in 2005 was sponsored by CICAD and OAS and requested by Colombia, UK and US. Also, as mentioned, Keith Solomon was paid by the Monsanto company when leading the research (Lubick, 2007). My remind stems from the fact that, interestingly, this specific report is definitely the most optimistic, concluding that the risk associated to the spraying of coca crops with the herbicide mixture in Colombia “were small in most circumstances” (Solomon et al., 2005). The report itself underlines that the work team was chosen among experts of different nationalities in order to assure the reliability of the findings, but some doubts on the independence of the study arise anyway. As far as my area of interest, the most glaring example of this is the fact that, after claiming the innocuity of the herbicide on bees, the authors simply generalize this result to all the other beneficial insects, without any scientific proof supporting this last statement.

The case study of Putumayo highlighted a how the practice of aerial spraying hit hard the local economies, based on livestock and agriculture. The same events are likely to occur also in the Pacific region, and especially in Cauca, where the communities rely on these same economic activities. As mentioned before, a main problem is that, when loosing confidence in the government, poverty and sense of injustice can be drivers for the decision of switching to illicit activities, such as coca growing.

Finally, given the fact that was the government itself, with the resolutions of the National Department of Anti-narcotics (DNE) established the necessity to monitor the effects on human health and the ecosystems in the sprayed area, it is interesting that the tremendous findings got from these evaluations did not result in a halt of fumigations. In this sense, it is worth noting that even though my analysis regarded only the impacts

on the vegetation and animals, it is already painting an alarming picture that could justify alone the redefinition in the eradication policy. The human health issues, proved to happen by large research, only add shadow to this already dark side of the Plan.

4 The balloon effect

As reported in the literature review, several authors and organizations emphasized the role of the balloon effect in multiplying the damages of coca cultivations to the forest health. This chapter seeks to answer to the research question whether the displacement of crops occurred in Colombia between 2001 and 2015. Specifically, I examined the data collected by SIMCI over the years about Putumayo department and the departments of Chocó, Cauca and Nariño, that are embedded in the Colombian Pacific region. The analysis aims to find proves of coca displacement both within the same department, and between border regions of different departments. Finally, a brief paragraph explores how the displacement is linked to deforestation by further data examination about the loss of forest connected to coca cultivations.

4.1 Chocó

Within the Colombian Pacific region, the department of Chocó covers an area of 46.530 km² with 505.046 inhabitants, being one of the most extended departments of the country (ENCOLOMBIA). The collection of data highlighted that Chocó was only slightly affected by coca crops until 2005, when the hectares cultivated rose from 323 to 1.025 (SIMCI).

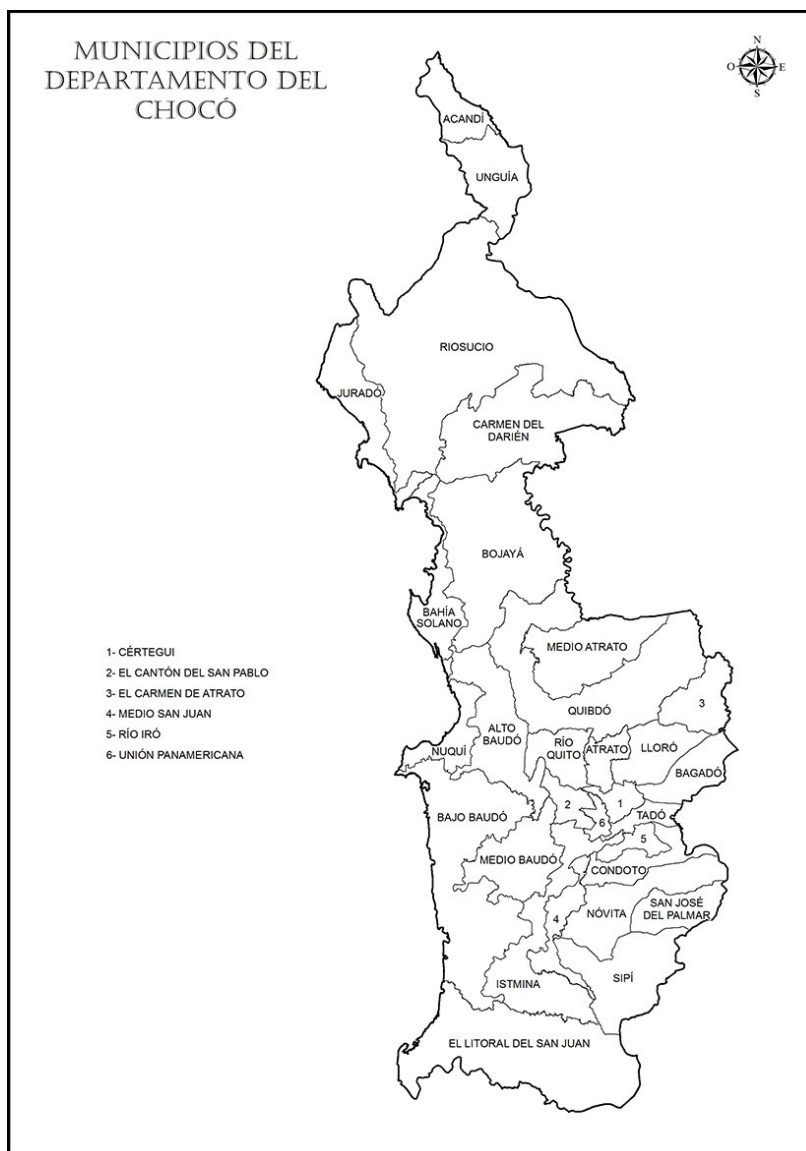


Figure 4.1: Municipalities of Chocó department.

First, in order to detect whether the displacement occurred within the same department, I analyzed the data regarding the coca cultivations per municipalities of Chocó. *Table 4-1* illustrates the hectares cultivated between 2003 and 2013 in the municipalities most affected by coca crops, and therefore most significant for my work. When observing the data, great changes from year to year among the municipalities is immediately visible, and some displacement seems to occur. In particular, in 2006, in Alto Baudó, Bajo Baudó, and, in minor extent, Medio Baudó the illicit crops decrease, while the neighboring municipalities of Novita and Sipí face a sharp increase of coca cultivations. On the other hand, during the following year, in 2007, the situation reversed: in Novita and Sipí municipalities the hectares used for growing coca decreased, while an augment was registered in the municipalities of Alto Baudó, Medio

Baudo and Bajo Baudo. No major differences in the cultivations trend between different municipalities were reported until 2011 when, following a decrease in Alto Baudo, Bajo Baudo, Cantón San Pablo, and Istmina, the *cocaleros* expanded in Novita. However, in this latter municipality and in San José del Palmar the illicit cultivations dropped in 2012, while Alto Baudo, Medio Baudo, Bajo Baudo, and Litoral del San Juan saw a significant augment of coca plantations.

Table 4-1: Hectares cultivated per municipality of Chocó department per year (2003-2013).
Note: data from SIMCI.

Municipality	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Alto Baudo	45	12	104	7	259	391	159	489	196	268	105
Bajo Baudo	177	78	332	82	353	1114	147	341	248	562	145
Cantón del San Pablo	1	12	48	0	25	52	63	133	68	58	29
Istmina	57	36	196	210	205	425	497	847	684	760	369
Litoral del San Juan	0	1	2	3	11	102	24	60	36	144	67
Medio Baudo	4	12	68	24	77	228	254	333	352	606	177
Novita	93	30	90	237	76	215	190	249	464	165	91
San José del Palmar	0	0	0	0	46	94	57	107	104	43	92
Sipí	76	127	150	248	28	74	122	191	130	125	106



Figure 4.1a: Coca crops density in 2001.
Source: SIMCI.



Figure 4.2b: Coca crops density in 2012.

Observing contradictory trends in coca crops in different territories during the same year could be a sign that displacement of cultivations is occurring. However, it would be

hazardous to claim that the balloon effect is happening on the basis of this factor alone. In order to corroborate my hypothesis, therefore, I compared the new plantations with the total cultivated area per year. In this regard, *Figure 4.3* encompasses the data collected by SIMCI in the period between 2004 and 2010. The new crops seem to constitute a large portion of the hectares cultivated with coca in Chocó per year, which means a high crops mobility. SIMCI, indeed, specifies that the data about new coca crops refer to those areas that were not cultivated the year before. Therefore, we can assume that the *cocaleros*, forced to abandon their territories by the eradication efforts, displaced to neighboring areas starting new coca plantations.

