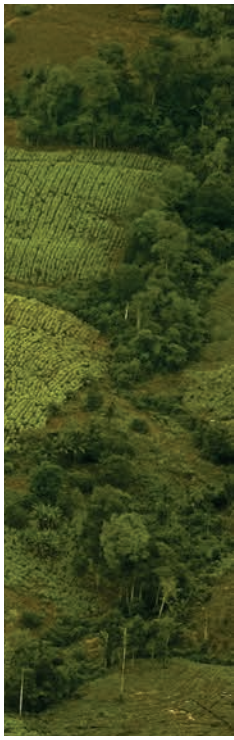
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Gobierno de Colombia





Colombia

Survey of Territories Affected by Illegal Crops 2021

November 2022

UNODC Research

Colombia

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Territories affected by illicit crops monitoring 2021.

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Explanatory remarks

The Monitoring of Territories Affected by Illicit Crops 2021 report comes as part of the SIMCI Project, with strong collaboration from the Government of Colombia, in particular the Ministry of Justice. This collaboration is not limited to financial and logistical aspects; it also includes technical and strategic elements resulting from the joint construction of a monitoring model based on technical and objective evidence.

The maps and territorial analyses here are based on the official cartography provided by the Government of Colombia by means of an inter-institutional technical committee. Data on actions taken by the Government of Colombia to address the drug problem are provided by the Colombian Drug Observatory (ODC).

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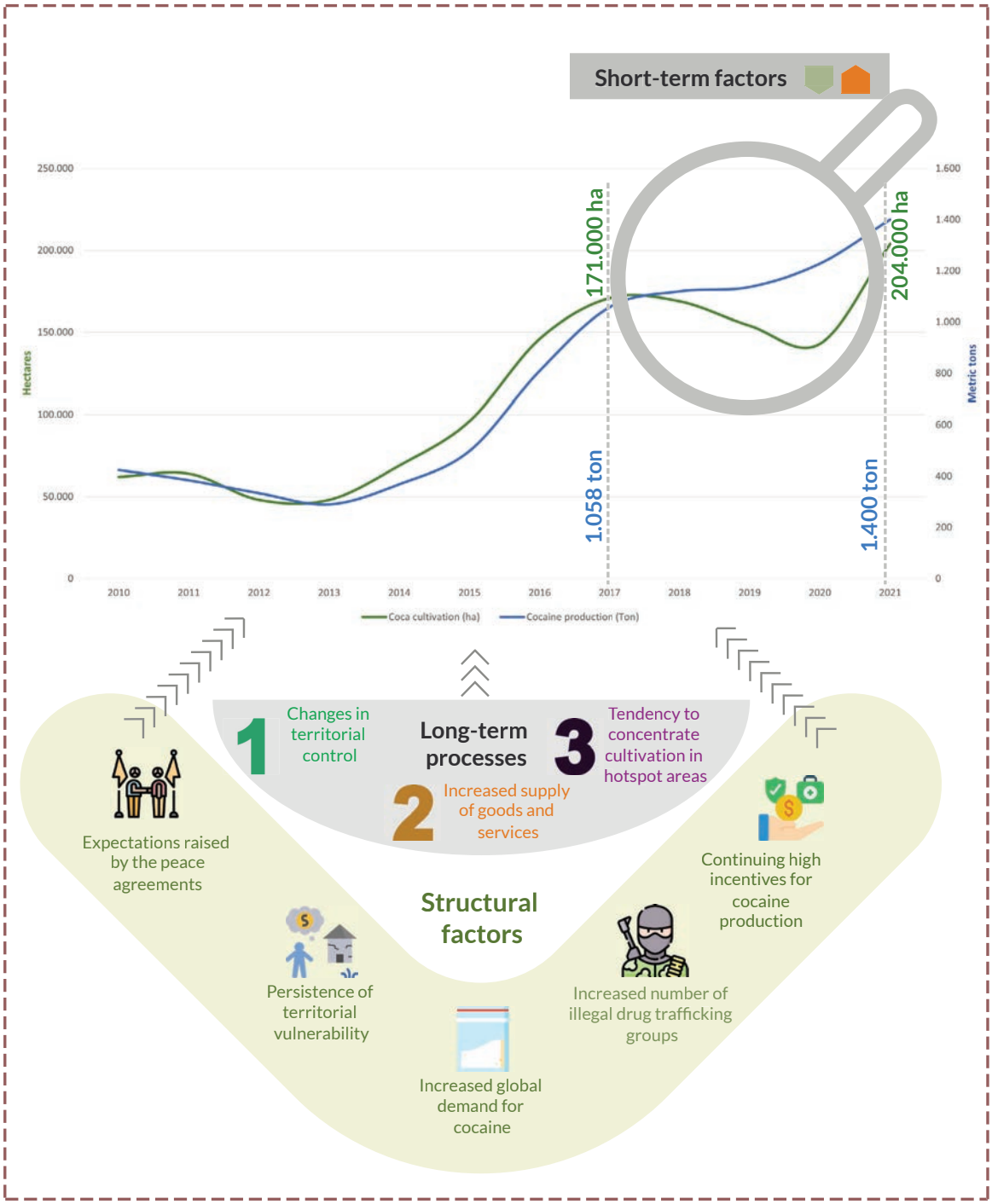
Summary fact sheet–Colombia coca cultivation survey, 2021

	2020	Change (%)	2021
Net coca cultivation area calculated on 31st December (rounded to the nearest thousand)[1]	143,000 hectares	43	204,000 hectares
Pacific region	50,701 hectares	76	89,266 hectares
Catatumbo region[2]	40,116 hectares	6	42,576 hectares
Central region	25,221 hectares	35	34,003 hectares
Putumayo – Caquetá region	22,041 hectares	45	31,874 hectares
Meta-Guaviare region	4,462 hectares	36	6,075 hectares
Orinoco region	121 hectares	157	311 hectares
Amazon region	119 hectares	27	151 hectares
Sierra Nevada region	2 hectares	0	2 hectares
Average fresh coca leaf yield[3]	6.4 mt/ha/year	-	6.4 mt/ha/year
Potential fresh coca leaf production[3]	997,300 mt (874,300 mt – 1,180,500 mt)	14	1,134,700 mt (856,900 mt – 1,352,200 mt)
Potential cocaine hydrochloride (100% purity) production	1,228 mt (1,077 mt – 1,454 mt)	14	1,400 mt (1,058 mt – 1,669 mt)
Average potential cocaine hydrochloride/hectare harvested[3]	7.9 kg/ hectare harvested	-	7.9 kg/ hectare harvested
Cocaine seizures[4]	505,683 kg	32	669,340 kg
Illegal laboratories destroyed[5]	5,226	10	5,767
Reported manual eradication of illicit crops[6]	130,147 hectares	-21	103,257 hectares

1 This corresponds to the area with coca found on December the 31st, 2020, vis-à-vis December the 31st, 2021.
2 Prior to 2018, Catatumbo region (Norte de Santander and Cesar) was considered as part of the Central region (Antioquia, Córdoba, Bolívar, Santander, and Boyacá). Since 2018, the results of the Catatumbo region are presented separately.
3 The national average yield per hectare per year and the potential cocaine production per hectare harvested are calculated from the productive area during the year (AP).
4 Cocaine seizures include those cocaine hydrochloride seizures that were the results of actions by the control authorities in the national territory, as well as the results of international operations or current Maritime Agreements. Values for the year 2020 were updated to in comparison to the 2022 report, to reflect latest data.
5 This only includes cocaine laboratories and other structures set up to produce basic cocaine paste and cocaine base. Values for the year 2020 were updated to in comparison to the 2022 report, to reflect latest data.
6 Values are verified and updated on a continuous basis, which may have an impact on data and trends previously reported. Values for the year 2020 were updated to in comparison to the 2020 report, to reflect latest data.

Executive summary

In 2021, coca cultivation reached a historical high level in Colombia , breaking the downward trend of the last three years. Also the potential cocaine production reached a historical record high, following the upward trend since 2014. This new situation is the result of the following short- and long-term processes and underlying structural conditions in Colombia.



2021 Data

Coca cultivation

2020
143,000 ha

2021
204,000 ha

43%

Potential cocaine hydrochloride production

2020
1,228 mt

2021
1,400 mt

14%

The increase in the coca crops includes new fields that have not yet reached their most productive age, which partially explains the difference between the magnitudes of the increase.

Short-term factors associated with the trend of coca cultivation

Reduction 2017 - 2020

- Steady intervention
- Groups that exercised control moved out
- Implementation of the peace agreements
- Promotion of voluntary eradication

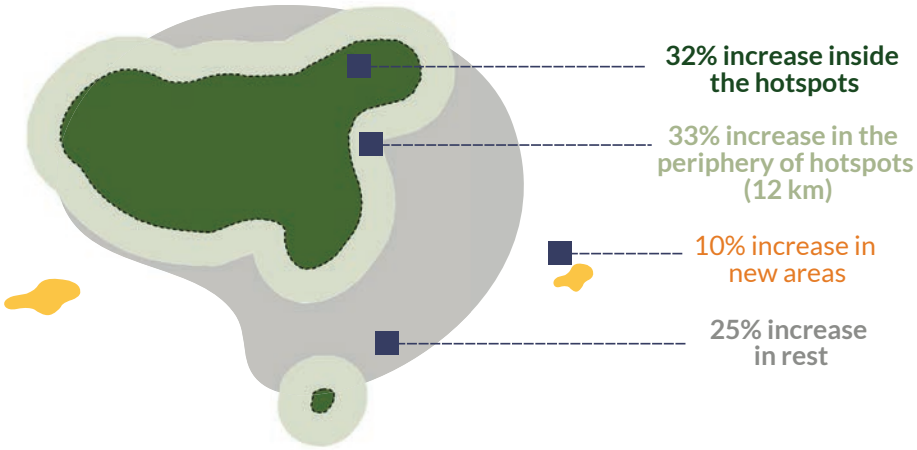
Sustainability?

Increase 2020 - 2021

- Less crop reduction interventions
- Positioning of new criminal groups
- Worsening of socio-economic condition due to the pandemic

Where did the increase of coca cultivation take place in 2021?

In contrast to previous years, coca cultivation increased outside of the coca hotspots (enclaves)



70 % of the territory with coca in 2020 experienced an increase in coca cultivation in 2021.

In new areas the increase was sudden and concentrated, Northern Chocó and Cauca could quickly become hotspots.

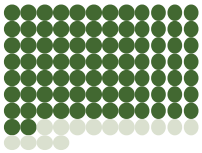
The location of coca cultivation

The location of coca cultivation in Colombia has some particularities.



62 %

of coca cultivation is concentrated in the departments of Nariño, Norte de Santander, and Putumayo



86.5 % of coca cultivation has been in the same places for the past 10 years.

Out of Colombia's **1,122** municipalities, **181** are affected by coca cultivation, half of the national coca area is situated in **12 municipalities**.

The Tibú municipality **ranks first with nearly** 22,000 ha of coca cultivation.



of coca cultivation in 2021 was located in areas **close to municipal capitals** where the income from coca can easily become part of the legal economy.



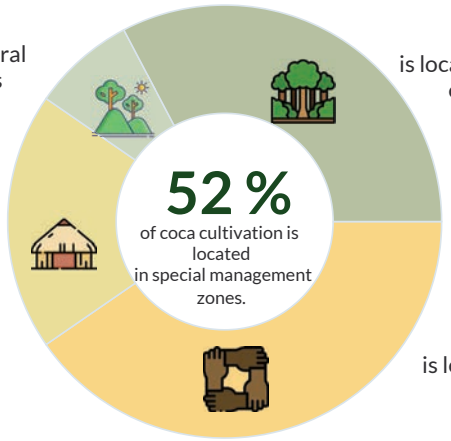
18%

of the increase in coca cultivation took place in the **buffer zones of National Natural Parks**, causing a risk for their conservation.

Coca cultivation threatens the preservation of biological and cultural diversity.

4 %
is located in natural national parks

17 %
is located in forest reserves of the second Act.



10 %
is located in indigenous reserves

21 %
is located in Afro-descendant communities

Not only cultivation, but also the manufacturing of cocaine can affect the ecosystems in those zones

Increased efficiency: coca fields continue to produce more leaves and more cocaine

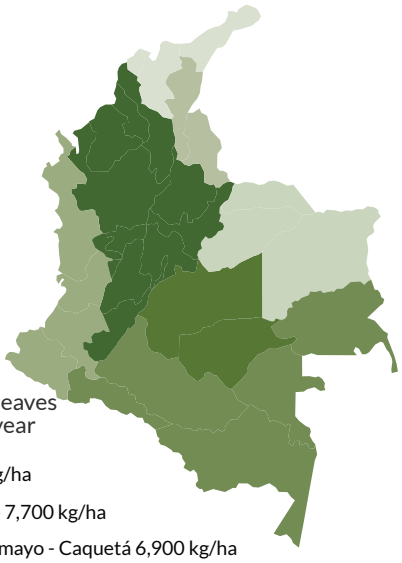
Factors influencing coca crop productivity in 2021

Optimization of the number of plants per hectare

More coca fields were at their most productive ages (2 to 4 years)

Coca plants have been replaced with more productive varieties

More farmers apply agrochemicals and do that more often



Yield of fresh coca leaves per hectare per year

- Central 7,700 kg/ha
- Meta - Guaviare 7,700 kg/ha
- Amazonía, Putumayo - Caquetá 6,900 kg/ha
- Pacífico 6,000 kg/ha
- Catatumbo 5,900 kg/ha
- Orinoquía 4,100 kg/ha
- Sierra Nevada 2,000 kg/ha

Coca - cocaine production	2014	2020	2021
Annual fresh coca leaf production	308,500 mt	997,300 mt	1,134,700 mt
Potential cocaine hydrochloride production	368 mt	1,228 mt	1,400 mt
Average coca leaf yield	4.7 mt/ha/year	6.4 mt/ha/year	6.4 mt/ha/year
Average potential cocaine hydrochloride	5.6 kg/hectare	7.9 kg/hectare	7.9 kg/hectare

Criminal groups push for cost efficient production to maximize their incomes

The impact of long-term processes on the current state of coca cultivation



1

Changes in the role of illegal armed groups: from hegemony of three predominant groups to more and diverse groups that include drug traffickers and producers.

Dynamics of criminal groups



3 predominant illegal armed groups with hegemonic control

More than **60** organized organizations (source: INDEPAZ)

Changing roles and relationships

Local groups that control the territory

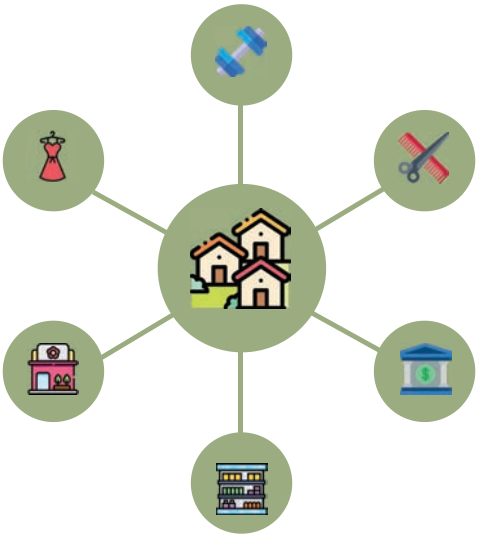


Producers coca/cocaine

Drug Traffickers

Populated places near coca growing areas offer greater supply and demand of services and goods, which is attractive to drug producers and coca farmers.