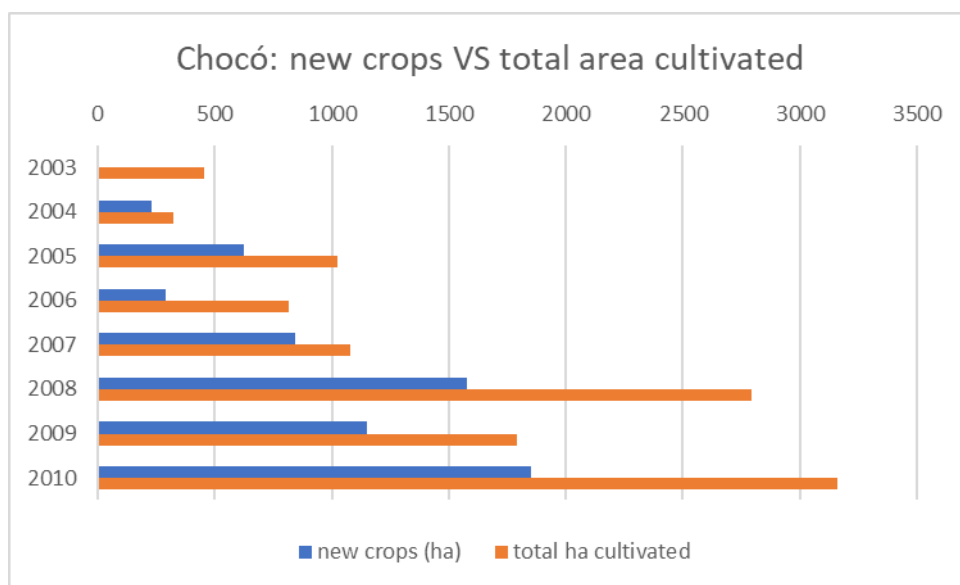


Figure 4.3: Comparison between ha cultivated and new crops in Chocó department (per year). Note: data from SIMCI.

4.2 Cauca

Cauca department is located in the Southern part of the Pacific region, being separated from Chocó by Valle del Cauca, and bordering, among others, Nariño and Putumayo departments. Despite its limited extension, Cauca hosts 1.404.313 people (ENCOLOMBIA). Unsurprisingly, the department was among the most affected by coca plantations in 2001, since the corridors connecting the Amazon to the Pacific region converge in Cauca, which gives it a strategically crucial role in the drug trafficking (UNODC/SIMCI and DNE, 2011).



Figure 4.4: Municipalities of Cauca department.

The data presented in *Table 4-2* concerns the hectares cultivated with coca per those municipalities of Cauca department most affected by the illicit crops. When comparing the data reported per municipality, some contradictory trends between different territories were observed. To be more specific, for instance, in 2003, in Argelia and El Tambo the hectares cultivated with coca significantly decreased, while conversely in the neighboring Balboa, Guapi and Timbiquí municipalities the amount of territory cultivated markedly grew. Similarly, in 2006, a decrease of coca plantations in El Tambo and Guapi was followed by a sharp increase in Balboa and Patía. To cite another example of crops' mobility, in 2008, in El tambo and Guapi the replanting was intense, along with Lopez and Patía municipalities, probably due to the net decrease of coca cultivations occurring in Argelia and Balboa the same year. Finally, worthy of note is the situation in 2012, when the abandonment of large plantations in Balboa, Guapi, Lopez, Mercaderes and Timbiquí presumably caused a displacement of the illegal activity in Argelia and El Tambo.

Table 4-2: Hectares cultivated per municipality of Cauca department per year (2003-2013).
Note: data from SIMCI.

Municipality	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Argelia	93	65	153	161	637	483	300	296	200	470	121
Balboa	94	23	24	91	192	15	49	77	120	43	24
El Tambo	187	203	629	307	803	1240	1284	1560	1514	1876	1297
Guapi	146	374	489	121	414	1434	1368	1022	984	396	182
Lopez	15	59	63	79	273	476	921	791	1040	341	548
Mercaderes	3	0	0	31	8	0	75	137	420	17	21
Patia	0	0	6	83	48	105	109	82	51	58	76
Piamonte	651	281	517	594	669	523	165	131	253	516	461
Timbiqui	253	260	579	453	960	1050	1698	1581	1494	507	572

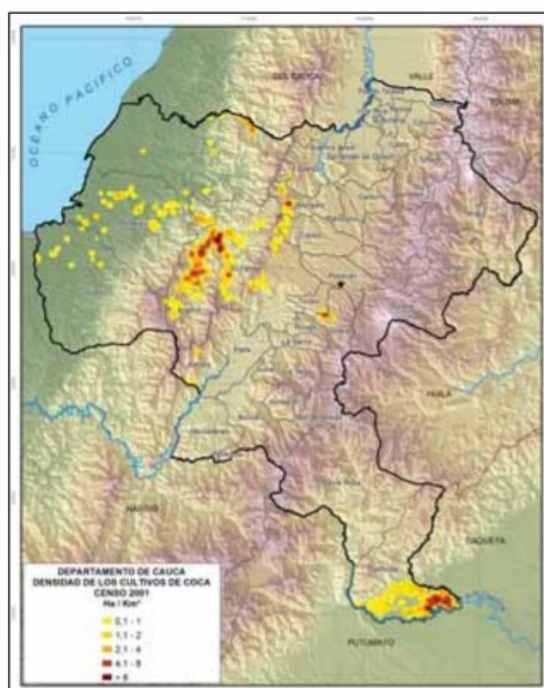


Figure 4.5a: Coca crops density in 2001.
Source: SIMCI.

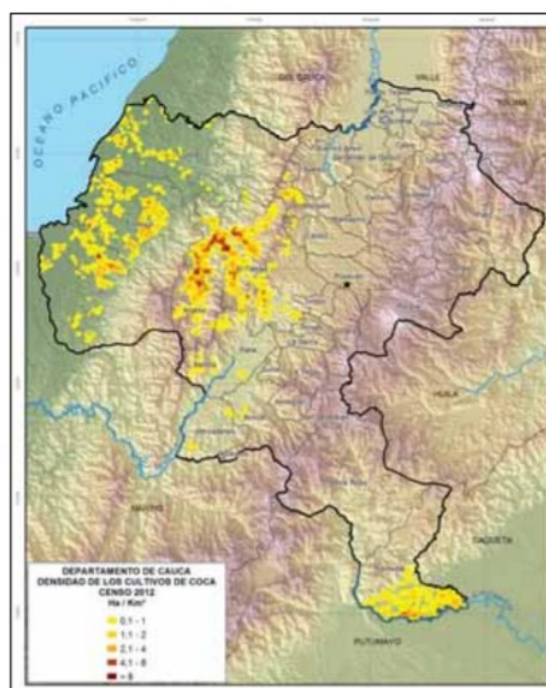


Figure 4.5b: Coca crops density in 2012.

Further proves of the balloon effect include the ineffectiveness of the eradication efforts in the department. When eradicating, both manually and through aerial spraying, the government expects to reduce the illicit activity nearly to the same extent of the territory eradicated, with an indirect correlation between the hectares eradicated and the hectares cultivated. However, as shown in Figure 4.6 this is not the case. Often, indeed, the *cocaleros* whose territory is subjected to eradication, replant coca crops either nearby the same plot or moving to neighboring areas (Isacson, 2020), which nullifies the eradication efforts.