2



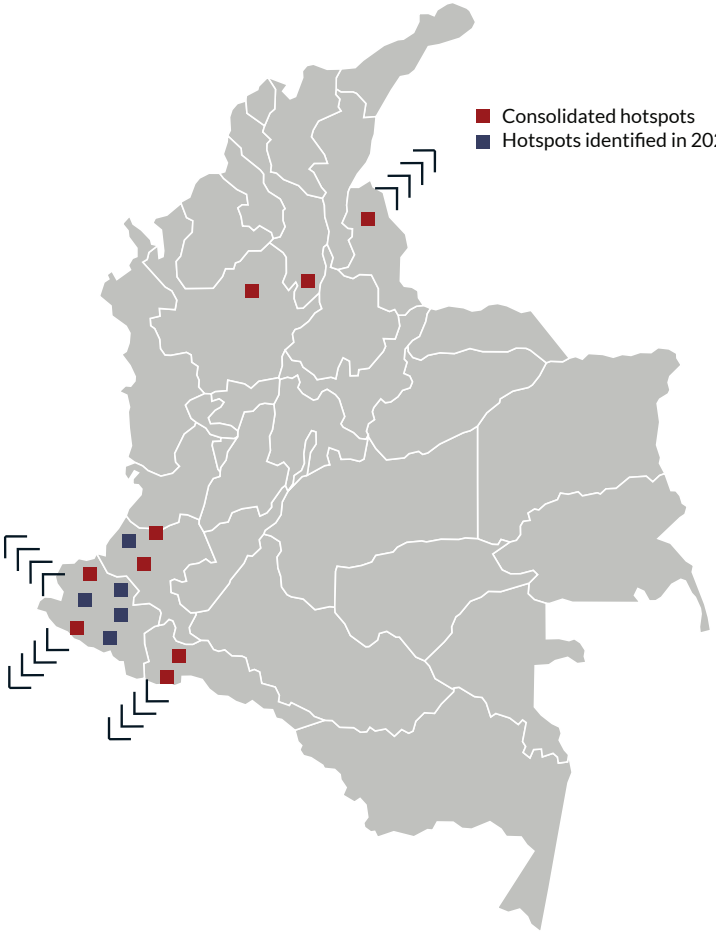
In coca hotspots, there is a greater flow of financial resources that stimulates trade and allows access to goods and services that would not have been available without the illegal activity.

"...a wide variety of clothing and beauty stores, restaurants, pharmacies and supermarkets, meat shops where you can find everything from groceries to household appliances, as well bars and prostitutes"

(Source: Coca farmers)

3

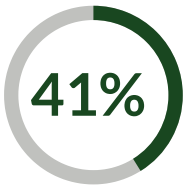
Concentration of cultivation in hotspots: an efficient agro-industrial model to grow coca, that could expand to other areas.



Out of the 14 coca hotspots, 5 were newly identified in 2021.

The coca hotspots are characterized by:

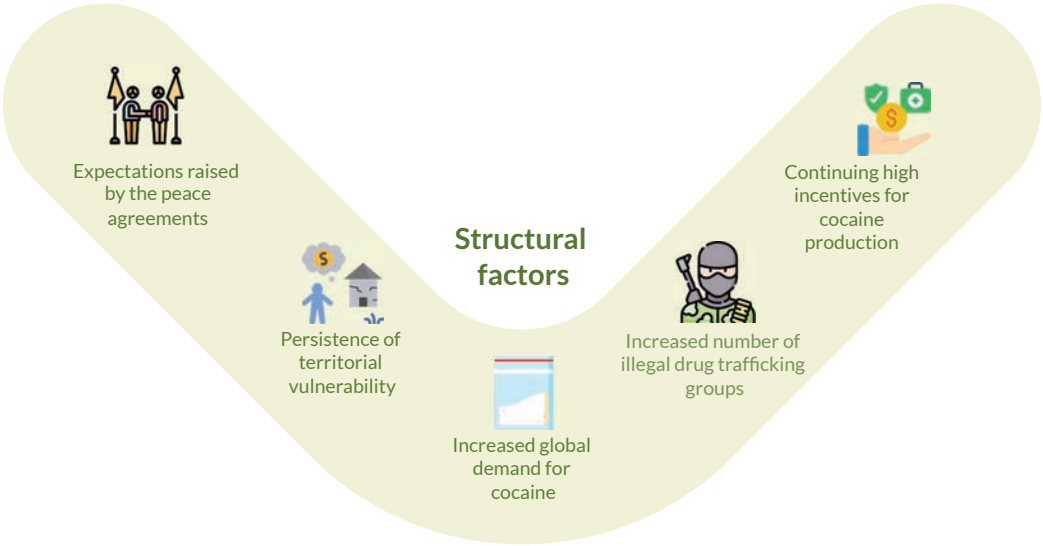
1. Concentration of the coca cultivation (higher number of hectares per square kilometer)
2. Persistence (coca crops cultivated in the same location/territory for more than four consecutive years)
3. More productive coca fields than before
4. Concentration of all steps in the production of cocaine in the same territory
5. Proximity to major trafficking routes
6. Better prices of coca products than outside



of coca is located in the **coca hotspots** where there are more hectares of coca per square kilometer and the fields are more productive, a situation that has persisted for more than four years.

- Crops within the most consolidated hotspots are up to **2.4 times more productive** than outside, as in the case of Argelia - El Tambo.
- The concentration and persistence of coca cultivation is located in areas where cocaine is trafficked. **The locations are beneficial for drug trafficking ;** 12 of the 14 coca hotspots are located in international border departments with direct access to the sea.
- In those coca hotspots there **is a convergence of illegal armed groups, drug traffickers and producers**.
- Drug trafficking **groups move ever closer to coca production areas**.

The changes are driven by the convergence of multiple factors



The interplay of several factors has created a context favorable to the increase in cocaine production and production efficiency

Increased global demand for cocaine

There has been a growing demand for cocaine globally that may affect its supply in producing countries. There were an estimated 21 million users of cocaine-type substances in 2020. Looking at trends over the last 10 years, there is evidence of a steady long-term increase in the number of estimated users of this type of drug.

Persistence of territorial vulnerability

The municipalities where coca production is concentrated continue to face conditions of poverty and limited market access opportunities. The Multidimensional Poverty Index (MPI) for the rural sector (populated centers and dispersed rural areas) for PDET (Development Programs with a Territorial Approach) municipalities is 46%, or 28 percentage points higher than the national aggregate (18%) in 2021.

Expectations raised by the peace agreements

According to the results presented by the *Kroc Institute*, peace accord implementation levels in the country are low: only 2 % of the provisions of the peace accord regarding the Comprehensive Rural Reform have been completed. The average implementation progress recorded is over 50%, based on the management indicators registered in the *Integrated Post-Conflict Information System* (SIIPO).

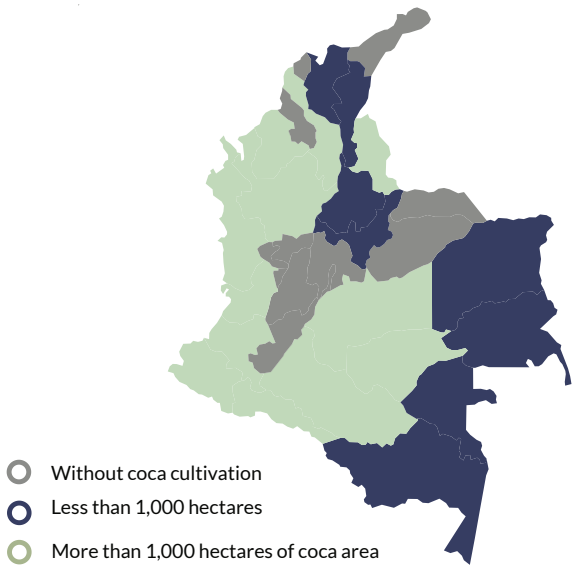
Increased number of illegal drug trafficking groups

Drug trafficking groups are expanding into areas with historically favorable conditions for coca production. In 2021, post-Farc armed groups were present in 138 municipalities formerly occupied by the guerrilla group Fundación Paz y Reconciliación (Peace and Reconciliation Foundation).

Continuing high incentives for cocaine production

The continued devaluation of the colombian peso over several years has progressively improved profits for drug traffickers. In addition, there have been increases in crop yields and economic returns for producers. Moreover, drug traffickers offer financial support to farmers to grow coca.

Major changes in drug production require major changes in intervention strategies in the territory



Interventions where coca cultivation is phasing out

Focusing actions on territories where coca cultivation is phasing out can achieve fast results. Caldas was declared a territory free of coca crops in 2019. The Magdalena Medio and Western Boyacá sub-region is moving towards the abandonment of illicit crop production. Currently, eight departments with less than 1,000 hectares of coca are identified where this type of strategy could be implemented to ensure that the elimination of coca cultivation there is sustainable.

Support the indigenous and Afro-Colombian cultures to find their own way out of the drug economy

It is necessary to work with indigenous peoples and Afro-descendant communities to understand the differentiated impacts caused by the drug problem with an ethnic and rights-based approach, supporting the design of actionable strategies in their territories.





Long-term strategies to deal with the drug problem

Generating technical evidence of the impact of interventions in the territories affected by illicit cultivation requires strengthening the recording system that includes actions in different components: supply reduction, rural development, security, investment in infrastructure and services, and socioeconomic monitoring of the implementation and impact of the different interventions.

Action axes



1.Environmental protection



2.Supply reduction



3.Rural development and security

Inter-institutional coordination for territorial transformation



A comprehensive transformation of the territories affected by coca cultivation requires coordinated work between national government agencies, local governments, international cooperation agencies, private sector companies and civil society, to strengthen actions to promote economic and social development, formal ownership, access to land, self-sustainability and food security, payment for environmental services, inter alia.

Research and monitoring for a better understanding of the problem



To better understand the problem of illicit drugs in the country, it is necessary to produce more and better evidence that covers the whole drug trafficking chain in the territories affected by coca cultivation to support the design and implementation of new interventions.

Iconos: Flaticon.com

Introduction

The United Nations Office on Drugs and Crime (UNODC) and the Ministry of Justice present the monitoring report on territories affected by coca cultivation as of December 31, 2021, prepared by the Integrated Illicit Crop Monitoring System (SIMCI).

The findings of this report are organized in two sections: the first one shows the results at the national level and the second one at the regional level. The ***first chapter*** highlights that potential cocaine production maintains the increasing trend that has been registered since 2014, while the coca cultivated area resumes the strong increasing trend that had been present since 2014 and that was interrupted between 2018 and 2020. This recovery of the trend is the result of the interaction of multiple structural factors that matched with a reduced efficiency in interventions.

As opposed to the 2018-2020 period, coca did not only grow within the productive hotspot areas, as the increase was generalized; even departments that presented a reduction trend, such as Caquetá, Meta and Guaviare, showed an increase in coca cultivation. Although five departments have had less than 100 hectares of coca cultivation for more than nine years, coca-free territories have yet to be consolidated.

The ***second chapter*** stresses elements of change that dynamize the incentive system and may have an impact on the reactivation of the phenomenon in territories that were prone to abandonment. These changes do not only affect coca growers; they also have an impact on communities that interact with the production chain. The report highlights changing roles and power actors in the territories, new urban-rural relations that imply new alternatives for transforming illegal profits into goods and services, as well as the formation of productive hotspot areas not only related to the concentration and persistence of coca, but also to the development of other hotspot area characteristics economically speaking.

The second section, in the ***third chapter***, outlines trends in the area planted and cocaine production in producing regions, and the ***fourth chapter*** compiles the actions that

the Colombian government implemented to address the illicit drug production problem. Even though there is no assessment on the effect of these interventions, the chapter highlights a broader view of the concept of intervention, the effect of which cannot be measured exclusively on the basis of changes in potential cocaine production.

This report incorporates findings gathered from the coca cultivation survey based on information captured by remote sensing and different investigations, carried out directly in the field, to estimate coca cultivation yield, territory characteristics and conditions of the markets stimulated by coca cultivation.

Therefore, this report is based on quantitative and qualitative research methodologies (***fifth chapter***), which guarantee historical series comparability, a detailed description of which can be found in the methodological chapter; additionally, the digital version includes a statistical annex with the relevant data, which can also be consulted in the Colombian Drug Observatory (www.odc.gov.co) and in the Spatial Information Bank of the SIMCI project (www.biesimci.org).

CHAPTER 1

Coca cultivation survey

The historical coca cultivation series had its highest point in 2021, when 204,000 ha of coca were detected on December 31. This is reached after three years of continuous reduction between 2018 and 2020 in which, however, coca was above the 145,000 ha detected in 2001, the first year of the series (map 1).

The fact that cultivations have exceeded 200,000 ha is not a temporary condition from last year, since 2017 coca plantations have remained at the highest part of the series. Various factors, internal and external to the country, have had an impact on the way in which the drug trafficking phenomenon is developing in Colombia is undergoing profound changes and adaptations that must be understood in order to design new strategies that respond more efficiently to these new conditions.

This chapter presents some elements to contribute to the understanding of these changes. First, we present five contextual elements that constitute structural factors (figure 1): 1) increase in global demand for cocaine and its derivatives; 2) expectations derived from the peace agreements; 3) persistent territorial vulnerability; 4) creation of incentives for cocaine production; and 5) increase in illegal drug trafficking actors.

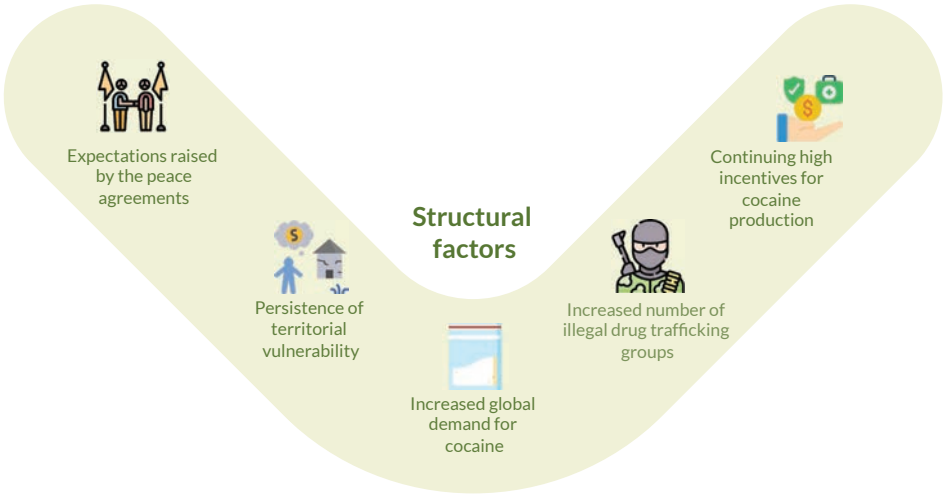
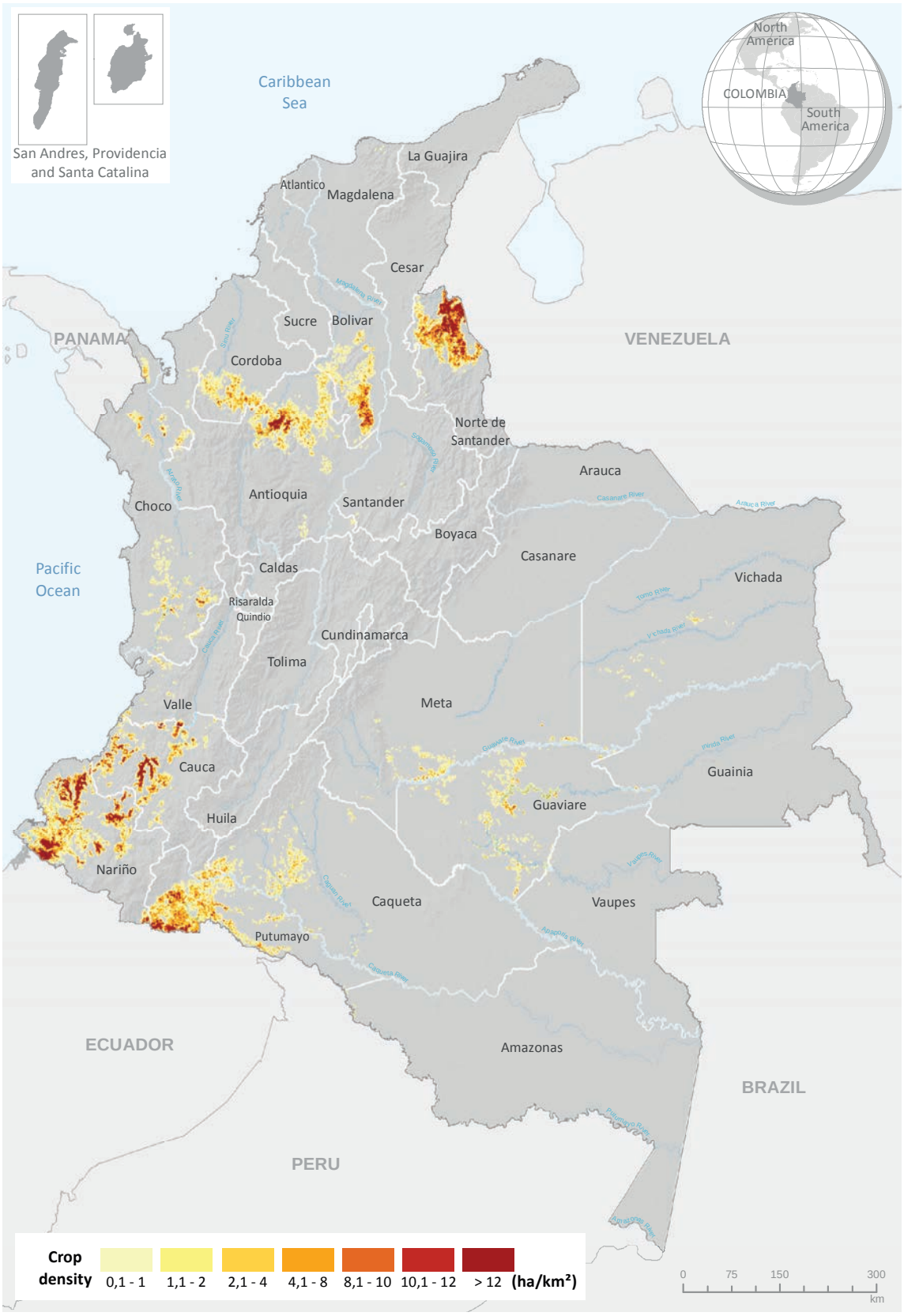


Figure 1. Coca production structural factors

Map 1. Coca cultivation density in Colombia, 2021



Source: Colombian Government - UNODC supported monitoring system.
Boundaries, names and titles used herein do not construe acknowledgement or acceptance by the United Nations.