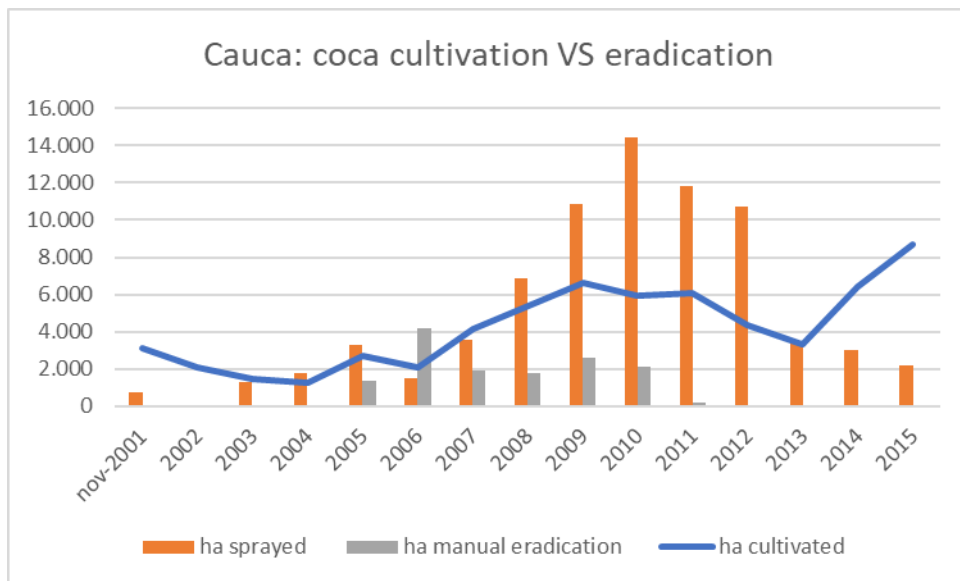


Figure 4.6: Comparison between ha cultivated and ha eradicated in Cauca department (per year). Note: data from SIMCI.

Also, the balloon effect could explain why the territory newly planted form at least half of the total area cultivated in Cauca department. Summarizing the data reported by SIMCI between 2003 and 2010, indeed, Figure 4.7 shows that the replanting activity was intense, especially if considering the total amount of hectares cultivated per year.

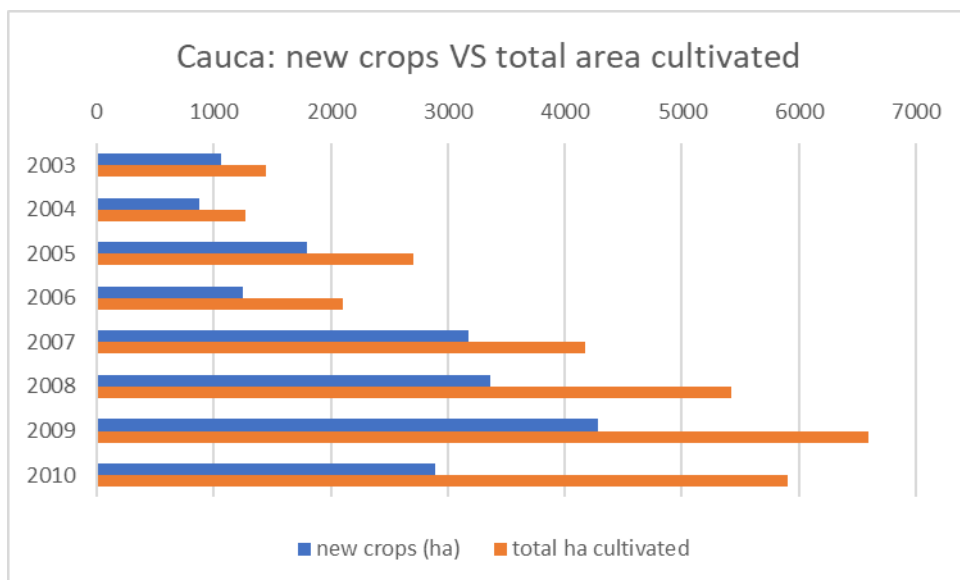


Figure 4.7: Comparison between ha cultivated and new crops in Cauca department (per year). Note: data from SIMCI.

4.3 Nariño

Favorable climate and environmental conditions make Nariño an important territory for the coca growing, besides hosting several cocaine laboratories due to its geostrategic location (UNODC/SIMCI and DNE, 2011). Being the southernmost department in the Colombian Pacific Region, indeed, Nariño is at the corner between Cauca and Putumayo, bordering Ecuador to the south. As a consequence, in 2001, Nariño was the territory most impacted by coca crops among the departments of the Pacific Region (SIMCI). As far as the inhabitants, this region is one of the most populated in Colombia, with 1.766.008 people (ENCOLOMBIA).



Figure 4.8: Municipalities of Nariño department.

Similarly to the study carried out for Chocó and Cauca, *Table 4-3* presents the data released by SIMCI about the presence of illicit crops in specific municipalities of Nariño. For certain years, the analysis revealed that displacement between municipalities has likely occurred. One example is 2004, when a large area including Barbacoas, Magüí and Cumbitara municipalities knew a sharp decrease in coca cultivations, that was balanced by a major increase in the Northern part of Nariño,

encompassing Francisco Pizarro, La Tola, Santa Barbara and Mosquera municipalities. When the year later the situation almost reversed, in the Northern region the coca plantations trend was quite downward, partly counterbalanced by the increase reported in Barbacoas, Cumbitara and El Rosario. Furthermore, relevant crops mobility involved the year 2006, during which a drop in cultivations in the municipalities of Barbacoas, Magüí, Roberto Payán, and El Rosario, was followed by an increase in an extended region including Tumaco, Cumbitara, Olaya Herrera, Policarpa, and Santa Barbara. As far as 2008, in addition, the large department of Barbacoas was affected by a considerable augment of plantations that displaced from the neighboring municipalities of Cumbitara, El Rosario, Francisco Pizarro, Olaya Herrera and Policarpa. To conclude, further signs of ballooning were detected in the years 2009 and 2010.

Table 4-3: Hectares cultivated per municipality of Nariño department per year (2001-2013).
Note: data from SIMCI.

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Barbacoas	714	2187	2767	1469	1920	1460	1586	3080	2928	3433	3193	1815	1511
Cumbitara	3	140	301	127	329	483	452	250	451	221	194	97	115
El Charco	984	798	699	649	741	741	1728	2202	1130	748	1080	702	1020
El Rosario	28	102	230	221	508	372	434	273	290	253	203	169	127
Francisco Pizarro	37	45	16	107	153	192	501	407	189	189	207	59	61
Ipiales	1130	350	212	520	629	357	287	215	192	139	247	162	370
La Tola	15	29	2	94	27	75	184	164	465	139	63	31	41
Magui	1694	2398	3532	2175	2139	1002	2593	2240	1323	1207	1563	494	478
Mosquera	34	119	55	289	38	34	188	140	129	84	222	76	115
Olaya Herrera	14	690	506	575	517	870	1972	1286	1452	612	1104	712	719
Policarpa	15	29	215	236	212	545	773	221	389	235	202	165	301
Roberto Payan	1048	2361	3509	2409	2265	1011	2896	2336	1539	1585	2058	460	858
Samaniego	0	0	9	0	7	46	24	120	281	531	551	226	336
Santa Barbara	233	258	274	345	213	1303	700	706	802	615	587	294	279
Tumaco	1421	5585	5234	4806	4004	7045	5642	5865	4682	5464	5593	5065	6612

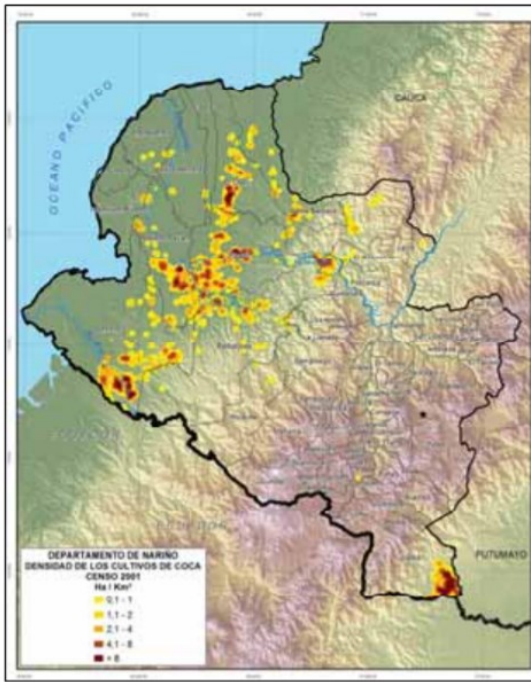


Figure 4.9a: Coca crops density in 2001.
Source: SIMCI.

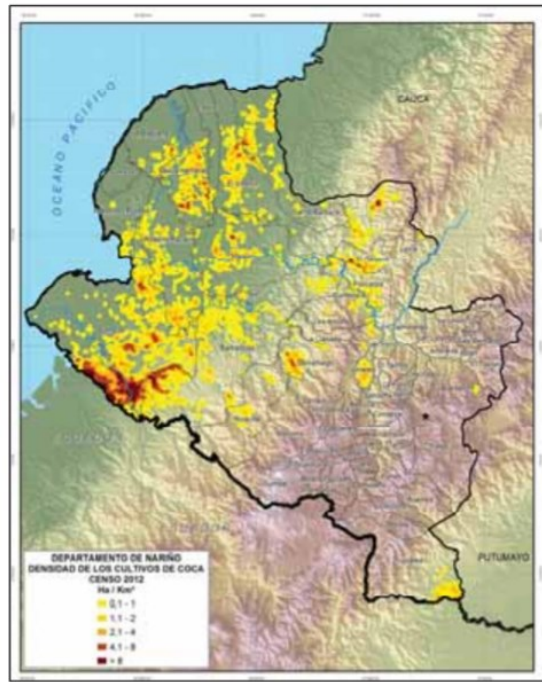


Figure 4.9b: Coca crops density in 2012.

My investigation continued with a comparison between the hectares of coca eradicated and the total area cultivated per year. Although SIMCI did not publish specific information for manual eradication in Nariño between 2001 and 2004, it can be noted that the eradication efforts failed to produce the desired outcomes. The most likely explanation is that coca crops displaced from the territories eradicated to nearby plots, partially unbinding the coca supply trend to the government's counternarcotic strategy.

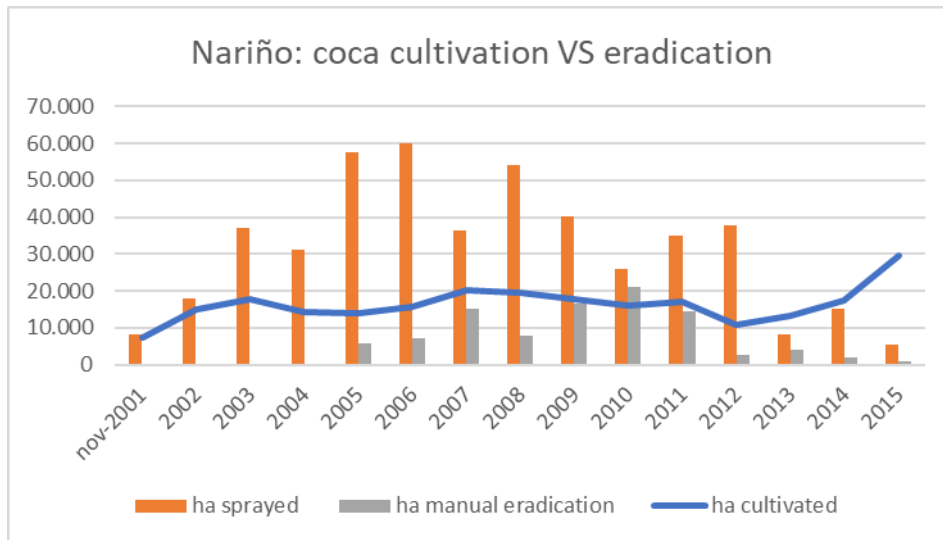


Figure 4.10: Comparison between ha cultivated and ha eradicated in Nariño department (per year). Note: data from SIMCI.

The large mobility of plantations is reflected also in the following graph, showing that the percentage of new crops on the total of area cultivated per year is significant, especially in 2003, when the large majority of the overall territory cultivated with coca in the department is constituted by hectares newly planted.

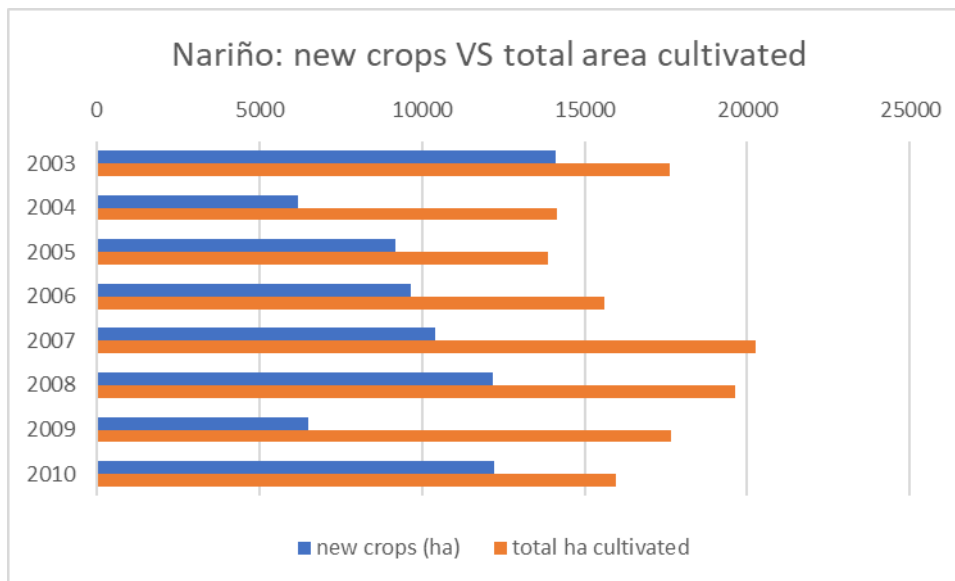


Figure 4.11: Comparison between ha cultivated and new crops in Nariño department (per year). Note: data from SIMCI.

4.4 Putumayo

Located in the southwest of Colombia, with a population of 378.483 people (ENCOLOMBIA), Putumayo is the only department object of my study that is encompassed in the Amazonia region. Bordering Ecuador and Peru, its territory has always been the site of intense drug production and trafficking, to the point that in 2001 it was the department most affected by coca crops in the country (UNODC/SIMCI and DNE, 2011).



Figure 4.12: Municipalities of Putumayo department.

Once again, the data collected by SIMCI present proofs of crops displacement. In particular, in 2004, in Orito the overall coca growing increased after that in the surrounding region, including of Puerto Asís, Puerto Caicedo, Puerto Guzmán, San Miguel, and Valle del Guamuez, large coca crops were abandoned. Similarly, in 2007, in Puerto Leguizamo the plantations diminished, probably moving to Puerto Asís, Puerto Caicedo, Valle del Guamuez and Villagarzón, where the hectares cultivated had a boost. Finally, noteworthy is the situation in 2012, when in Mocoa and, to a lesser extent, in Villagarzón the plots planted with coca increased, after that the southeastern region of the department saw a significant decline in the illicit activity (*Table 4-4*).

Table 4-4: Hectares cultivated per municipality of Putumayo department per year (2001-2013). Note: data from SIMCI.

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Mocoa	112	122	91	27	69	145	142	97	37	15	48	107	49
Orito	7629	1442	352	516	523	1153	1740	1269	583	556	1086	428	784
Puerto Asís	8680	2898	1527	543	1414	2509	4531	2627	1225	1551	2735	1463	2150
Puerto Caicedo	2340	709	210	141	330	547	929	449	326	281	854	526	682
Puerto Guzmán	4185	2494	2297	1050	1928	2118	1827	1077	794	623	1413	656	624
Puerto Leguizamo	3831	3187	1454	1275	2546	2562	1530	1653	1150	1044	1696	1218	1077
San Miguel	4041	903	600	194	661	756	867	481	236	136	499	416	659
Valle del Guamuez	9269	1553	850	471	1106	1896	2334	1319	583	335	1010	644	1093

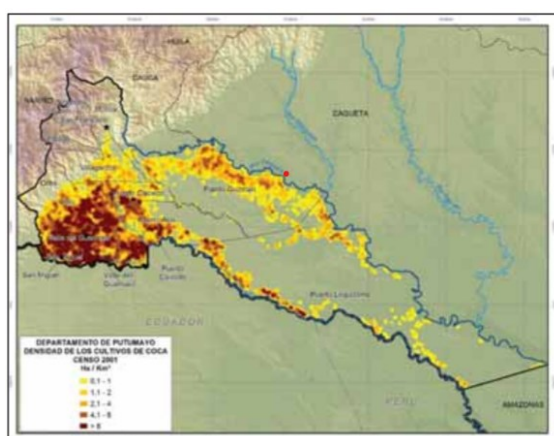


Figure 4.13a: Coca crops density in 2001. Source: SIMCI.