The following section presents how these contextual elements were consolidated alongside an improvement in cocaine production efficiency, mainly associated with the formation of productive hotspot areas, and how such hotspot areas shape changes in cocaine production incentives.

Finally, elements that contribute to understand why in 2021 there is a breakdown in the reduction trend of the last three years are presented, generating warnings regarding the evolution of the phenomenon for the coming years.

A scenario of changes and adaptations

Between 2013 and 2021, cultivation has increased more than four times, despite a reduction period between 2018 and 2020, which can be related to the intervention in the territories as a result of the implementation of the Comprehensive National Program for the Substitution of Illicit Crops (PNIS) and the Development Programs with a Territorial Approach (PDET), as well as the targeting of supply control operations in the most affected departments. By 2021, the increase is 1.5 times higher than in 2020 and is concentrated in three neighboring departments: Nariño, Putumayo and Norte de Santander (figure 2). In 2013, these departments accounted for 56% of the national total; in 2017 (first historical maximum) 60% represented by 103,000 ha and, by 2021, 62 % of the total planted with about 127,000 ha.

By 2021, more than 50% of the area under coca will be concentrated in special management areas, 3.5 percentage points more than what was identified in 2020. Half of the increase is focused on Indigenous Reserves and Black Community Lands. The increase of the area with coca in

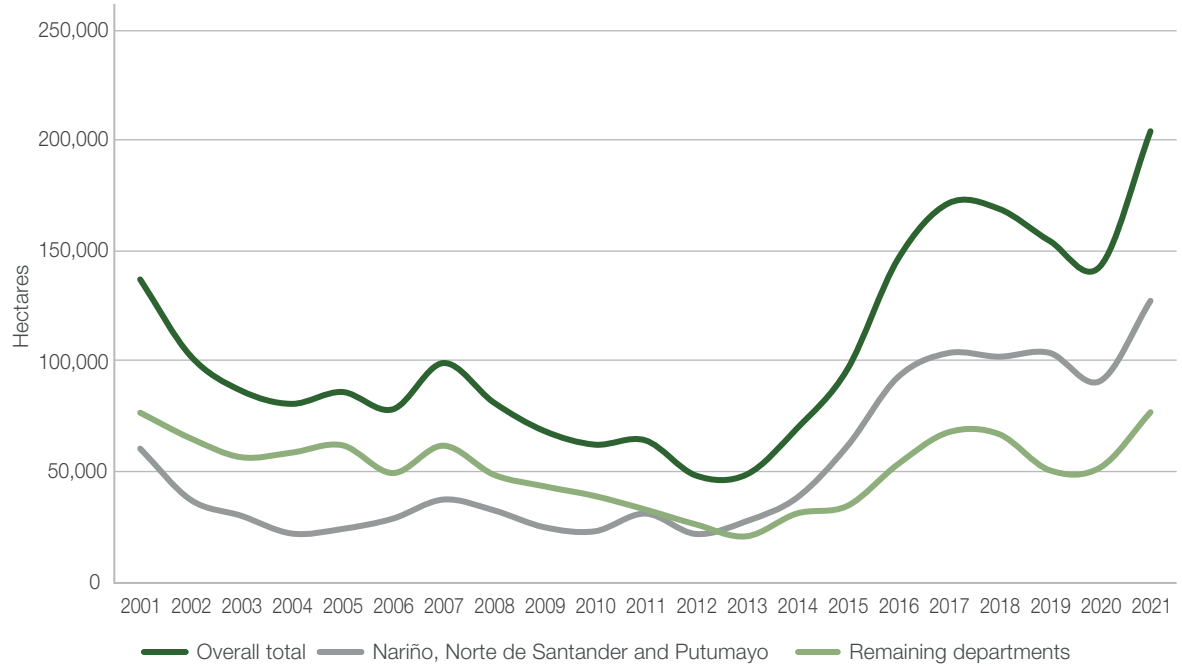


Figure 2. Historical series of coca cultivation in Colombia and in departments with the highest concentration (Nariño, Norte de Santander and Putumayo) as of 31 December, 2001-2021

special management areas is significant: 21 % in National Natural Parks (PNN); 69 % in reserves and close to 100 % in Black Community Lands. Similarly, there is an increase in areas of productive integration, which are those located less than 15 km from a municipal capital, and in those areas permanently affected during the last 10 years.

On the other hand, coca cultivations yield, represented in a greater capacity to obtain leaves (Figure 3), has been increasing since 2014, going from 4.7 mt/ha/year to 6.4 mt/ha/year in 2021, an increase of 36.2 %[1]. This increase in yield concurs with the following four changes evidenced in the cultivation fields: 1) increase in distance between furrows per hectare; 2) renewal of fields with more productive cultivars[2], not only in terms of leaf obtainment, but in alkaloid content; 3) higher proportion of coca fields in their most productive ages, between 2 to 4 years old; and 4) larger and more constant demand for agrochemicals, a situation that could be explained by greater access to products for pest, weed and fertilizer control, in addition to a reduction in expectation of loss/decrease in production.

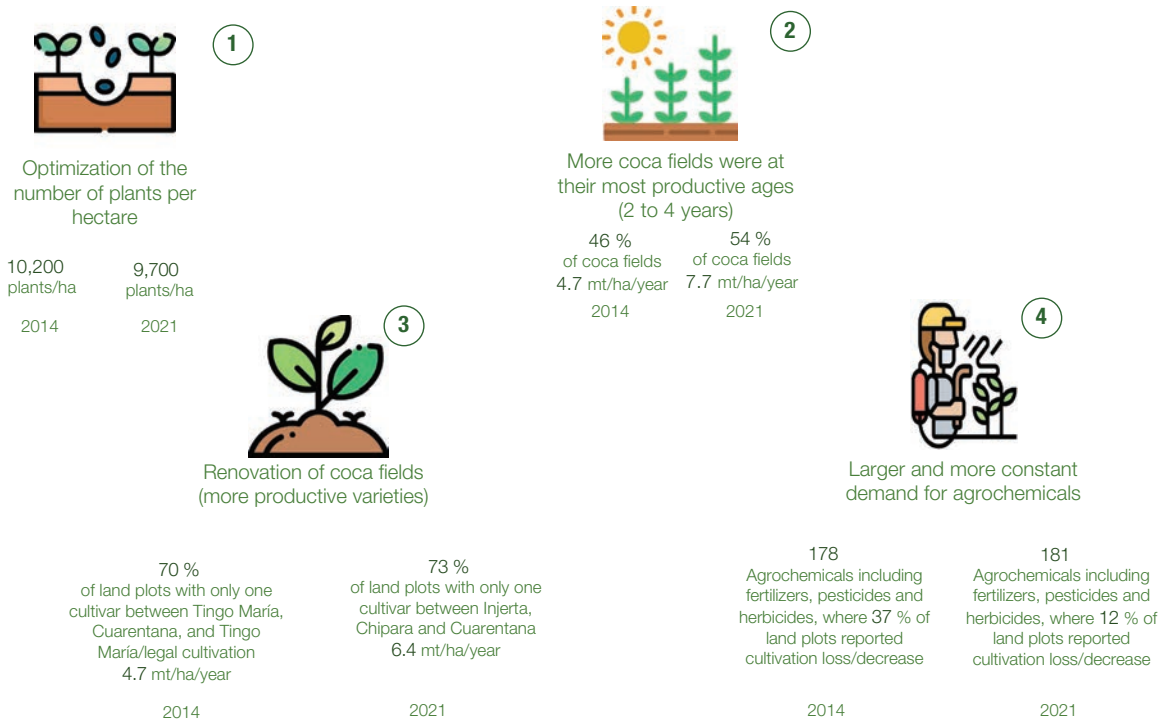


Figure 3. Factors affecting yield changes, 2014-2021

Source: Government of Colombia and UNODC/SIMCI (2020). Coca cultivation yield surveys in affected regions (2005-2021).

Note: Phase III was completed in 2014; Phase V is being updated in 2021 with results from Catatumbo, Central and Putumayo-Caqueta regions.

1. The figures of the 2014 coca cultivation yield studies close the regional behavior of the 2011-2014 period; in relation to 2021, the aggregated results correspond to the updates of the Catatumbo, Central and Putumayo-Caqueta regions. The closing of phase V is expected to take place in 2023, with the update of the Pacific region.
2. Cultivar is understood to be the common names by which the Agricultural Producers with Coca (PAC) define the plants.

Together with the increase in the area planted in 2021, and the increase in yield that has been consolidating since 2014, this implies a potential cocaine production of 1,400 mt, 14% more than in 2020.

Contextual elements for cocaine production in Colombia

The abrupt change in the trend of the area planted does not have a particular origin, as multiple elements have combined to consolidate it. There has been a trend towards coca concentration in hotspot areas for the last four years, with a consequent increase in the area planted; however, a strong trend towards reduction outside the hotspot areas and the focus of the eradication strategy generated a balance in favor of reduction, which was no longer evident in the last census. This situation of increased cocaine production also coincides with changes in the conditions affecting the market, of which the most noteworthy are the following:

1. Increased global demand for cocaine

The pandemic and post-pandemic scenario has become an opportunity for criminal actors dedicated to cocaine trafficking to diversify. According to the World Drug Report 2021[3], new organized groups are competing for control of the drug market in Europe, a dynamic that has led to greater competition, increased quality and greater accessibility for product acquisition, a combination that has possibly encouraged an increase in demand. In this regard, the same report expresses the concern on this subject, since between 2010 and 2019 the prevalence of cocaine use in the last year was 0.4%, with a growth in the number of consumers of 22% (20,000,000) in the same period of time.

One fact that confirms the increase in cocaine trafficking and consumption is the high number of shipments seized heading to Europe, one of the world's most popular destinations for consumption. In the most recent report of the International Narcotics Control Board (INCB)[4], unprecedented cocaine shipments from South America to Europe were seized in North and West African ports in 2021, a fact that supports the worrying situation of cocaine commercialization and consumption, but also the increase in coca cultivation in Colombia.

2. Expectations derived from the peace agreements

The signing of the peace agreement with the Revolutionary Armed Forces of Colombia-People's Army (Farc-EP) guerrilla created a period of tense stability in terms of security in the areas most affected by the conflict in the country. Nevertheless, in the post-agreement scenario, the remaining armed groups and new criminal structures quickly took over the territories abandoned by the guerrillas, taking over regional control and illicit economies that were within their scope of action. According to a report by the

3. United Nations Office on Drugs and Crime (UNODC), World Drug Report 2021 (Vienna: Author, June 2021), https://www.unodc.org/unodc/en/data-and-analysis/wdr-2021_booklet-1.html.
4. United Nations. International Narcotics Control Board, International Narcotics Control Board Report for 2021 (Vienna: Author, March 2022), https://www.unodc.org/documents/mexicoandcentralamerica/2022/Informe_JIFE_2021.pdf.

Peace and Reconciliation Foundation[5] on the subject, since the signing of the agreement in 2016, the post-Farc-EP armed groups spread rapidly and were located by 2021 in 138 of the municipalities formerly occupied by the Farc-EP. These illegal structures have found in drug trafficking one of their funding sources since it is a business with tradition and a stable commercial structure that can continue to reap revenues.

Although there are still illegal groups that call themselves political interest groups, most of them have a clear and almost exclusive economic interest. The 2021 report on the presence of armed groups published by the Institute for Development and Peace Studies (Indepaz)[6] reported three major illegal structures operating in the country: twenty-two narco-paramilitary groups, thirty post-Farc-EP structures and eight National Liberation Army (ELN) guerrilla fronts. The same source indicates that the narco-paramilitary groups operate mainly in Bolivar, Norte de Santander, Cordoba, Antioquia and Meta, the most visible organization being the Autodefensas Gaitanistas de Colombia (AGC), with an estimated 1,600-1,700 people in their ranks. The post-Farc-EP groups are concentrated in Norte de Santander, Antioquia, Cauca, Nariño and Meta, with the Southeastern Bloc as the most prominent with 2,700 individuals in the group; in addition, the ELN has an estimated 2,450 people in its structure, concentrated in Antioquia, Chocó, Cauca, Norte de Santander and Arauca.

Large groups such as the ELN, the AGC or the Southeast Bloc from the former Farc-EP, have the capacity to be present in large territories; nonetheless, most groups do not have such capacity and prefer to concentrate coca in territories they can control in order to generate the greatest possible efficiency in the production process. The Ombudsman's Office in its Special Report: Illegal Economies, Armed Actors and New Risk Scenarios in the Post-agreement (2018), points out the proliferation of criminal economies, especially drug trafficking, as possible increased violence scenarios, and mentions:

> "Farc-EP retreat from their areas of influence has led the National Liberation Army (ELN), the post-demobilization armed groups (Autodefensas Gaitanistas de Colombia/Clan del Golfo - AGC/CG, Puntilleros and Pelusos) and the dissident structures of the Farc-EP itself, to deploy violent dynamics aimed at controlling the aforementioned economies and intervening in the development of the circuits associated with them, positioning themselves in such environments with the use of criminal strategies that range from direct conflict with competing armed groups to operational alliances, thus increasing the risks of victimization for local populations in the areas involved" [7].

In addition, International Crisis Group also highlights in its report "Colombia's Armed Groups and their Dispute for the Spoils of Peace" (2017) the following:

5. Peace and Reconciliation Foundation, Post-Farc Armed Groups (GAPF): a new spiral of violence in Colombia (Bogotá: Author, August 19, 2021), https://e7c20b27-21c2-4f2b-9c38-a1a16422794e.usrfiles.com/ugd/e7c20b_d33aea1ed5b7406b95c1031d9ed79f5a.pdf.
6. Peace and Development Studies Institute (Indepaz), Conflict hotspots in Colombia. Report on the presence of armed groups (Bogotá: Author, September 2021), http://www.indepaz.org.co/wp-content/uploads/2021/10/INFORME-DE-GRUPOS-2021.pdf.
7. Ombudsman's Office, Special Report: "Illegal Economies, Armed Actors and New Risk Scenarios in the Post-Agreement" (Bogota: Author, 2018), 10. https://issuu.com/defensoriadelpueblo/docs/informe_diagramado_17-09-18_2_

> "Since the Revolutionary Armed Forces of Colombia (Farc-EP) withdrew from their rural nuclei to cluster in camps in early 2017, rival armed actors have taken their place, waging a battle for spoils: control over isolated communities and territories, many of them rich in illicit business. In Tumaco, a Pacific cocaine distribution hub, in Choco villages, or in smuggling areas near the Venezuelan border, established armed groups and new dissident factions have targeted state forces, intimidating communities and bidding to become the undisputed local chiefs" [8].

On the other hand, in 2021 Trejos and Badillo conclude that in Colombia there is no longer a specific armed conflict, to the extent that multiple violent confrontations are evident, as a consequence of a post-agreement scenario:

> "While the demobilization of the Revolutionary Armed Forces of Colombia (Farc-EP) achieved a reduction in some conflict-related violence rates -homicides, kidnappings and forced displacement, for example- (Rettberg, 2020), it did not mean the end of armed violence in several territories. However, the scenario that was set up with the departure of the Farc-EP cannot be read homogeneously throughout the territory. Although in some sub-regions (such as southern Córdoba), violence rates increased dramatically (Nussio and Howe, 2016), in others (such as southern Bolívar), the armed conflict did not significantly alter (Trejos, 2020)" [9].

Typically, these groups do not control the trafficking routes and therefore behave as intermediaries or facilitators vis-à-vis transnational drug trafficking groups.

3. Increase of illegal drug trafficking actors: decrease in gaps between transnational organized crime (TOC) and local organized crime (LOC) in areas affected by coca cultivation

One of the main concerns generated in the post-agreement period are changes in the relationship between transnational criminal organizations associated with drug trafficking (TCOs) and illegal armed groups (IAGs) present in coca-growing territories[10]. In the pre-agreement period, the presence of the Farc-EP, the ELN, paramilitary groups and the Popular Liberation Army (EPL) facilitated cocaine negotiations with TCOs, by providing access to production areas for the procurement of cocaine base paste for subsequent crystallization, as well as for the acquisition of cocaine hydrochloride in large volumes[11]. In this context, TCOs conducted their negotiations through "emissaries",

8. International Crisis Group, "Colombia's Armed Groups and Their Scramble for the Spoils of Peace". Latin America Report, no. 63 (October 19, 2017), 3. https://www.crisisgroup.org/es/latin-america-caribbean/andes/colombia/63-colombias-armed-groups-battle-spoils-peace.

9. Luis Fernando Trejos Rosero and Reynell Badillo Sarmiento, "Post-Farc-EP: The Five Active Armed Conflicts in the Colombian Caribbean". Revista 100 Días, no. 101 (2021, Jan.-Apr.), https://www.revistaciendiascinep.com/home/despues-de-las-farc-ep-los-cinco-conflictos-armados-activos-en-el-caribe-colombiano/.

10. See: Ombudsman's Office Delegated for the Prevention of Risks of Human Rights Violations and IHL Early Warning System (SAT), Special Report: illegal economies, armed actors and new risk scenarios in the post-agreement (2018, September),https://issuu.com/defensoriadelpueblo/docs/informe_diagramado_17-09-18_2_; Eva M. Rey and Diego Rodríguez, Transnational Organized Crime: Borders and Actors in the Hemisphere (Escuela Superior de Guerra Books, 2020); Darío E. Cortés, Transnational Organized Crime: Mexican Drug Trafficking Organizations in Colombia (Bogotá: Escuela Superior de Guerra "Rafael Reyes Patria", 2020).

11. See: Deissy V. Durán, Transnational Organized Crime in the Americas (Bogotá: School of Intelligence and Counterintelligence Brigadier General Ricardo Charry Solano, 2012); Henry Torres, "Transnational Organized Crime in Colombia." Díkaion 22, no. 1 (2013): 109-130, http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0120-89422013000100005&lng=en&tlng=es.

liaison personnel to monitor the departure of shipments through ports and borders, mainly; once cocaine was processed, the shipments were moved from the production areas to the departure point, through trafficking networks facilitated by the IAGs[12].

Given the changes in the IAG structures and their coverage in the territory in the post-agreement scenario, the TCOs moved their emissaries from ports and borders to areas with a higher coca concentration, with the purpose of guaranteeing cocaine supplies; once they arrived in these areas, they activated the connections with the IAGs present in the territory, with less capacity than before (hereinafter referred to as local organized crime [LOC]) to access production areas[13]. TCOs negotiate directly with the intermediaries and owners of the laboratories the quantities and qualities of cocaine, and it is they who coordinate the exit routes with the LOC[14].

Under globalization, this mode of intermediation between the "global organization/company" and local producers generates domination relations, following the implementation of different strategies for the consolidation of industrial districts[15], oriented to the exploitation of agro-industrial goods for export. Thus, the proximity between transnational organized crime (TOC) and the LOC threatens the efforts and intervention actions of institutions in addressing the production, trafficking and consumption of illicit drugs, both in Colombia and worldwide. Currently, there is evidence of an increase in the number of detected cases of coca cultivation and cocaine crystallization in non-traditional areas[16], in which not only the establishment of these small and large-scale production processes is reported, but also raw material trafficking (cocaine paste/base) and alliances between the TOC and the LOC in different countries that were only considered to be drug transit and consumption countries.

At a local level, in order to establish and sustain it, there is a need to consolidate a culture of the illicit that is appropriated and exploited for social benefit or welfare, called Neighbordhoods Effects[17]; this in practice corresponds to a local community that accepts these domination conditions, inasmuch as its participation does not guarantee a dynamic and permanent construction of welfare, but rather to remain within minimum conditions beyond those provided by institutional fragility[18].

12. See: United Nations. International Narcotics Control Board, Report of the International Narcotics Control Board for 2010 (Vienna: Author, 2010), https://www.incb.org/documents/Publications/AnnualReports/AR2010/AR_2010_Spanish.pdf; National Museum of Colombia, VIII Annual History Lecture "Ernesto Restrepo Tirado". Historical Analysis of Drug Trafficking in Colombia (Bogotá: Autor, 2014), https://www.museonacional.gov.co/imagenes/publicaciones/analisis-historico-del-narcotrafico-en-colombia.pdf.

13. Government of Colombia and United Nations Office on Drugs and Crime (UNODC), Characterization of infrastructures and dynamics of illicit production of cocaine hydrochloride (2021). Restricted document.

14. See: Ministry of Justice, Trafficking, https://www.minjusticia.gov.co/programas-co/ODC/Paginas/oferta-drogas-trafico.aspx; Abel Gil, "Cocaine Routes around the World," EOM (2019, January 27), https://elordenmundial.com/mapas-y-graficos/las-rutas-de-la-cocaina-en-el-mundo/; National Police-Anti-Narcotics Directorate-International Center for Strategic Studies against Drug Trafficking, Cocaine Market Analysis (2020), http://www.ameripol.org/portalAmeripol/ShowBinary?nodeId=/WLP%20Repository/116170//archivo; Drug Enforcement Administration (DEA), 2020 NDTA. National Drug Threat Assessment (2021, March), https://www.dea.gov/sites/default/files/2021-02/DIR-008-21%202020%20National%20Drug%20Threat%20Assessment_WEB.pdf.

15. José Luis Molina, Luis Martínez-Cháfer, Francesc Xavier Molina-Morales and Miranda J. Lubbers, "Industrial Districts and Migrant hotspot areas: A Model of Interaction" (2018), http://repositori.uji.es/xmlui/bitstream/handle/10234/174868/Molina_2018_Industrial.pdf?sequence=1 DOI: 10.1080/09654313.2018.1455808.

16. Seth Robbin, "Coca Cultivation and Cocaine Production Reach New Heights in Honduras," InSight Crime (2022, April 19), https://es.insightcrime.org/noticias/cultivo-coca-produccion-cocaina-alcanzan-alturas-honduras/.

17. Mario L. Small, Robert A. Manduca and William R. Johnston, "Ethnography, Neighborhood Effects, and the Rising Heterogeneity of Poor Neighborhoods across Cities". City & Community 17, n.º 3 (2018): 565-589.

18. Laura Castro-Díaz, Institutional fragility associated with the illicit coca-cocaine transformation (master's thesis) (2021). Universidad de los Andes, Bogotá, Colombia, https://repositorio.uniandes.edu.co/handle/1992/54621.

On the other hand, from a global perspective, the presence of the TOC, as a "global organization/company", generates different types of incentives in the territory, among which the following stand out: 1) local monetization of dollars (exchange) for the purchase of cocaine (paste/base/chlorhydrate) begins to influence the construction of prices; 2) the entry of more Colombian pesos in coca cultivation areas, after its devaluation against the dollar, facilitates the means to co-opt the territory, in the face of a post-pandemic inflationary scenario locally and globally, which strongly affects the most vulnerable populations in Colombia; 3) the strengthening of productive chains with their suppliers, in which not only their supplies are guaranteed, but also the quantity and quality of the products generated locally, evidenced both in the financing of the production complexes and in the promotion of best practices for coca leaf, coca paste and cocaine base production[19], and 4) local connections of the "global organization/company", by having a local presence in areas of illicit cultivation and carrying out other illegal activities, will not only be oriented towards buying and trafficking drugs, but will also tend to strengthen purchase and sale networks of weapons and ammunition, smuggling, human trafficking, among other dynamics that tend to be encouraged in border areas in Colombia[20].

4. Persistent territorial vulnerability

Territories affected by the presence of coca cultivation maintain strong conditions of vulnerability; investments made in municipalities prioritized for the implementation of the peace agreement, where most of the coca cultivation is located, have not so far generated significant changes in security conditions; nor in road connectivity, agricultural production and commercialization costs, or market access opportunities. Thus, although the national government has made a significant fiscal effort, such effort has not achieved the required impact levels to reduce the factors driving the establishment of coca cultivation throughout the territory. Additionally, in the economic sphere, territories' vulnerability increased due to the impact of the crisis derived from the COVID-19 pandemic.

A territorial overview (map 2) indicates that by 2021, 86.5% of coca is in areas affected for more than 10 years (figure 4), which corroborates that the persistence of vulnerable conditions in the territories, strengthens persistence and encourages the increase of illegal activities in the territories. Compared to 2020, these permanently affected territories increased by nearly 2 percentage points.

19. Government of Colombia and UNODC, Infrastructure Characterization.

20. Information obtained in the context of the project "Diagnosis of needs to address transnational organized crime on the border between Colombia and Ecuador", executed between the Government of Colombia, the Embassy of the Federal Republic of Germany in Colombia and UNODC/SIMCI in 2020.

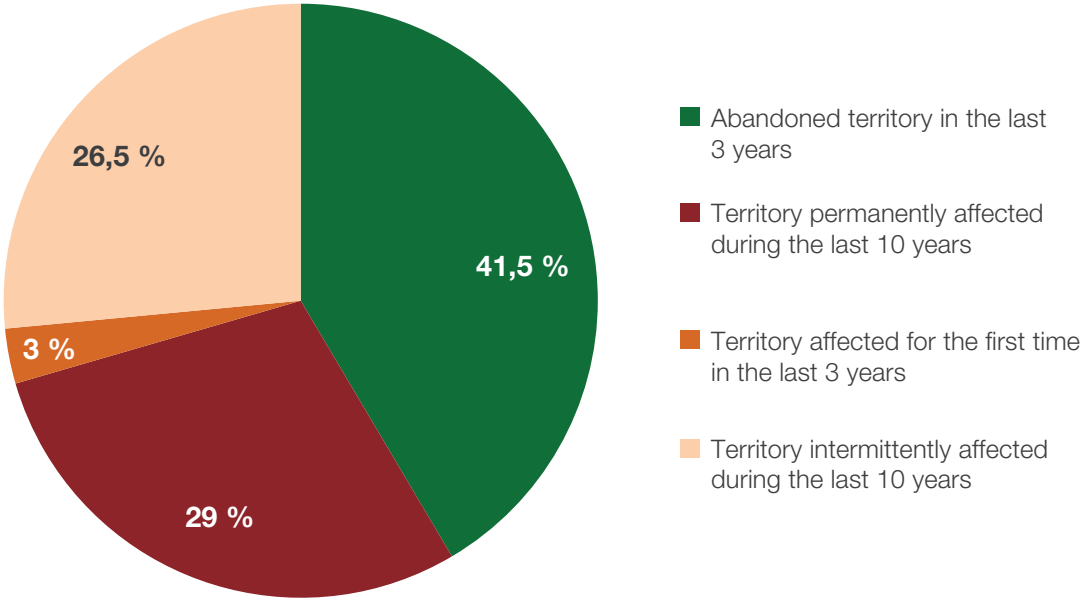
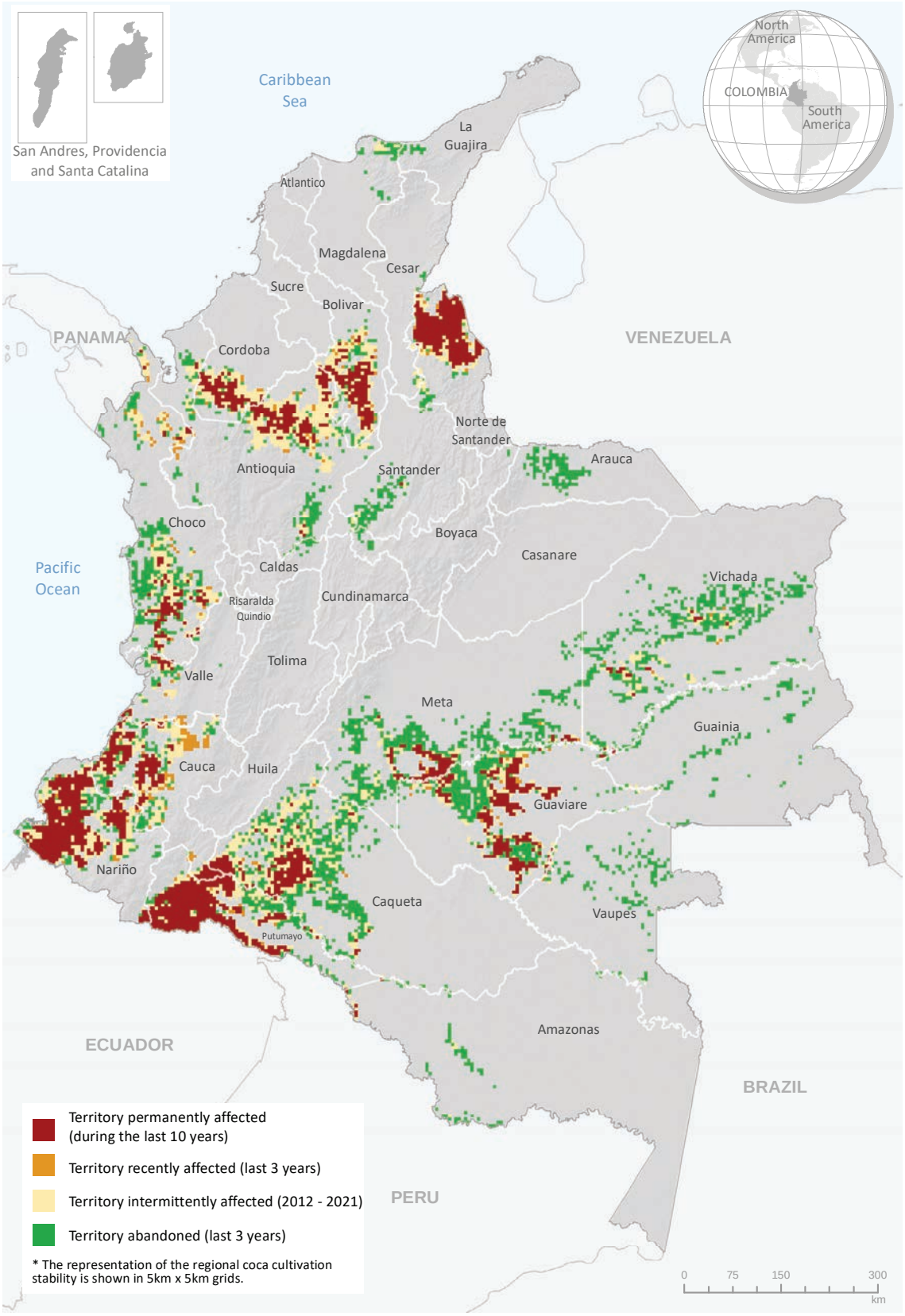


Figure 4. Coca cultivation persistence distribution, 2012-2021

Map 2. Regional distribution according to coca cultivation persistence, 2012-2021



Source: Colombian Government - UNODC supported monitoring system.
Boundaries, names and titles used herein do not construe acknowledgement or acceptance by the United Nations.

5. Greater incentives for cocaine production

There are several challenges in determining the factors that influenced coca cultivation and cocaine production growth; however, some degree of influence can be attributed to the environment, including external economic factors related to the national economy and internal factors associated with the cocaine economy.