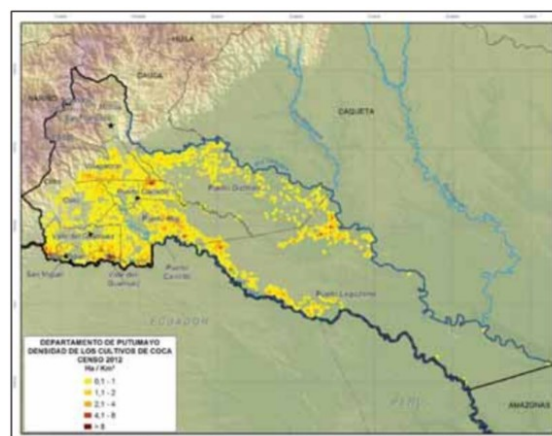


Figure 4.13b: Coca crops density in 2012.

As argued for Cauca and Nariño departments, in the period between 2001 and 2015, the intense eradication efforts were not followed by a reduction in coca cultivation of the same entity. Although SIMCI did not provide the data about manual eradication per department between 2001 and 2004, the next graph presents clear proves of intense replanting in the period. To take one example, in 2006 the hectares sprayed significantly exceeded the hectares cultivated, that, despite the heavy fumigations, continued increasing the next year. This is only possible when, in the same year, the peasants replant on the same site or displace crops to neighboring regions.

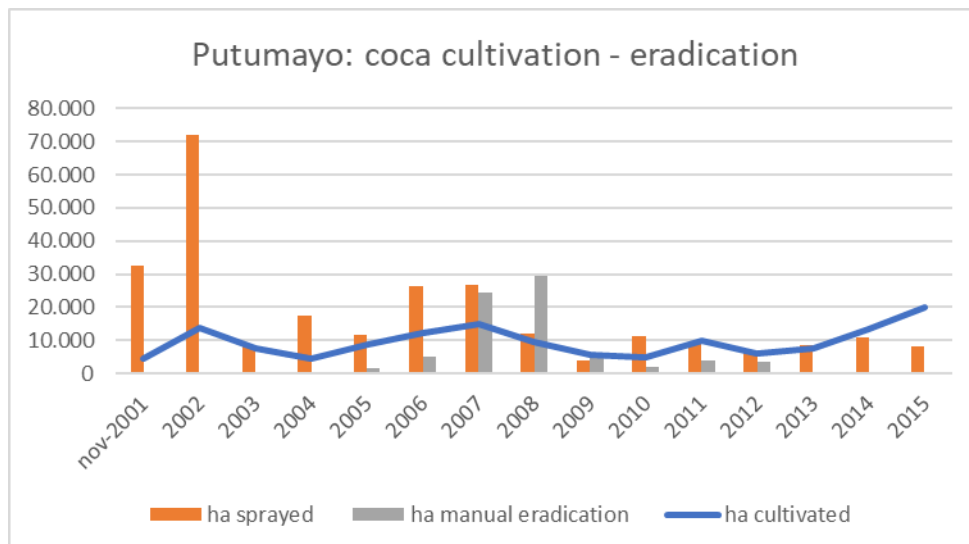


Figure 4.14: Comparison between ha cultivated and ha eradicated in Putumayo department (per year). Note: data from SIMCI.

Finally, the graph in Figure 4.15 depicts a further evidence of displacement. The high proportion of new crops in relation to the total amount of hectares with coca plantations per year confirms that the replanting was on large scale.

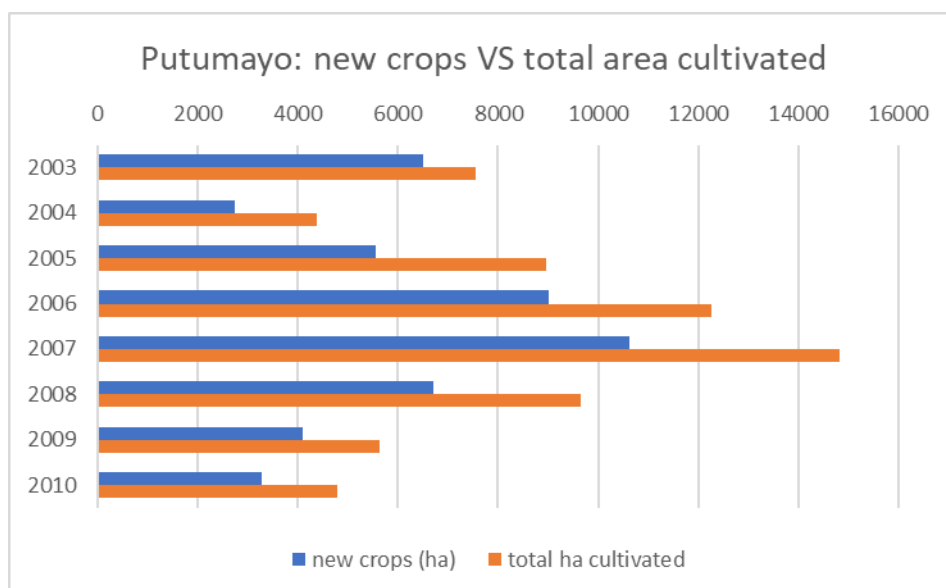


Figure 4.15: Comparison between ha cultivated and new crops in Putumayo department (per year). Note: data from SIMCI.

4.5 Borders

The previous sections attempted to find signs of displacement within the same department, leaving aside the interactions between different departments. For this

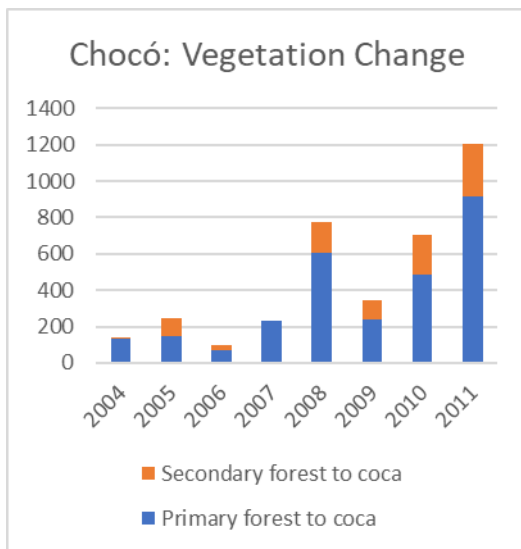
purpose, I observed the coca trends per year in those municipalities bordering with another department. The most visible examples of displacement are outlined below.

First, in 2009, the municipality of Lopez (Cauca) had a boost from 476 to 921 hectares cultivated, while in the neighboring Buenaventura (Valle del Cauca) the coca growing activity decreased. Also, in 2010, if the municipality of Policarpa (Cauca) saw a decrease in coca crops, in the bordering Mercaderes (Nariño) the cultivations rose. Moreover, comparing the coca trends in Piamonte (Cauca) and Puerto Guzman (Putumayo), it can be hypothesized that, in 2012, the plantations moved from the latter to the former municipality. If considering the northeast border of Nariño with Cauca, then, some displacement seems to have been occurred between the municipalities of Santa Barbara and El Charco, belonging to Nariño, and Guapi and Argelia, included in Cauca department. For instance, in 2006, in Guapi there was a decline in the illegal activity, while a strong growth characterized the cultivations in Santa Barbara. Another example is when, in 2012, the drop in coca plantations in Santa Barbara was followed by an increase in the municipality of Argelia. To conclude, it is worth noting that, in 2006, if Ipiales (Nariño) experienced a drop in coca growing, the cultivations surged in Orito (Putumayo) and Valle del Guamuez (Putumayo) municipalities.

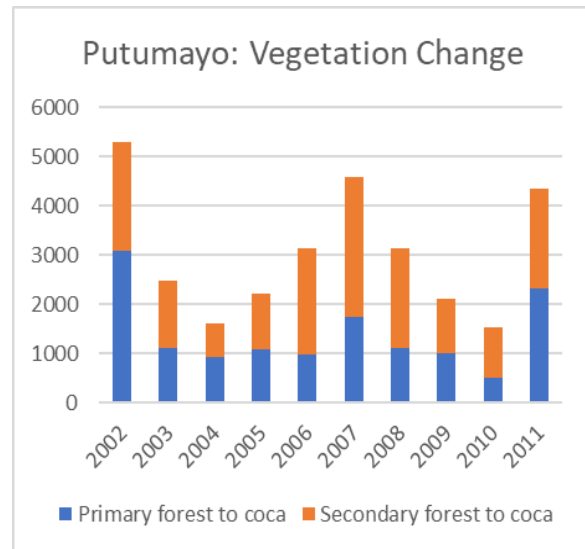
4.6 Displacement and deforestation

By 2000, Colombia had a forest cover of 54.7%. As of 2015, this percentage was reduced to 52.2%, which represents a loss of almost 3 million hectares (IDEAM).

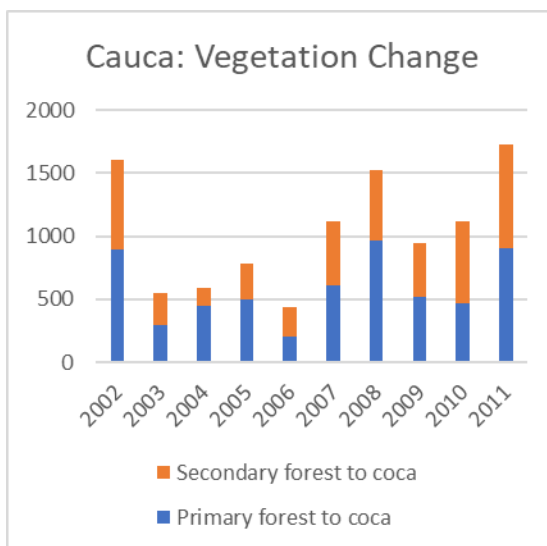
Within agricultural production, illicit crops stand out as important drivers of deforestation, both directly but also indirectly, allowing the arrival of other productive activities with greater direct impact. Coca producers try to hide their crops from monitoring by the authorities by replanting in smaller and never previously eradicated areas (Chadid et al., 2015), thus contributing to the loss of primary forest. When displacement occurs, therefore, coca plantations also clear hectares of important old-growth forests, endangering the biodiversity of their ecosystems. In this regard, the graphs *4.16a*, *4.16b*, *4.16c*, *4.16d* present the vegetation change due to coca cultivations per department under study. The relative data were collected by SIMCI between 2002 and 2011, except for Chocó department, whose information are available from 2004.



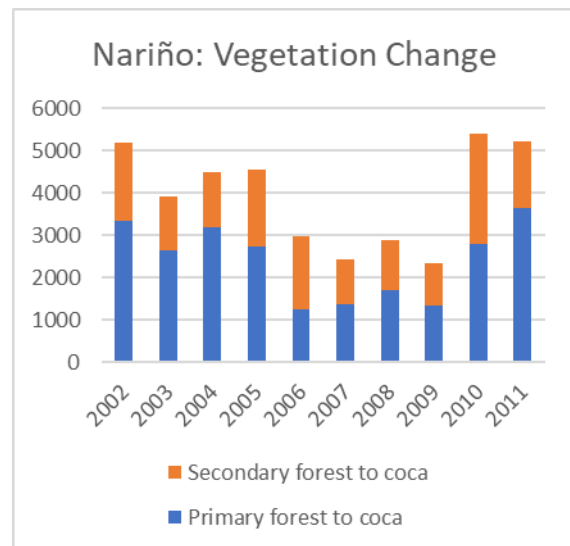
4.16a



4.16b



4.16c



4.16d

Figure 4.16a, 4.16b, 4.16c, 4.16d: Conversion of forest to coca cultivations per department. Note: data from SIMCI.

The graphs highlight to what extent the conversion of forests to coca plantations constitutes a relevant issue. Most of the time, the hectares of primary forest affected by coca per year are proportionately more than the loss of secondary forest. The term “primary forest” indicates those rare wild old-grown forests with no evidence of human disturbances. Due the continuous moving of crops to new regions, consequently, the balloon effect causes the increasing deforestation of biodiversity-rich and uncontaminated areas.

4.7 Findings

This chapter aimed to investigate whether the eradication efforts in Colombia in the period under study caused the displacement of the coca plantations. A specific analysis per Chocó, Cauca, Nariño, and Putumayo departments confirmed the initial hypothesis that the balloon effect indeed occurred. As first proof of displacement, it was observed that frequently neighboring municipalities presented opposed trends in coca growing, in a way that, when the hectares cultivated decreased in a municipality, the neighboring regions saw an increase in coca crops. This happened not only within the same department, but also between border municipalities belonging to different departments. Secondly, the high percentage of new plantations on the total of coca cultivations per year corroborates the hypothesis of crops mobility. In addition, data available for Cauca, Nariño and Putumayo departments showed that the eradication efforts were not followed by a reduction of hectares cultivated of the same entity, which indicates the replanting after the intervention of the government.

The comparison between the maps about the density of coca crops per department in 2001 and in 2012 (*Figure 4.2a-b*, *Figure 4.5a-b*, *Figure 4.9a-b*, *Figure 4.13a-b*) allows some general observations about the coca cultivations mobility in the country. In 2001 Putumayo and Chocó presented, respectively, the worst and the best situation in terms of coca crops. However, in 2012, while Putumayo is less intensively cultivated, several hectares were affected by coca plants in Chocó, especially in the southern region of the department. As far as Cauca department, while in 2001 the coca was intensively cultivated in Argelia, El Tambo and Piamonte, we can clearly observe the illicit activity expanded (or displaced) to the northern-western area of the department, becoming less intense in the three aforementioned municipalities (*Figure 4.5a-b*). In general, both Putumayo and Cauca departments present a decrease in the density of the cultivations over the years, although in Cauca the affected area enlarged. As far as Nariño (*Figure 4.9a-b*), the spots where the concentration of coca plants was high in 2001, mostly became less densely cultivated in 2012. However, it is the only department among the ones under study that, over the decade, knew the rise of an intense activity of coca growing occupying a vast area, located in Tumaco and Barbacoas municipalities.

In general, it seems clear that the balloon effect happened in the analyzed region, causing, specifically, the displacement of coca crops towards the Pacific region. Since I

did not analyze the illicit activity development in the rest of the country, I could not assess whether such mobility derives from intense eradication in Putumayo department alone or if it is the result of a national wave of crops displacement to the west.

If combining the effects of the herbicides on the environment (see Chapter 3) with the countless damages coming from the displacement of crops, an alarming scenario emerges. The frequent mobility, indeed, means the enlargement of the zone affected at least once by coca plantations, and, therefore, deforested. As described in the last section of the chapter, in fact, the data released by SIMCI on the forest loss caused by coca crops highlight that, moving the plantations to new unaffected territories, the balloon effect deeply worsens the phenomenon of forest clearance. In particular, the conversion rate of primary forest to coca per year reached high levels, which represents a serious menace for globally important ecosystems.

What is clear, anyway, is that the governmental strategy is not only harmful for ecosystems, but ineffective. The high rate of replanting explicitly indicates that the illicit market was not bended by the Plan, but, on the contrary, it continued flourishing. The obviously question this raises is why such evidences did not lead to the suspension of the eradication program since it seems to be almost useless in the war on drugs. The next chapter will address this question, besides investigating whether environmental concerns led to a at least partial redefinition of the Plan.

5 Policy Implications

The previous chapter concluded that the coca eradication methods, provided for by Plan Colombia, not only were ineffective in the war on drugs, but what is more, resulted in the deep degradation of the environment and deforestation. The literature review highlighted that, in the period between 2000 and 2015, several studies inquired on the risks of fumigating and manually eradicating in Colombia as main tools against the drug trafficking. This chapter investigates whether these findings implied some policy changes over the years, especially driven by the objective of preventing further damages to biodiversity-rich ecosystems. Consequently, through my analysis it will be shown whether the environmental degradation linked to the implementation of Plan Colombia has been securitized between 2000 and 2015.