Regarding external factors, it is worth noting that in 2021 COP devalued 43.5% against USD, being the most devalued currency in Latin America[21]. As shown in figure 5, this trend has been occurring since 2014, which, added to the findings presented in the previous sections, could have facilitated the creation of incentives for cocaine production to increase. One of several possible explanations for this relationship is that devaluation could increase

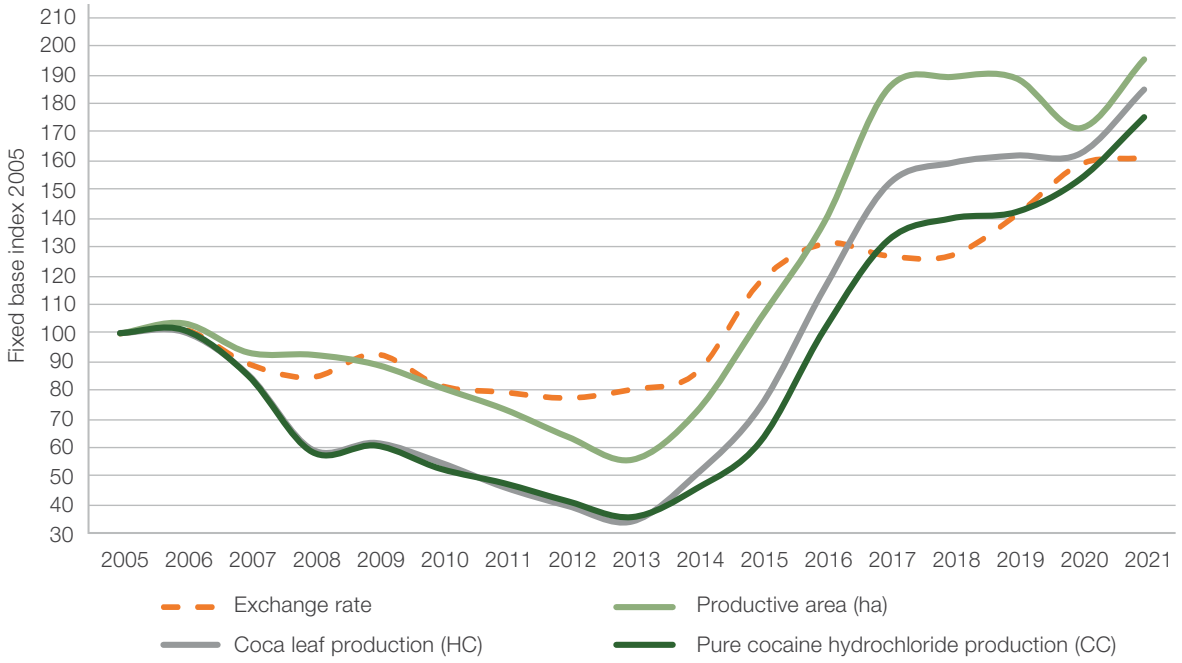


Figure 5. Behavior of the representative market rate (TRM/Exchange) vs. performance of the productive area, coca leaf production, hydrochloride production, 2005-2021

TRM Source: Bank of the Republic, Industrial and Treasury Technical Department, Industrial and Treasury Sub-Management. For leaf production area and production behavior: Internal calculations UNODC/SIMCI.

Estimates: UNODC/SIMCI.

Note: In order to facilitate the comparative analysis regarding variable growth, IBFs were estimated for the year 2005. An IBF seeks to analyze variations in relation to a fixed reference period.

21. See: Brayan Xavier Becerra, "Colombian Peso, the most devalued currency in Latin America, according to Big Mac Index," La República (June 15, 2022), https://www.larepublica.co/globoeconomia/peso-colombiano-la-moneda-mas-devaluada-de-latinoamerica-segun-indice-big-mac-3298414#:~:text=La%20revista%20de%20de%20The%20Economist,m%C3%A1s%20devaluada%20en%20la%20regi%20C3%B3n; Ministry of Commerce, Industry and Tourism. Office of Economic Studies, Macroeconomic Context of Colombia (2022 Update), https://www.mincit.gov.co/getattachment/1c8db89b-efed-46ec-b2a1-56513399bd09/Colombia.aspx; Portafolio, "Dollar has risen 567.49 pesos in Colombia during 2021," Portafolio (2021, Aug 10), https://www.portafolio.co/economia/finanzas/precio-del-dolar-dinero-que-ha-ganado-el-dolar-en-colombia-durante-el-2021-554947; Fenalco, "Colombia has the most devalued currency in the world in 2021," Fenalco, https://www.fenalcoantioquia.com/blog/colombia-tiene-la-moneda-mas-devaluada-del-mundo-en-2021/; Portafolio, "Las razones de la fuerte caída del dólar en Colombia," Portafolio (2020, June 3), https://www.portafolio.co/economia/las-razones-de-la-fuerte-caida-del-dolar-en-colombia-541415.

the profit margin of drug trafficking, since cocaine production could be flexible to the behavior of the exchange rate[22], considering the capital capacity and connections of transnational criminal organizations and IAGs to bring in foreign currency and finance the coca-cocaine production chain[23].

In relation to internal factors, a series of incentives are highlighted in relation to: 1) coca production in its different stages relies on financing[24] provided by national and international criminal groups which - in some areas of the country - control the entire production chain aiming to guarantee the quality of the product; 2) the level of profit of those growers who sell leaves is estimated to be proportionally higher, if compared to licit agricultural activities; for instance, in the last five years (2016) - on average - the net income of the grower who sells the leaf corresponds to 78% of the production value, being a higher level when compared to the net income of the agricultural sector in that same period (53% of the production value)[25], and 3) productive specialization of on-farm processes is strengthened, as there is an increase in the monthly net income per household of growers who process cocaine base paste, as a consequence of a greater production capacity and increased prices. Over the last five years, this indicator went from COP 401,500 (USD 201) in 2014, with an average yield of 7.8 kg of CBPP/mt of leaf per year reported by 29% of farmers, to COP 1,462,000 (USD 391) in 2021 with a yield of 13.8 kg of CBPP/mt of leaf per year recorded by 51% of farmers; additionally, an accumulated growth of 15% in cocaine base paste price is calculated between 2014 and 2021.

As a result of the influence of these structural factors, and as can be deduced from the last three monitoring reports of the territories affected by illicit cultivation[26], changes are evident in coca/cocaine processes and products, as well as in their dynamizing actors, among which three determinant changes stand out: 1) the presence and apparent consolidation of actors that dynamize these illicit activities and the way they interact; 2) in the products that are traded in the territories, in particular a greater supply of goods and services to transform money into welfare, and 3) territories with greater coca concentration and persistence, where new dynamics in cultivation converge, represented in new cultivars, technified sowing methods and greater efficiency in the transformation of the leaf into cocaine, under an hotspot area model. The convergence of these elements generates incentives to stay engaged in the illegal business, reduce risk perception and promote greater efficiency in the generation of income, a topic that will be developed in greater depth in the second chapter of this report.

22. Sergio Orjuela, Exchange rate effect on Colombia's coca cultivated area (master's thesis) (2019). National University of Colombia, Bogotá, https://repositorio.unal.edu.co/handle/unal/76388.
23. Jorge A. Restrepo, "The de-escalation of the conflict and the increase in coca cultivation," Razón Pública (2016, August 1), https://razonpublica.com/el-des-escalamiento-del-conflicto-y-el-aumento-de-los-cultivos-de-coca/.
24. Luis Jaime Acosta, "Four Mexican cartels control cocaine buying and trafficking in Colombia," Reuters (2020, October 22), https://www.reuters.com/article/colombia-mexico-drogas-idLTAKBN2772D9.
25. Refers to net income from the agricultural sector excluding coffee.
26. As part of the Monitoring Report on Territories Affected by Illicit Crops in Colombia, published by the Government of Colombia and UNODC in 2019, 2020 and 2021. See: https://www.unodc.org/colombia/es/index.html; https://www.minjusticia.gov.co/programas-co/ODC/Paginas/Publicaciones-ODC.aspx#oferta.

The pandemic: effects on the most vulnerable

Given COVID-19, as well as its new variants, countries implemented different measures to counteract its effects on public health by means of mobility restrictions, a situation that limited the development of different economic activities. The overall impact of these restrictions on the annual coca harvest could be limited, as observed in the three main producing countries (Colombia, Peru and Bolivia) in relation to the periodicity of harvests; nevertheless, cocaine production could be more affected on two different fronts: a reduction in the intervention of the cultivation and on the other hand, the scarcity of precursors[27]. Importantly, the impact of COVID-19 on coca cultivation, production, trafficking and cocaine consumption may vary depending on the areas and measures applied.

At the local level in Colombia, these restrictive measures could have contributed to coca cultivation promotion and its transformation, to the extent that the IAGs encouraged the sowing of new fields as means to strengthen their armed control in strategic areas[28]. Moreover, faced with an inflationary scenario - especially in raw materials for the agricultural sector - it was found that the IAGs are the ones who generate incentives to facilitate the supply channels for agrochemicals, propagation material (seeds, seedlings, among others), advance purchase of yields and processed products on the farm[29], and are also responsible for providing price incentives for higher quality products; these strategies are sponsored by the TCOs[30]. This generates an illusory expectation of “prosperity”, based on the ability to earn more income when compared to licit activities, and an apparent “security”, perceived by the illegal armed control.

Globally, the COVID-19 pandemic has transformed cocaine trafficking nodes; however, the supply chain generally remains intact in markets such as the United States and Europe, areas with an upward trend in consumption. For example, COVID-19 related restrictions in South, Central and North America have not significantly affected the flow of cocaine into the United States, as the impact has not extended to maritime activity, a situation that has not limited the TCOs from adapting and continuing to traffic large quantities of cocaine[31]. Furthermore, in Europe, drug traffickers adapted to travel restrictions and border closures; this on a wholesale scale was reflected in some changes in routes and methods, with greater reliance on smuggling via intermodal containers and commercial supply chains, and less reliance on the use of individuals as couriers[32].

27. United Nations Office on Drugs and Crime (UNODC), Research Brief. COVID-19 and the Drug Supply Chain: from Production and Trafficking to Consumption (Vienna: Author, 2021), https://www.unodc.org/documents/data-and-analysis/covid/Covid-19_Suministro_de_Drogas.pdf.
28. Indepaz, Colombia’s hotspots of conflict.
29. Reuters Agency, “Mexican cartels reconfigure drug trafficking in Colombia with productive coca seeds”, Gestión (2022, May 10), https://gestion.pe/mundo/mexico/con-productivas-semillas-de-coca-carteles-mexicanos-reconfiguran-el-narcotrafico-en-colombia-mexico-noticia/.
30. Government of Colombia and UNODC, Infrastructure Characterization.
31. DEA, National Drug Threat Assessment 2020.
32. European Monitoring Centre for Drugs and Drug Addiction, European Drug Report2021: Trends and Developments (Luxembourg: Publications Office of the European Union, 2021), https://www.emcdda.europa.eu/system/files/publications/13838/2021.2256_ES0906.pdf.

Situation in 2021: high yield and return to the increasing trend in coca cultivation area

The aforementioned structural transformations constitute incentives to improve yield and efficiency in cocaine production: a secured market due to the global increase in consumption, territories affected by the pandemic and that continue to find in coca production an outlet for their vulnerable conditions, a reconfiguration of the armed presence in the territory with coca that opens spaces for new and ever closer negotiations between international drug trafficking organizations and armed groups, as well as a favorable exchange rate for exports constitute a framework of opportunity for new and old illegal actors to focus on the rapid generation of revenues.

Production hotspot areas formation: greater efficiency in cocaine production

Coca concentration has been reported for more than a decade; however, persistence and higher yield conditions have only been achieved in the framework of productive hotspot areas. As a matter of fact, in response to the continuous and targeted intervention to control supply in these territories - particularly associated with manual eradication and the concept of alternative development with territorial criteria[33] - growers opted for small, isolated and itinerant cultivations.

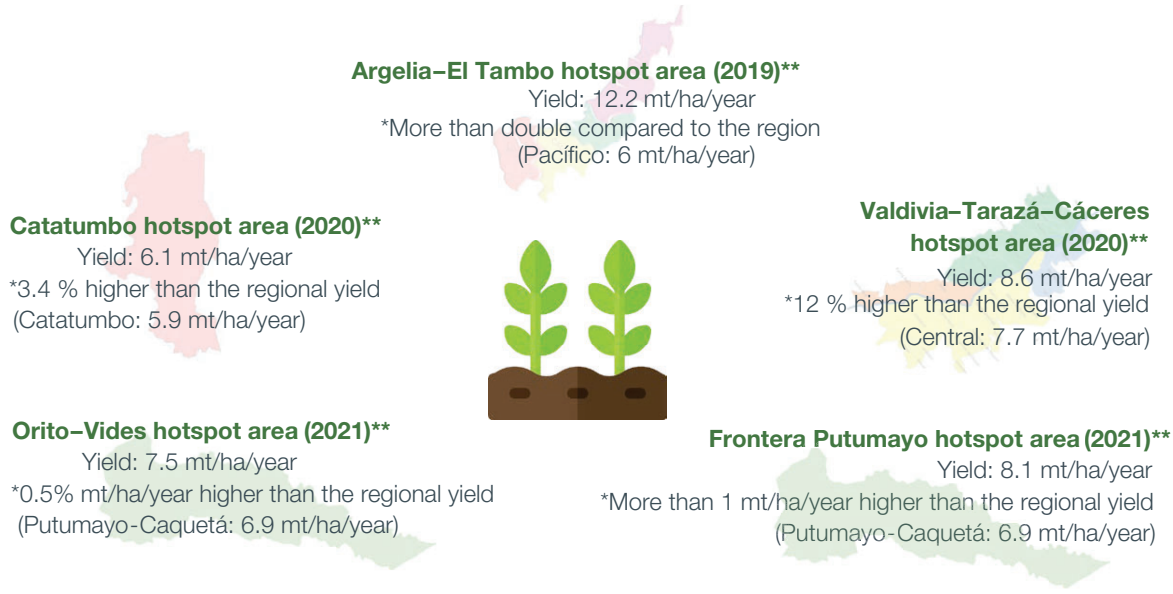
In 2017, when the first historical coca cultivation peak occurred, 22% of the coca registered for this year was concentrated in areas with persistence conditions and high sowing density. By 2018, when a reduction phase began and continued for three consecutive years, coca cultivation concentration increased in hotspot areas (40.5% of area with coca in 2020 located in these territories); despite this, outside these territories, the reported trend was to reduce the area with coca, and even in some territories to abandon the phenomenon, generating a kind of balance in the national affectation.

By 2021, a more complex landscape was identified: productive hotspot areas with a tendency to increase both in area and territorial extension (five new hotspot areas) and a peripheral area with a marked tendency to increase, regardless of supply control efforts. Out of the nine productive hotspot areas identified in 2020, all of them report an increase in area with coca in 2021. The hotspot areas located on the Pacific coast of Nariño show the largest increase, more than twice as much as reported in the previous year: Tumaco Border shows a territorial contraction despite the increase in the affected area, as well as Putumayo Border, a particularity that corroborates the trend towards densification (more coca in less territory).

33. As part of Alternative Development, several types of programs have been implemented; one of them was the Forest Warden Families Program (PFGB, 2003-2010), which focused its intervention according to environmental conditions and included agreements with the signing of individual or collective contracts that sought to keep the entire area free of illicit crops. Omar Giraldo and Ricardo Lozada, Alternative Development Program in Colombia Forest Warden Families. Perspective from the Rural Territorial Development Approach (Manizales, 2008). More recently, in the framework of the implementation of the PNIS, three linkage modalities were managed: families with illicit crops, non-producing families linked to affected territories and collectors; however, none of the three promotes free territories from a territorial approach. FIP and UNODC, Who are the families living in areas with coca cultivation? Characterization of the beneficiary families of the National Comprehensive Program for the Substitution of Illicit Crops -PNIS-, (Bogota: Author, 2018); https://www.unodc.org/documents/colombia/2018/Agosto/Quienes_son_las_familias_que_viven_en_las_zonas_con_cultivos_de_coca_N.1.pdf.

In Cauca and Nariño, five new productive hotspot areas were consolidated[34] which, although they concentrate about 2% of the registered coca area for 2021 and occupy less than 1% of the coca territory for the same period, are consolidated as a warning for the configuration of territories with particularities both in the sowing and cultural management and the transformation and commercialization process, aspects that result in an optimization of profits generated by illicit activity and where the intervention to control the current supply does not have a sustainable impact. Production and yield studies carried out by UNODC show that the increase in coca cultivation yields is higher in hotspot areas. Currently, there is data from five hotspot areas.

The existence of production hotspot areas (figure 6) has a great impact on cocaine production dynamics in Colombia and is due to many changes in actors, incentives and relationships that facilitate this dynamic. As a matter of fact, while in 2017 22% of coca was in the hotspot areas, in 2021 the figure rose to 41%. This is not only about having more and more productive coca, but also about creating multiple conditions to optimize revenue extraction.



** Year of update

Figure 6. Yield levels in five hotspot areas characterized by coca cultivation yield studies

Source: Government of Colombia and UNODC/SIMCI. Coca cultivation yield surveys in affected regions (2005-2021)

34. The productive hotspot areas in Nariño are: Roberto Payán-Isagualpi (coastal areas with the possibility of connection with Frontera Tumaco and El Charco-Olaya Herrera) and Telembí-Cristal, El Charco-El Turbio, Policarpa-Patía, located in the mountainous area of the department. In Cauca, the new hotspot area is beginning to consolidate in the coastal area, Timbiquí-Saija.