As stated in the introductory chapter, the debate around the concept of environmental security emerged in the post-Cold War era. In conjunction with the attention paid to the environment, several theorists hypothesized how to overcome the new environmental challenges. As already mentioned, the Copenhagen School believes that, when securitized, an issue is treated as an existential threat, allowing exceptional measures to solve it (see Chapter 1.2). However, the proposal of a harsh policy to preserve the ecosystems received several critics by other schools of thought. For instance, in contrast to the Copenhagen School, some argued that, if the environmental degradation represents a threat to human security, the use of force constitutes a marginal element in facing it, mostly ineffective and to be used only under the auspices of international organizations. On the contrary, according to these scholars, development cooperation, soft power, democratization and cooperation between states and transnational organizations should be the most effective and preferable tools (Bajpai 2000).

My position in the debate over the inclusion of the preservation of Colombian environment into the security sphere is a combination of the Copenhagen School and its critics. To my mind, the Copenhagen School correctly accentuates the fundamental consequences that the securitization process implies, meaning the absolute prioritization of the object securitized. At the same time, however, I find counterproductive the use of force to overcome environmental issues in Colombia. In this regard, I agree with those scholars that emphasize the effectiveness of tools such as transnational cooperation, as well as calling the intervention of international organizations.

Considering the Colombian case, the government, backed by the United States, first securitized the degradation of ecosystems by legitimizing Plan Colombia through environmental concerns. As highlighted in Chapter 2, in fact, Bogotá justified coca eradication also by stressing how coca growing was major cause of deforestation in Colombia. However, the same government mostly ignored the environmental questions that emerged immediately after the start of the Plan about the risks linked to the eradication campaign. This suggests that the securitization of the environmental threats in Colombia was not actual between 2001 and 2015. We could assume that the environmental rhetoric accompanying the pursuit of Plan Colombia constituted a simple means to reach political objectives, since, before studies showing evidence of damages caused by coca eradication, the government continued implementing the same policy. In particular, this happened during the administration of President Uribe (2002-2010), who initially failed to recognize any relevant harmfulness of glyphosate for the environment till 2007, when he declared its willingness of reducing the resort to fumigations, that would be replaced by manual eradication. On the other hand, the next President Santos (2010-2018), dealing with several request of stopping the disasters linked to fumigations, apparently gradually opened to such demands, to the point of completely halting aerial spraying in 2015. However, I will discuss later how political motives played a key role in taking this decision.

In Chapter 3, when summarizing the main findings on the noxiousness of glyphosate for the ecosystems, among others, I cited the assessments, in 2005 and in 2009, of the toxicologist Keith Solomon. The study in 2005 (Solomon et al., 2005) was specifically requested by the governments of Colombia, the United Kingdom and the United States of America, while the research in 2009 (Bernal, Solomon, and Carrasquilla, 2009) received funds from the governments of Colombia and the United States. Also, Keith Solomon, was funded by a pesticide consortium including Monsanto company, which produces the glyphosate. Although the panels embed experts from different countries, their over-optimistic conclusions inevitably raise some perplexities on the impartiality of the research, since they find relevant contradictions in the majority of other studies on the subject. Inevitably, the question is whether the government, willing to continue pursuing a hardline policy in the war on drugs against the FARC paramilitary group, put pressure on the team of experts in order to legitimize the eradication methods.

Nonetheless, in Colombia the debate over the suitability of the aerial spraying was so intense that, besides the accusations from the NGOs, involved even some Colombian governmental agencies. First of all, the Colombian Human Right Ombudsman's Office, after receiving several complaints by the local communities of Putumayo, questioned the fumigations through a series of resolutions issued in 2001, demanding the suspension of the spraying to the minister of justice and to the National Narcotics Council. This request was supported by remarking that the law required an environmental management plan, which was missing. Furthermore, another resolution, dated 2003, denounced an increase in the concentration of glyphosate in the fumigations. Some doubts on the feasibility of the aerial spraying came also from the governor of Cauca, Floro Tunubalà, who belonged to the Guambiana indigenous community. Along with the governor of Nariño Parmenio Cuellar, Tunubalà proposed some edits to the Plan that provided for a more frequent resort to manual eradication and crop substitution, instead of aerial spraying. However, the demands of the two governors, despite the large support among the peasants of the region, remained unheeded. Importantly, moreover, in July 2001 Bogotá suspended the spraying of coca crops for 10 days in the departments of Amazonas, Caquetá, Guainía, Guaviare, Putumayo and Vaupes in order to examine the request by the Organization of Indigenous Peoples of the Colombian Amazon (*Organización de los Pueblos Indígenas de la Amazonía Colombiana*, OPIAC) to halt fumigation since they violated the basic human rights, as well as of the rights of indigenous communities. Unfortunately, the government rejected their claim and resumed the fumigations after 10 days. Two years later, in 2003, after a new injunction filed by the OPIAC, the Constitutional Court forced Uribe to consult with indigenous communities, although the Plan was left in place. In this occasion, the controversy included the interior Minister Fernando Londoño Hoyos, according to whom without fumigations insurgents would invade the territories of aboriginals to grow coca themselves, and, therefore, the indigenous people would benefit from the Plan implementation. However, his discourse did not consider what was the actual reality at that time, since the devastating effects of fumigations forced the displacement of thousands of peasants, including the aboriginals (Transnational Institute, 2003).

These were only a few examples of the large number of motions and accusations from both Colombian government agencies and international organizations. Nevertheless, Bogotá continued eradicating through aerial spraying. Alvaro Uribe, since

he became president in 2002, decided to even increase the concentration of glyphosate in the spraying to facilitate the eradication (Transnational Institute, 2003). As alluded before, he supported its policy by stating that otherwise *cocaleros* would have destroyed the Colombian environment, which is clearly a nonsense discourse. Furthermore, in 2003 the National Narcotics Council (*Consejo Nacional de Estupefacientes*, CNE) issued the Resolution 0013, that authorized the spraying of areas inside national parks where there was evidence of coca crops. Even in this case, environmental concerns were made only in relation to the coca growing, by emphasizing that illicit cultivations in natural reserves “threaten their conservation and maintenance”¹. In this way, the resolution failed to take into account the effects of aerial eradication on these ecosystems, which includes the degradation due to glyphosate itself, but also, most importantly, the displacement of crops.

A turning point in the dispute over the fumigations occurred in July 2007, when the President Uribe surprised the national and international community by sharing its willingness to reduce aerial spraying in favour of manual eradication. The president motivated his decision by recognizing that manually removing the coca plants from the roots was proven to be more effective, as well as cheaper. Furthermore, President Uribe highlighted that "instead of uniting Colombians around the idea of eradicating drugs, [aerial spraying] causes complaints and provokes reactions against eradication" (StoptheDrugWar.org, 2007), which suggest his desire to stop the continuous protests coming from the peasants and local communities. In sum, this announcement was mostly driven by convenience and political concerns, with no environmental consideration. However, at the same time, we could argue that ecological purposes indirectly led to Uribe’s statement, since the many motions and protests that induced the government to edit its policy were often rooted in environmental discourses. My intention here is to check whether the data confirm a shift in the antidrug policy after the announcement of President Uribe.

¹ Resolution 0013, 27th June 2003. *Consejo Nacional de Estupefacientes*.

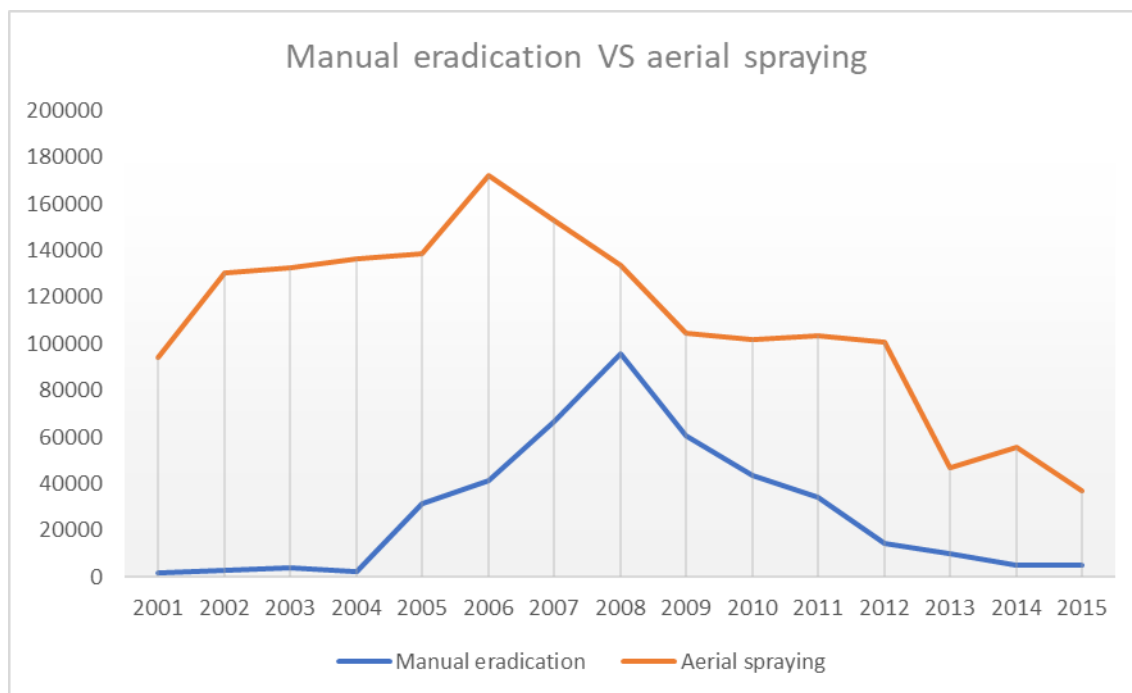


Figure 5.1: Manual eradication and aerial spraying in Colombia (2001-2015).
 Note: data from SIMCI.

Figure 5.1 highlights a peak in manual eradication corresponding to 2008, the year following the speech of President Uribe. At the same time, the use of aerial spraying presents a descendent trend from 2006 till the halt of fumigations in 2015, with a sharp decrease between 2008 and 2009. The data show a change in the drug policy after the announcement of Uribe, but not proportional to the expectations. The President, indeed, declared that aerial spraying would have been used only when strictly necessary, meaning when the manual eradication was too dangerous. However, between 2008 and 2010, when he left the presidency, the fumigations, despite decreasing, were still widely employed. On the other side, after the peak in 2008, in 2009 manual eradication dropped again and continued diminishing during the following years. Again, this suggests that Uribe’s administration failed to fulfil the promises made through the President’s speech delivered in July 2007.

Since when he was elected president in August 2010, Juan Manuel Santos was a vocal critic of the war on drugs, speaking in favor of alternative drug policies (Drug Policy Alliance, 2014). Consistently to his declarations, both aerial spraying and manual eradication of coca crops constantly decreased till the stop of fumigations in 2015 (*Figure 5.1*). This last decision followed the report of the International Agency for Research on Cancer (IARC), which is part of the World Health Organization, where the

glyphosate was described as “probably carcinogenic to humans” (International Agency for Research on Cancer, 2017). Consequently, Santos supported the National Narcotics Council (CNE), a body composed by ministers and other civil servants, when agreed for the stop of fumigations on 14 May 2015 (Reuters Staff, 2015). Once again, although the environmentalist organizations celebrated the event, ecological concerns were only a marginal element in the policy decision making. However, for the first time, the pressures coming from the United States, who strongly opposed to a softening of the war on drugs (Ospina, 2015), did not overcome scientific research on health (and environmental) issues linked to the herbicide.

On the contrary, when the current President of Colombia Ivan Duque declared his intention to resume aerial spraying with glyphosate in 2018, the United States played some role. Donald Trump, indeed, warned President Duque that without fumigations Washington would have decertified Colombia as a drug war ally (Alsema, 2019). Until this day, the announcements of Duque on the resuming of fumigations were not followed by an actual resurrection of aerial spraying program, due to the many restrictions imposed by the Constitutional Court in 2015 and 2017 (Isacson, 2020). However, President Duque is still pushing in that direction, raising the concern of environmentalist and international organizations. Following Felbab-Brown (2020), this suggests that political purposes surpassed matters both on the health of citizens and the preservation of the ecosystems, meaning that the government is not willing to prioritize the environmental issue at all.

This chapter demonstrated how, despite the many scientific studies showing the harmfulness of fumigations, the Colombian government is far from adopting an appropriate approach to contrast the drug-trafficking. After the hardline policy pursued in the first year of presidency, in 2007, President Uribe gave new hope to the environmentalists talking in favor of a major use of manual eradication over the aerial spraying, although his discourse was mainly driven by the objective of stopping the protests. Nevertheless, my analysis highlighted that, even though the use of manual eradication increased in 2008 and the fumigations were less between 2008 and 2010, these latter were still the major tool in the eradication policy, and, therefore, Uribe’s administration did not meet the promises. The election of President Santos was welcomed by those organizations and peasants protesting against the spraying with glyphosate, since he renovated in multiple occasions his position against the war on drugs. However, the ecological issues played only a marginal role in President Santos’

decision-making, including when he promoted the halt of fumigations in 2015. At the same time, on the other hand, under his leadership, Colombian drug policy for the first time was not dominated by the dictates of the United States, contrary to the current situation under Duque's administration.

Conclusion

Discussions about Latin American security necessarily need to embed questions over the preservation of ecosystems, so that good living conditions would be assured to locals. While traditional discourses of security, including concepts of political power and sovereignty, continue guiding the debates on the subject, this thesis demonstrated how the securitization of the environment is crucial to address major social challenges in Colombia. Remarkably, then, the clearance of Colombian forests is matter of international security if considering that it deeply affects the global warming. Last but not least, the primary rainforests in Colombia host an immense variety of species, that without protection would risk the extinction. Along the lines of this thesis, therefore, it would be interesting to evaluate the entity of the space given to environmental issues in political debates over Colombian security after 2015.

The practice, in Colombia, of eradicating coca crops through fumigation, suspended in 2015, worried the environmentalists. The mixture sprayed, containing glyphosate, was evaluated as damaging for both plants and some organisms. Furthermore, the fixed-wing aircrafts used to spray were proved to facilitate the drift of the herbicide for hundreds of meters away from coca cultivations. In Putumayo department, indeed, local farmers complained about countless loss in the harvest and livestock after the aerial spraying.

While it is well-established that coca cultivations are a major cause of deforestation in the country, to consider the eradication of illicit cultivations a remedy for land clearing has no foundation. When eradicating, either manually or aerially, indeed, the coca growers move to neighbouring plots to start new cultivations, deforesting new areas. This analysis showed that displacement occurred within the same department, as well as between Putumayo and the territories of the Pacific region (departments of Nariño, Cauca, Chocó, Valle del Cauca). A high rate of replanting and new crops per year demonstrated not only the mobility of coca crops, but also the ineffectiveness of eradication in combating coca production.

These findings raise questions relating to the reason that led Colombian government to continue pursuing the Plan instead of adopting different cost-effective solutions. A partial answer is constituted by the role of the U.S. in this fight against drug trafficking. Bogotá received pressures by its U.S. partner to keep fumigating at any cost, so political motives largely influenced this suicidal policy. However, several protests

and accusations demanding the halt of fumigations forced Uribe's administration, in 2007, to claim the intention to choose manual eradication over the aerial spraying. Nonetheless, data showed that these declarations were only minimally followed by facts.

Under Santos' government, in 2015, the aerial eradication was stopped, demonstrating for the first time the independence of Colombia from the U.S.-labelled global war on drugs. However, once in office, in 2018, the current President Ivan Duque planned to resume fumigations, although it has not happened yet. Again, the United States, Under Trump's administration, threatened to withdraw the alliance with Colombia in combating drug trafficking if Bogotá would have refused to restart spraying coca crops.

Further studies on the main drivers of Duque antidrug policy-making could offer useful tools to better understand the actual vicissitudes, as well as to find positive alternatives to the resumption of fumigations. In this sense, through a careful cost-benefit analysis, some feasible policy recommendations are desirable, with the scope of creating an antidrug policy that respects both human rights and the delicate Colombian ecosystems.

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