The hotspot areas (hot spots) point to an agro-industrial model for coca cultivation, with a risk of expanding to other areas

A productive hotspot area is defined spatially as a territory that in the last five years has presented a highly significant concentration of coca cultivation (hectares planted per square kilometer) and in which the persistence of the phenomenon has been greater than four years. Additionally, in some of these areas -thanks to field studies- characteristics different from the rest of the region have been identified (cultivars, yields, cultural management, cultivation density). In the same line, there is a tendency towards integration and chaining in situ, as well as the potential specialization of production processes (cultivation and processing).

A productive hotspot area obeys a territoriality implemented on the basis of a geographical space in which a community has culturalized a sufficiently large space with its knowledge; in the case of coca-cocaine production, apart from the spatial indicators described above (see box), there are two types of strategies: on the one hand, the dominant strategy promoted by transnational criminal organizations through coordination with illegal armed groups locally and, on the other hand, the dominant strategy represented by communities that participate in illicit activities.

The *first element* worth mentioning about the hotspot areas as strategic areas where an agroindustrial model is promoted is the production of cocaine base as a raw material and exportable product. Coca concentration and persistence generates local advantages to strengthen cultivation and processing by providing growers with access to inputs and services that contribute to increase the yield of these processes in the short term. This translates into greater capacity to obtain coca leaf, with higher alkaloid content in the leaves and greater extraction efficiency. This situation is shown through changes in the rationality of growers. In this regard, in 2014, concerns over the loss or decrease in production were associated with the eradication of their cultivations through spraying, while now they mainly focus on the existence of pests and diseases that may affect their production.

Since 2019, through coca cultivation yield studies, the decrease in risk perception at the local level in hotspot areas was reported, a situation that implied an increase in the investment made by the grower in 1) renewal of seedlings with the expectation of generating more leaf containing more alkaloid; 2) the hiring of private labor, mainly for harvesting; and 3) the acquisition of more frequently used agrochemicals with a diversified portfolio of products. This growing trend has now been confirmed, even in areas outside the hotspot area. On this aspect, there is a warning that, if this trend continues, yield rates in non-hotspot areas will increase in the next two years, as growers are investing in coca, under the same strategy of the hotspot areas, as evidenced in 2019. Thus, in the latest data from the Putumayo-Caqueta region, non-hotspot areas increased the use

of agrochemicals (on average between 28 additional types of products than in hotspot areas), with a wide diversification of the types of cultivars in their fields (70 different cultivars, each with less than 8 % of fields in non-hotspot areas, while 64.2 % of the fields in the Orito-Vides hotspot area are chipara, rusia and reina).

The *second aspect* lies in the fact that coca concentration and persistence can be explained by the functional geography of trafficking. Out of the fourteen hotspot areas identified in 2021, nine are located in border departments with connections to countries such as Venezuela (Catatumbo hotspot area) and Ecuador (Putumayo Border, Orito-Vides and Tumaco Border hotspot areas); in the remaining hotspot areas, their location could be related mainly to three conditions: 1) exit through the Pacific Ocean (El Charco-Olaya Herrera and Roberto Payán-Isagualpi, El Naya and Timbiquí-Saija hotspot areas); 2) limited access, which ensures security conditions and territorial control, a situation that facilitates their exit through the Pacific Ocean (Argelia-El Tambo hotspot area); and 3) strategic position to connect internal illicit drug routes, both for raw materials and final product, in the north of the country (Valdivia-Tarazá-Cáceres and San Pablo-Taracué hotspot areas). In each case, where more than one of the conditions converge, this increases the possibilities for facilitating the sustainability of these illegal activities, as well as the effectiveness of illicit revenues, under an economic production model of scale that allows the most efficient interconnection between suppliers and clients.

The *third element* corresponds to the integration of the entire production cycle in situ, from propagation material generation[35] to obtaining the final product - cocaine hydrochloride - facilitated by the coexistence of the aforementioned strategies (an actor that dominates and an actor that is dominated). Consequently, in 2019, higher prices in coca leaf and cocaine base paste were identified in Argelia and El Tambo (42% and 38%, respectively, compared to non-hotspot areas), possibly explained by the implementation of the dominant strategy, through the synergy between international drug trafficking cartels and IAGs, both with local presence in areas affected by coca cultivation (figure 7).

35. These are seeds, seedlings, cuttings or cuttings intended to reproduce the coca plant; they are produced in nurseries for cultivation implementation.

		Fresh coca leaf (kg)	Cocaine base paste (kg)	Cocaine base (kg)
Pacifica[a]	No Hotspot Area	2,550	2,000,000	
	Argelia-El Tambo H.A	4,400 ▲ 42 %[d]	3,000,000 ▲ 38 %[d]	
Catatumbo[b]	No Hotspot Area	2,279	2,592,000	
	Catatumbo H.A	2,487 ▲ 9 %[d]	2,614,000 ▲ 1 %[d]	
Central[b]	No Hotspot Area		3,687,000	
	Valdivia-Tarazá-Cáceres H.A		3,496,000 ▼ -5 %[d]	
Putumayo-Caquetá[c]	No Hotspot Area	3,203	2,688,000	2,912,000
	Orito-Vides H.A	3,425 ▲ 7 %[d]	2,056,000 ▼ -24 %[d]	2,933,000 ▲ 1 %[d]
	Frontera-Putumayo H.A	2,876 ▼ -10 %[d]	2,705,000 ▲ 1 %[d]	2,784,000 ▼ -4 %[d]

Figure 7. Coca leaf, coca paste and cocaine base prices in hotspot and non-hotspot areas characterized by coca cultivation yield surveys

Source: Government of Colombia and UNODC/SIMCI. Coca cultivation yield surveys in affected regions (2005-2021)
Notes:
(a) Information corresponding to 2019.
b) Information corresponding to 2020.
c) Information corresponding to 2021.
(d) Difference in relation to Non-Hotspot Area.

According to the new data collected in the field, it is now evident that coca prices and derivatives generated on-farm are not differential, a situation from which it could be inferred that criminal organizations no longer seek to co-opt growers with high prices, given that their strategies were implicitly accepted by the dominated local population and participants in informal community agreements, as reflected in the defense of coca cultivation and its processing. This situation is possible to the extent that the trafficking intermediation chain was reduced by bringing international clients closer to the production areas, as well as by generating an expectation of "bonanza and prosperity" which, with the "security" provided by the IAGs, facilitates negotiations of large volumes of cocaine, both raw materials (basic paste or cocaine base) and final product (cocaine hydrochloride).

Local perceptions can be corroborated in hotspot areas, since in the population centers near coca cultivation there is an increase in licit commercial activities and specialized services, such as gyms, beauty salons, purchase and sale of motorcycles, cars and motors, entertainment services, among others, as evidenced in the field.

Implementing dominant strategies implies the subordination of the local population, which not only voluntarily accepts incentives under an ethereal perception of "prosperity and security" due to the new coca bonanza, as a starting point for the establishment, expansion and sustainability of coca cultivation and processing, but also remains subject to disputes over the control of routes and production areas.

Where has the increase been concentrated?

Although it is clear that productive hotspot areas are determinant in maintaining the area planted with coca above historical levels since 2014, the break in the trend at the national level that is evident in 2021 originates mainly outside hotspot areas (map 3, figure 8).

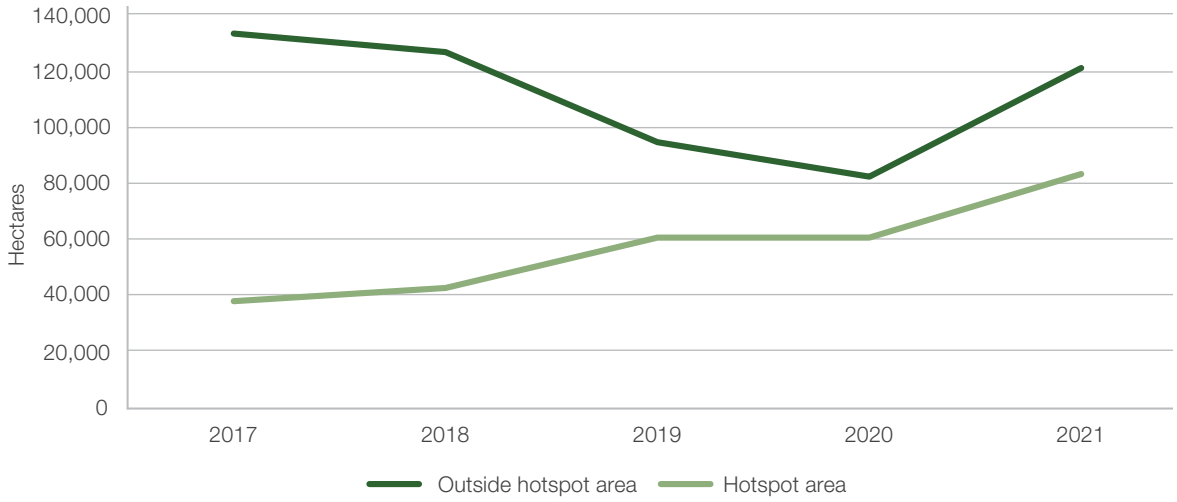


Figure 8. Area with coca inside and outside territories designated as hotspot area, 2007-2021

As a matter of fact, 28 % of the increase was recorded within the hotspot areas, an additional 4 % in areas that will reach hotspot area status in 2021 and the remaining 68 % outside the hotspot areas.

In this regard, hotspot areas account for 32% of the increase, but only 15% of the territory where there was an increase. Outside the hotspot areas, 68% of the increase was reported, as well as 85% of the territory where it occurred. In other words, coca grew more intensively inside than outside the hotspot areas (figure 9).



Figure 9. Coca cultivation dynamics by trend in area (hectares) and territory (grids 1 km^2), 2020-2021

33% of the increase occurred outside hotspot areas, but less than 12 km from one, in areas that do not yet meet the density and persistence conditions to be integrated into that category, but may be influenced by them; this behavior is consolidated as a warning for the implementation of strategies, since it may favor the increase in territorial occupation of complex areas (20% of the area with coca that increased in 2021 is located less than 5 km from a productive hotspot area).

There is a tendency to expand hotspot area conditions with increasing yield depending on the proximity to these areas; According to the surveys conducted in 2021, as part of the *Characterization of the Catatumbo and Valdivia, Cáceres and Tarazá hotspot areas*, the Agricultural Production Units with Coca (UPAC) within the Catatumbo hotspot area had average yields of 8.4 mt/ha/year, while those located at a maximum distance of 7.5 km from the hotspot area had average

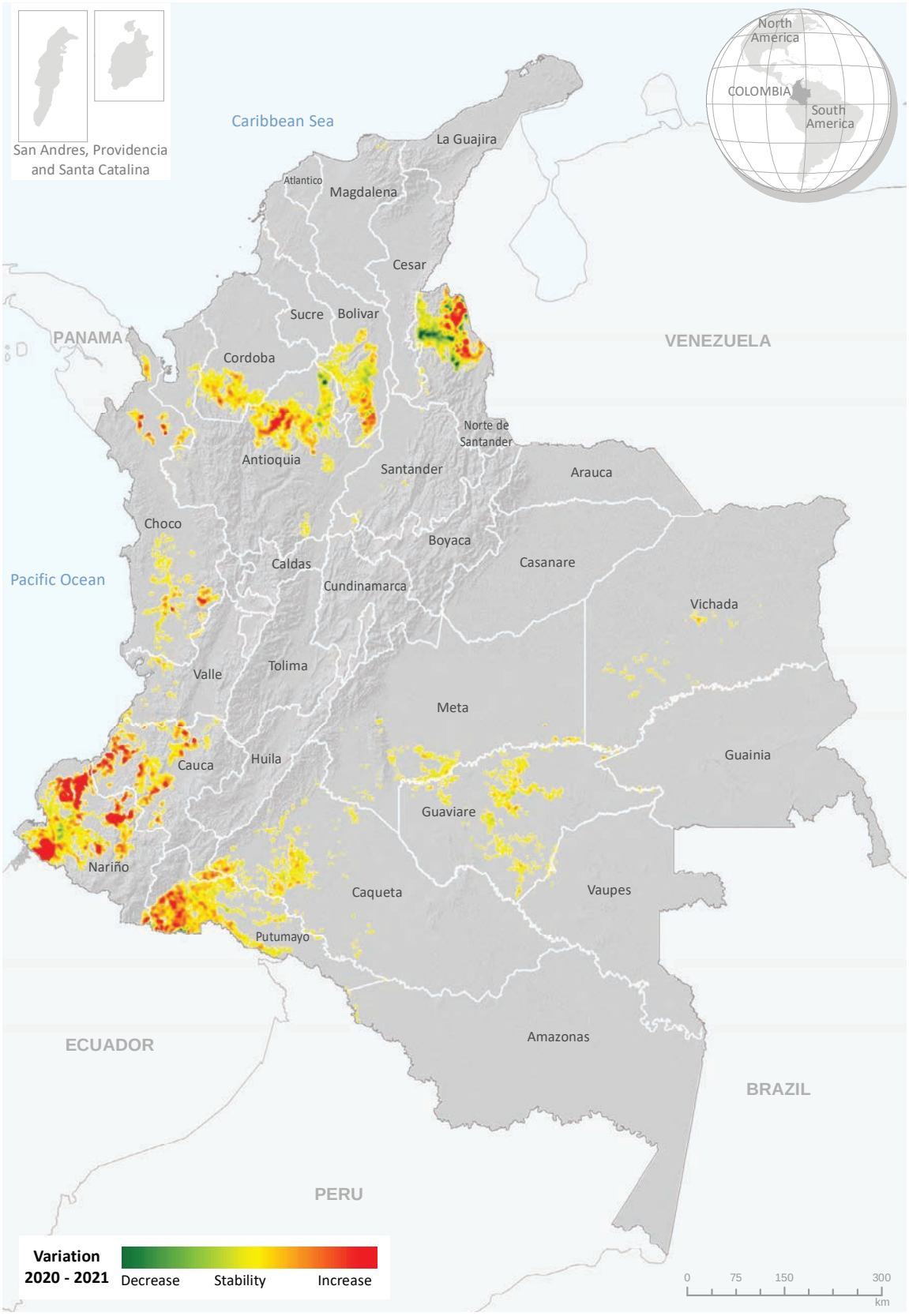
yields of 7.7 mt/ha/year; those located between 7.5 and 15 km from the hotspot area have yields of 6.9 mt/ha/year.

Outside the hotspot areas, it is also worth noting that 10% of the increase was identified in expansion areas[36], unlike in previous years, when expansion areas had an uncertain development and coca was not always consolidated; last year there was not only the presence of illicit crops, but also a tendency to form concentration centers with a higher cultivation density per square kilometer. These areas are likely to become new concentration and persistence areas, mainly in the north of the departments of Chocó and Cauca.

Finally, also outside the hotspot areas, an apparent dynamic of small illegal structures in search of territories to promote coca production enterprises should be highlighted. Although it is still necessary to obtain more details about this dynamic, young mid-level commanders, organized in small groups without a political ideology, are known to have used their knowledge of territories with productive potential to promote coca cultivation and thus receive profits from cocaine trafficking, as Indepaz argues[37]. In relation to this thesis, the International Crisis Group[38] affirms that, in the case of Farc-EP dissidents, structures commanded by middle and young commanders have been found that have had the opportunity to focus their actions on the capture and enjoyment of drug money, leaving aside the original ideological principles of the guerrilla organization. This new fragmented criminal landscape in the first link of the cocaine production chain in Colombia, as presented in the World Drug Report 2021 [39], has led to the creation of alliances with new trafficking organizations that have established themselves in Europe to meet the high demand for this product in the continent, thus creating a diverse expansion of cocaine suppliers.

36. The expansion areas are those that, according to the persistence dynamics of coca cultivation 2012-2021, have been recently affected by coca; in this period, coca has only been present in the last three years. For this exercise, they were analyzed in grids of 1 km^2.
37. Indepaz, Colombia's hotspots of conflict.
38. International Crisis Group, "Another Form of Struggle: Defending Peace with the FARC in Colombia". Latin America Report, No. 92 (2021, Nov. 30). https://d2071andvip0wj.cloudfront.net/092-a-fight-by-other-means-spanish%20(1).pdf.
39. United Nations Office on Drugs and Crime (UNODC), World Drug Report 2021 (Vienna: Author, June 2021), https://www.unodc.org/unodc/en/data-and-analysis/wdr-2021_booklet-1.html.

Map 3. Absolute variation in area planted with coca, 2020-2021



Source: Colombian Government - UNODC supported monitoring system.
Boundaries, names and titles used herein do not construe acknowledgement or acceptance by the United Nations.

Change in 2021, beyond hotspot areas

In 2021, 85% of the coca affected territory is located outside the productive hotspot areas; in the remaining 15% of the affected territory, i.e. within the hotspot areas, there is 41% of coca reported for 2021, a little more than 83,000 ha.

The sharp increase recorded in 2021 has different origins. While in 2020, 65% of the territory showed a reduction trend, in 2021, 31% has this condition. In the reduction areas, 20,000 ha less coca was registered and in the increase areas, 82,000 ha more coca was registered.

On the other hand, 85% of the areas with a reduction trend are located in PDET municipalities; 31% have a record of intervention in 2021 and less than 1% are located in the *Magdalena Medio and Occidente de Boyacá sub-region*, which is progressing towards the declaration of coca-free status.

An intervention that had to be adjusted

The intervention, which in previous years had an impact on the reduction, presented restrictions in 2021[40]. The intervention, which in previous years had an impact on the reduction, presented restrictions in 2021. For instance, a 14% reduction in area was achieved in the territories that were continuously intervened in 2019 and 2020, above the 3.5% reduction in the non-intervention areas. The landscape in 2021 is the opposite: both in intervened and non-intervened areas, the trend of the area with coca is increasing, with 32% and 45% respectively.

Opportunities in an unfavorable scenario

Monitoring departments with a tendency to abandon coca production allows to focus the development of action strategies to reduce the vulnerabilities that enhance coca production and thus grant a declaration as coca-free territories. A review of the situation of the departments with favorable conditions for abandonment in 2021 led to the conclusion that Caldas continues to be, for the eighth consecutive year, one of the coca-free territories in the country. Other departments such as La Guajira, Cesar and Vaupes continue in the process of abandonment and are candidates for a process of declaration of coca-free territories accompanied by a robust institutional attention. Although departments such as Santander and Boyacá increased the number of hectares with coca in 2021 (an increase of 3.3 and 3 times with respect to the area registered for 2020), the Ministry of Justice and UNODC Colombia as technical support of the process advanced in the consolidation of an action plan aimed at designing a series of territorial transformation projects, seeking to enhance local development in order for these departments to obtain the declaration as coca-free territories.

40. The fourth chapter provides a more detailed description of the actions taken by the Colombian government to address drug production.

In 2020, 35% of the territory had some type of intervention; by 2021 there was a reduction of four percentage points. Also, there is a lower incidence in terms of impact, going from 14% of the intervened territory being coca-free to only 6% in 2021.

In recent years, manual eradication in Nariño had to be interrupted by a judicial decision of the Criminal Decision Chamber of the Superior Court of the Judicial District of Pasto[41], which ordered the total suspension of all illicit crop eradication activities (eradication carried out by the security forces and terrestrial spraying [PECAT]) in the collective territories of black communities and in the indigenous reserves of the Pacific of Nariño belonging to ten municipalities[42]; This measure is based on the violation of the right to prior consultation with the communities in order to carry out this activity. These collective territories accounted for 71% of all coca in the department by 2021; the area with coca in these territories increased by 2 times what was identified before the suspension of intervention activities.

Aerial spraying was not implemented

One factor to take into account is that spraying was not submitted for evaluation to the National Narcotics Council (CNE). In 2019, the National Environmental Licensing Authority (ANLA) delivers to the National Police the Reference Terms for the Elaboration of the Study for the Modification of the Environmental Management Plan (PMA) of the Illicit Crop Eradication Program; at the end of that same year, the ANLA issues the Order of Initiation for the modification of the PMA. During 2020, the ANLA carried out different activities such as visits to the six spraying sites (San José, Caquetá-Putumayo, Tumaco, Caucasia, Catatumbo and Condoto), convening the different socioeconomic, physical, biotic and academic research roundtables, as well as requesting technical concepts from the Regional Autonomous Corporations (CAR) and entities attached to the environmental and sustainable development sector.

In December 2020 the Environmental Public Hearing was held, as a result of the implementation of these activities, the Constitutional Court issued sentence T-413-21, where it points out: (i) There were no guarantees of participation in the environmental hearing that the ANLA and the National Police held in December 2020. The Constitutional Court also highlighted the fact that there were no prior consultations in indigenous and Afro territories that overlap with areas to be sprayed; and (ii) The non-promotion of voluntary substitution of illicit crops, but rather the promotion of forced eradication by the Army, which could lead to more conflict in the territories.

41. Inter-Church Justice and Peace Commission, "Orders to suspend forced eradication of illicit crops in Afro and indigenous territories in Nariño" (2021, May 12), https://www.justiciaypazcolombia.com/ordenan-suspender-erradicacion-forzada-de-cultivos-de-uso-ilicito-en-territorios-afro-e-indigenas-de-narino/.
42. Municipalities where eradication actions within collective territories were suspended are: San Andrés de Tumaco, Mosquera, Magüí Payán, Santa Bárbara, Roberto Payán, La Tola, El Charco, Francisco Pizarro, Olaya Herrera and Barbacoas.

Along the same lines, during the activities of the National Strike that began on April 28, 2021, members of Law Enforcement and the National Police who were carrying out manual eradication actions were deployed to support security in the most difficult areas[43] and blockades, affecting the monthly goals and the focused operations that were being carried out in the areas most affected by coca.

Another factor that must be taken into account in the impact of interventions is the poor level of implementation of the peace agreement[44], particularly in relation to point 1 (Comprehensive rural reform) and point 4 (Solution to the problem of illicit drugs). According to the KROC Institute report, *Five years of implementation of the Final Agreement in Colombia: Achievements, Challenges, and Opportunities to Increase Implementation Levels, December 2016 - October 2021*[45], the implementation of the peace agreement has advanced significantly in points 3 (End of the Conflict) and 6 (Implementation, Verification, and Endorsement Mechanisms), because the commitments related to these issues of the Agreement involved short-term actions to ensure the bilateral and definitive ceasefire process and the surrender of weapons, as well as to lay the foundations for the institutional and regulatory infrastructure for implementation.

Nevertheless, in relation to point 4 of the agreement (Solution to the illicit drug problem), the Kroc Institute[46] report notes that 21% of the provisions are complete and 27% are intermediate but is concerned that the proportion of families linked to the PNIS with long-term productive projects as of October 2021 is 2% of the total number of families (1,735 out of 80,240 eligible families). In this sense, five years after the signing of the agreement, the program has not yet made the investments required to generate lasting transformations in agricultural production units affected by the presence of coca cultivation (figure 10).

A lesser implementation is presented in relation to point 1 (Comprehensive rural reform), which records the highest level of delay. According to the official report of the Kroc Institute, this point shows 14% of provisions that have not been initiated and 69% in a minimum state of implementation. It also points out that the provisions that have not been initiated are related to large-scale and transformational aspects of the Agreement, such as the democratization of access to land, the PDETs and the National Plans for Comprehensive Rural Reform. The report notes that, if the pertinent measures are not adopted for their dynamization, they will probably not be completed in the time foreseen for the implementation of the agreement.

43. Infobae, "Warning of slow progress in the goal of eradicating illicit crops by 2021" (2021, Oct. 10), https://www.infobae.com/america/colombia/2021/10/10/advierten-lentitud-en-la-meta-de-erradicacion-de-cultivos-ilicitos-para-el-2021/.

44. Available information on interventions is not homogeneous; in many cases it refers to administrative records and very rarely includes data on the impact of interventions.

45. Peace Agreements Matrix, Kroc Institute for International Peace Studies. Five Years of Implementation of the Final Agreement in Colombia: Achievements, Challenges, and Opportunities for Increasing Levels of Implementation, December 2016 - October 2021. (Notre Dame, IN and Bogotá, Colombia: Peace Agreements Matrix/Kroc Institute for International Peace Studies/Keough School of Global Affairs, 2021). https://doi. org/10.7274/05741r69f09.

46. The Kroc Institute is part of the Keough School of Global Affairs at the University of Notre Dame (United States) and is one of the world's leading centers for peacebuilding research and studies. By mandate of the Government of Colombia and the former Farc-EP, signatories to the Final Agreement for the Termination of the Armed Conflict and the Building of a Stable and Lasting Peace, the Kroc Institute is given the primary responsibility for the verification and monitoring of the Agreement through the Peace Agreement Matrix Barometer (PAM) Initiative.

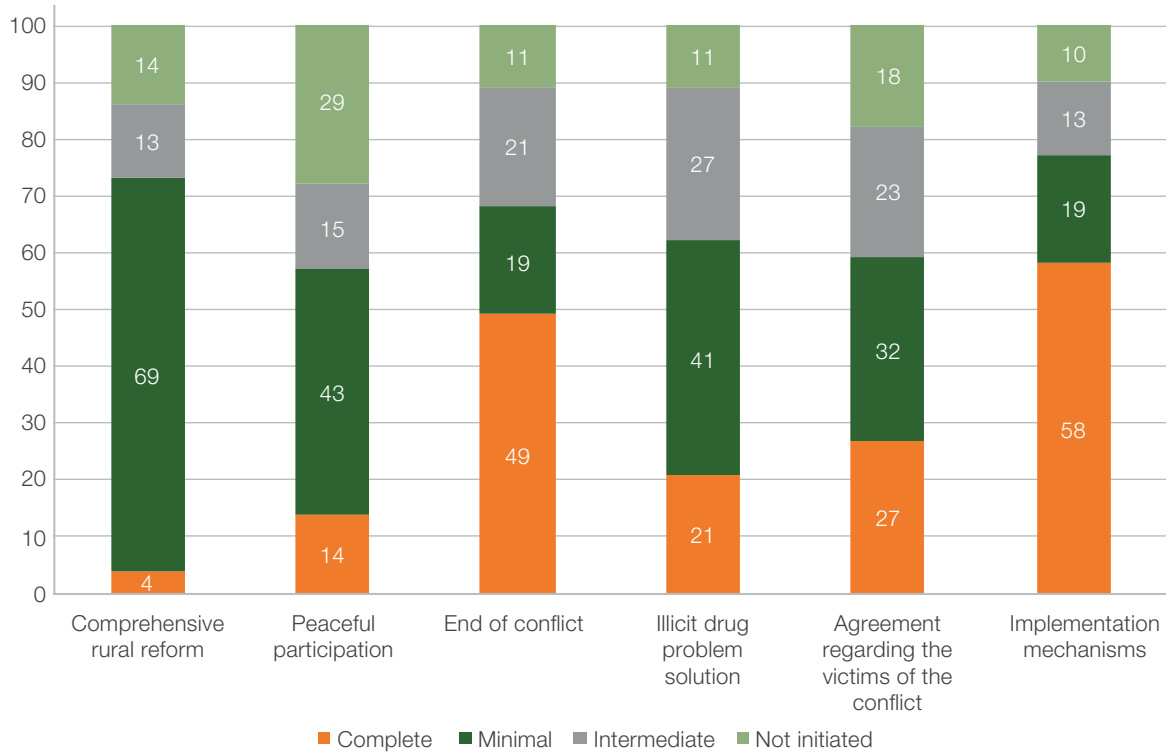


Figure 10. Progress in the implementation of the Peace Agreement, point by point, 2016-2021

Source: Kroc Institute for International Studies, Five Years of Implementation of the Final Agreement in Colombia.

In relation to the previous lines, it is important to highlight that for management indicators in the framework of the Final Peace Agreement implementation monitoring and according to the Implementation Framework Plan (PMI), as registered in the Integrated Post-Conflict Information System (SIIPO)[47] there is an average implementation progress of over 50%, identifying for point 1 a progress of 64% in 10 pillars and for point 4 a progress of 65.3% with 4 assessment pillars.

Although the national government has clearly made a significant fiscal effort to implement the agreement, the central points that have a direct impact on the territories affected by the presence of coca cultivation (PNIS and PDET) have not been fully materialized on the ground, so it is plausible to consider that the reduction of social expectations of real transformation of the territories has led to a change in the perception of farming families, facilitating their decision to return to illicit production.

For example, in the case of substitution programs, UNODC monitors the implementation of the PNIS, which benefits 99,097 families located in 56 municipalities in 14 departments of the country. Out of these families, 67,665 have received the technical assistance service (according to the Stabilization Council, 75,139 families in 14 departments and 56 municipalities received

47. Information accessed on August 20, 2022, https://siipo.dnp.gov.co/inicio.

the Immediate Technical Assistance service as of December 31, 2021), 64,276 have received food security support (according to the Stabilization Council, 76,234 families in 14 departments and 56 municipalities received payments for Immediate Food Assistance as of December 31, 2021) and 5,516 productive projects (according to the Stabilization Office, 26,083 families had benefited from the operation of productive projects as of December 31, 2021).

Under the program, 43,711 hectares of illicit crops have been voluntarily eradicated. Out of these, UNODC verified that 37,693 were eradicated voluntarily; this represents 98% compliance with the area committed to eradication. In addition, monitoring activities on the replanting or regrowth of cultivation in committed lands reported a persistence of 0.8 % of the area of illicit crops committed to eradication. It should be noted that there was no voluntary eradication under the PNIS in 2021.

Conclusion

Overall conditions in the country create a favorable scenario for the expansion of drug trafficking: assured markets for cocaine, persistent vulnerabilities and a reduced capacity to intervene in the territory have resulted in the formation of productive hotspot areas where more cocaine is produced per hectare. There is evidence that converges towards one main thesis: the cocaine production and trafficking phase in Colombia is undergoing important changes both in terms of incentives and actors involved. Although much more research is needed, it is clear that relatively small groups can control small territories and establish alliances with larger groups (including transnational groups) that are sufficiently lucrative to stay in business.

These changes in incentives and actors have implications for the effectiveness of intervention strategies. Although in many regions of Colombia coca growers remain trapped in a scenario of vulnerability and lack of opportunities, in the hotspot areas, for example, coca is more than a survival alternative: growers' incomes are increasing in these areas, as is the possibility of transforming this additional income into goods and services that were previously unavailable to them. This also transforms the profile of growers and their willingness to engage in productive alternatives under legal conditions.

In a digital version that can be available at the Observatorio de Drogas of Colombia (www.odc.gov.co) and in the Spatial Information Bank of the SIMCI project (www.biesimci.org), you will find a regional chapter that addresses the conditions of cocaine production. The information is broken down into eight regions: Pacific, Central, Catatumbo, Putumayo-Caqueta, Meta-Guaviare, Orinoco, Sierra Nevada and Amazonia, and details of the coca planted area, persistence factor, cocaine production and local markets are presented.

CHAPTER 2

Changes and trends in coca cultivation, cocaine production and trafficking in Colombia

Changes in the processes and products of coca/cocaine, as well as in the actors involved, have been evidenced in the last three monitoring reports on the territories affected by illicit crops[48] among the different factors identified, three decisive changes stand out: 1) the presence and apparent consolidation of actors that invigorate these illicit activities and the manner in which they operate; 2) in products traded in the territories, in particular a greater supply of goods and services to transform money into wellbeing, and 3) territories with greater coca concentration and persistence, where new cultivation dynamics converge, represented by new cultivation patterns, technified planting methods and greater efficiency in the transformation into cocaine, under a hotspot area model. The convergence of these elements generates incentives to stay in the illegal business, reduce their risk perception and promote greater efficiency in income generation.

The information presented herein is based on the analysis of different studies carried out by the Government of Colombia and UNODC as part of the SIMCI[49], field observations and dialogues with experts; available information from the national government, academia and non-governmental organizations (NGOs), among other sources, was also reviewed.

The proposed analyses should be interpreted as an approximation to the coca cultivation dynamics and its transformation into cocaine, although some warnings are stated regarding the structural changes in the relationships between key actors, the transactions they generate and the changes in the local dynamics of these illicit activities, further deepening and information gathering is

[48] As part of the Monitoring Report on Territories Affected by Illicit Crops in Colombia, published by the Government of Colombia and UNODC in 2019, 2020 and 2021. For more information visit: https://www.unodc.org/colombia/es/index.html / https://www.minjusticia.gov.co/programas- co/ODC/Paginas/Publicaciones-ODC.aspx#oferta.

[49] The analyses proposed in this chapter were carried out taking into account the findings of the UNODC-Ministry of Justice and Law studies: 1) Characterization of two productive hotspot areas: Catatumbo and Valdivia-Tarazá-Cáceres (2021); 2) Regional update of coca cultivation productivity studies in Pacific (2019), Catatumbo and Central (2020), and Putumayo-Caquetá (2021); 3) Characterization of cocaine hydrochloride production infrastructures in Colombia (2021); 4) Illicit drug price monitoring (2021); and 5) Coca market characterization in Colombia. General guidelines (2013).

recommended, as it is essential for the design and implementation of intervention strategies to facilitate the sustainable transformation of the territories where they are located.

Changes in the presence of actors and their interaction

The actors that fuel the coca/cocaine economy and their interactions in Colombia have undergone unprecedented structural changes in the history of drug trafficking in the country. Criminal organizations associated with drug trafficking that are now operating in the production zones are not the same as those seen in previous decades; they do not even share the same profile. In short, some of the differentiating aspects identified in the historical trajectory of drug trafficking include the following:

- Several types of actors are involved in coca cultivation and processing activities, having different zones of influence, links in the drug trafficking chain, as well as political and military capabilities and military strategies.

The implementation of adaptive business models according to the economic context of the territories where these activities are performed.

Changes affecting the structuring of relations and interaction among local actors, illegal armed groups (IAGs) and transnational criminal organizations (TCOs), aiming to dominate the territories and, consequently, the key links in the drug trafficking value chain.

The main milestones that explain these changes, according to various official and academic sources, are highlighted below.

Actors driving coca cultivation and processing activities

Coca cultivation, its manufacture into cocaine and trafficking to consumer countries was characterized by the leadership of two and up to six major criminal organizations, with different structures and purposes: 1) those that arose from the formation of illicit business organizations; 2) the formation of IAGs oriented to the armed conflict for political purposes; and 3) changes in the IAGs, under federal-type structures and with strong ties to transnational organized crime (TOC) (figure 11).

First, cartel-type economic structures were formed, which emerge from formal agreements between organizations in the same sector, with the purpose of reducing or eliminating market competition; from the illicit angle, these organizations establish agreements, alliances and distribution of territories where drugs are produced and trafficked, in order to carry out their operations, as evidenced in the Medellín, Cali, *Norte del Valle* and Coast cartels[50].

[50] National Police, Series: Dynamics of the police service in the Colombian context of violence 1948-2017 (Volume III: Police, terrorism and insecurity: upsurge of violence as a starting point for glimpses of peace and social movements strengthening between 1991-2017) (Bogota: Author, 2019).

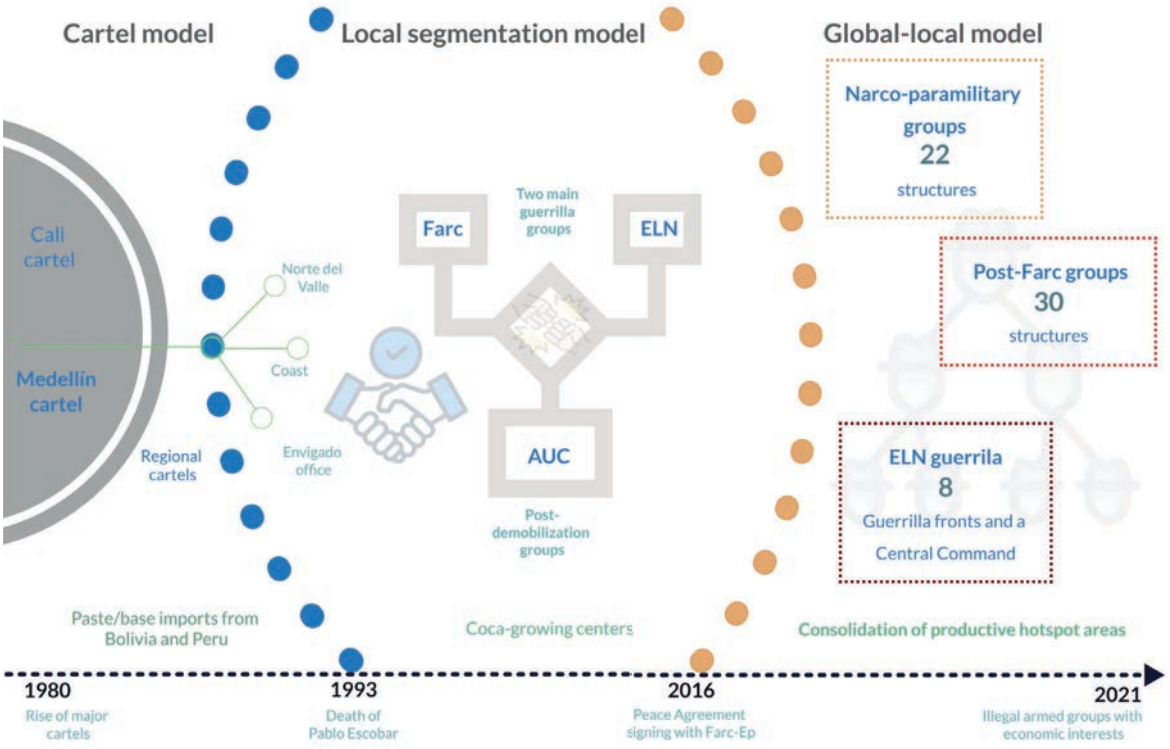


Figure 11. A timeline of changes in the key actors involved in coca cultivation activities and its transformation.

Secondly, the intensification of the internal armed conflict dating back to the 1960s between the State Armed Forces and the illegal armed groups (IAGs) led the latter to finance their operations through illicit means such as drug trafficking, illegal extraction of minerals, kidnappings and extortion, among other criminal activities[51]. The IAGs were structured differently: on the one hand, guerrilla-type -insurgents-, including the Revolutionary Armed Forces of Colombia-People's Army (Farc-EP), the National Liberation Army (ELN) and the Popular Liberation Army (EPL); on the other hand, paramilitary groups -counterinsurgents-, such as the *Autodefensas Unidas de Colombia* (AUC).

According to the *Commission for the Clarification of Truth, Coexistence and Non-Repetition*[52], drug trafficking is a protagonist of the Colombian armed conflict as it is a factor in its persistence and exerts a strong influence on the country's politics and economy, since it replicates an accumulation mode that uses violence, wealth and power, through an illegal economy that needs to be legalized through the national and international economic system. Thus, without a doubt, all actors involved in the armed conflict, directly or indirectly, have had some connections with drug trafficking, which have been determinant in the conflict and its degradation. Furthermore, throughout

[51] Ibid; " The Beginning: the years of MAS and the Self-Defense Forces of Magdalena Medio (1981-1991)". Verdad abierta (2008, August 20), https://verdadabierta.com/los-anos-del-mas-y-las-autodefensas-del-magdalena-medio/.
[52] Commission for the Clarification of Truth, Coexistence and Non-Repetition, Final Report. Findings and Recommendations (2022), https://www.comisiondelaverdad.co/hallazgos-y-recomendaciones-1.

the conflict, the search for control of drug trafficking, as well as drug and arms trafficking, have been some of the motives for armed confrontations, even within the same organization; the outflow routes, cultivation areas, laboratories and border crossings have deteriorated the territories where the armed conflict persists, mediated by drug trafficking control and other illegal economies such as illicit mining. Regarding this, the Commission established that each armed actor had a differentiated participation, depending on their period[53]:

- The increasing participation of the Farc-EP in different links of the drug trafficking chain to fuel the war and its military and economic strengthening changed its relationship with the communities and led to a rise in violence and control.

Paramilitarism forged a relationship with drug trafficking, generating a connection between crime and power to defend their interests and co-opt those stages of the most profitable business, creating functional armies for counterinsurgency and personal enrichment thanks to the sophistication of the private security forces of cocaine traffickers.

Upon the signing of the peace agreement (November 2016), Farc-EP combatants moved to 26 cantonment zones, surrendering their weapons (June 2017). This situation has led the ELN, post-demobilization armed groups (*Autodefensas Gaitanistas de Colombia/Clan del Golfo* - [AGC/CG], *Los Puntilleros* and *Los Pelusos*, among others)[54] and dissident structures of the Farc-EP themselves, to disputes over control of territories after the disengagement of the Farc-EP[55].

Thirdly, after the peace agreement, armed confrontation decreased substantially in most of the country; however, since then, a new violence scenario was generated, because even though the operations of IAGs such as ELN, *Clan del Golfo*, *Los Puntilleros* and *Los Rastrojos*, among others, continued, new dissident and reassembled groups composed of former combatants of the Farc-EP were also created[56]. In 2016, the National Government identified that the armed groups called *Los Gaitanistas*, the EPL and *Los Puntilleros* meet the requirements to be considered as parties to an internal armed conflict, according to international standards; the directive of the Ministry of National Defense calls them organized armed groups (OAGs)[57]. Given this scenario, armed activity has increased in the last four years[58].

[53] International Crisis Group, Watch List 2022 (2022, January), https://www.crisisgroup.org/global/watch-list-2022#colombia.

[54] International Crisis Group, "Colombia's Armed Groups and Their Scramble for the Spoils of Peace". Latin America Report, no. 63 (October 19, 2017), https://www.refworld.org/cgi-bin/texis/vtx/rwmain/opendocpdf.pdf?reldoc=y&docid=59e9a8914.

[55] Office of the Ombudsman Delegated for the Prevention of Risks of Human Rights Violations and IHL Early Warning System (SAT), Special Report: illegal economies, armed actors and new risk scenarios in the post-agreement (2018, September), https://www.defensoria.gov.co/ public/pdf/ economiasilegales.pdf.

[56] International Crisis Group, Watch List 2022.

[57] According to Directive 15/2016 of the Ministry of National Defense, organized armed group (OAG) is defined as an armed organization that under the direction of a responsible command, exercises over a part of the territory such control that allows them to carry out sustained and concerted military operations, characterized by the following elements present: (a) That it uses armed violence against Law Enforcement or other State institutions, the civilian population, civilian property or against other armed groups; (b) That it has the capacity to generate a level of armed violence that exceeds that of internal disturbances and tensions; and (c) That it possesses an organization and a command that exercises leadership or direction over its members, which allow it to use violence against the civilian population, civilian property or Law Enforcement, in areas of the national territory. See: https://www.mindefensa.gov.co/irj/go/ km/docs/Mindefensa/Documentos/descargas/Prensa/Documentos/dir_15_2016.pdf.

[58] Ideas for Peace Foundation (Fundación Ideas para la Paz, FIP), "Neither peace nor war. Hybrid scenarios of insecurity and violence in the Iván Duque administration". Report 36 (2022) https://ideaspaz.org/media/website/FIP_Infome_NiPazNiGuerra.pdf.

When analyzing the types of IAGs currently present, considering the following aspects is key[59]:

- **Integration and consolidation of the Farc-EP dissidents:** prior to the peace process, the Farc-EP had a pyramidal command and internal justice mechanisms that regulated the organization's behavior, although their operation was differentiated (some were more violent than others). In the last two years, dissident armed structures have been consolidated, going from being close to 30 groups that operated in a disarticulated manner in 2017 and 2018, to two factions[60] that brought together 38 structures. To date, the objectives of these factions are rather unclear insofar as they do not seem to be aligned with each other; despite the fact that the integration processes are recent, they have a subsistence vocation and lower coordination or national leadership capacities and are characterized as increasingly federated structures with territorial autonomy, where the "ground rules" and means of interacting with the communities change according to the changes in command.

- **ELN strengthening under destabilization structures located in Arauca and Catatumbo:**
  - The Strengthening of this group took place initially in the historic zones (Arauca, Catatumbo, southern Chocó, southern Bolívar and the border between Cauca and Nariño), where it shared illegal territorial control, and from there it would lead its expansion; nevertheless, ELN structures only have the power to destabilize at the local level, mainly in Arauca and Catatumbo. This could be a result of the setbacks they have had during disputes with other organizations, due to their expansion intentions.

- **OAG structures with connections to TOC:** the *Clan del Golfo* or *Autodefensas Gaitanistas de Colombia* counts with four base structures and 22 substructures in 12 departments, and drug shipping connections to 28 countries with bonds with transnational crime, such as Mexican cartels (Jalisco Nueva Generación and Sinaloa) and European mafias (Calabrese, Sicilian and Balkan drug traffickers)[61]; the above means that it is currently the most important organized crime structure at the national level, since it relies on TOC complex networks with local connections[62]. Although this organization has been the most affected by the actions of the security forces in recent years (Agamenón I and II military campaigns, with the death of several of its main leaders and the capture of its top commander,

[59] Ibid; International Crisis Group, Watch List 2022; Ombudsman's Office, Illegal Armed Groups and New Risk Scenarios in the Post-Agreement (Bogotá, October 2017), https://publicaciones.defensoria.gov.co/desarrollo1/ABCD/bases/marc/documentos/textos/Grupos_Armados_ilegales_y_ nuevos_escenarios_de_riesgo_en_el_posacuerdo.pdf.

[60] According to the FIP report, "Neither peace nor war", the two factions of the Farc-EP dissidents are characterized by: 1) the first one has about 23 structures and around 2,200 armed men. 2,200 armed men, which has gained territorial influence and managed to consolidate itself in the south of the country (southern Meta, Caquetá, Guaviare, Putumayo, Vaupés and Amazonas); The second faction, known as the Second Marquetalia, counts with approximately 14 structures and around 650 armed men, which tried to reorganize several of the structures that emerged from the demobilization of the Farc-EP, but it has been a project with little consolidation and articulation, a situation that, for the most part, has resulted in smaller structures, with territorial influence limited to local areas and with less armed capacity.

[61] ""Clan del Golfo' Connections is Present in 28 Countries." Radio Nacional de Colombia (2021, November 3), https://www.radionacional.co/ actualidad/judicial/conexiones-del-clan-del-golfo-28-paises; Eva M. Rey and Diego Rodríguez, Organized Transnational Crime: Frontiers and Actors in the Hemisphere (Bogotá: Libros Escuela Superior de Guerra, 2020), https://esdeguelibros.edu.co/index.php/editorial/catalog/book/74; "Attorney General's Office Impacts Drug Trafficking Network Accused of Sending Cocaine Shipments to Balkan Countries." Attorney General's Office (2022, April 2), https://www. fiscalia.gov.co/colombia/noticias/fiscalia-impacta-a-red-narcotraficante-senalada-de-enviar-cargamentos-de-cocaina-a-los-paises-de-los-balcanes/.

[62] Police Community of the Americas (AMERIPOL), Situational Analysis of Drug Trafficking. "A Police Perspective." Bolivia, Brazil, Colombia, Ecuador, Panama and Peru (2013), https://www.policia.gov.co/file/63027/download?token=VgOSuKJ_.

alias "Otoniel"), this structure has proven to have a significant capacity to recompose itself. Notably, this is the only group that maintains a capacity to influence and affect at the macro level (regional or national) and that other structures that had influence in different parts of the country (such as *Los Rastrojos*), or that had an important regional predominance (such as *Los Puntilleros* in Meta and Vichada, *Los Caparros* in Bajo Cauca or the EPL in Catatumbo), disappeared or went from being OAGs to Organized Crime Groups (OCGs).

According to the *Ideas for Peace Foundation*[63], the changes in territorial control since the implementation of the peace agreement to date could be due to two aspects:

1. Military capacity and territorial influence: the conflict went from confrontations between IAGs with large armed structures to local and focused conflicts, depending on the context of each territory, the military capacity and the relationship between actors (dispute, coexistence or dominance), mainly between IAGs and a lesser confrontation between them and Law Enforcement Forces and the State; thus, in areas of dispute, the IAGs focus their actions against the "*contending group*" or against the civilian population, whereas in consolidation or dominance territories actions against Law Enforcement Forces prevail.
2. Going from constant fragmentation and the emergence of dissident structures to integration and the formation of alliances, a situation that could lead to regrouping; strategic objectives, internal functioning and leaderships were also transformed.

Considering the changes in actors and business models, understanding the increase in coca cultivation in Colombia from 13,500 ha in 1985[64] to 204,300 ha in 2021 is feasible, since an analysis of the historical trajectory of each of these organizations, as well as their area of influence, reveals business models adapted to their interests, which encourage coca cultivation, as well as cocaine production and trafficking.

Adaptive business models associated with drug trafficking as an interaction method among key actors

According to the *Commission for the Clarification of Truth, Coexistence and Non-Repetition*[65], once the war on drugs was declared in the 1980s, disputes over control of the business between the cartels and, later on, its integration into the counterinsurgency struggle, drug trafficking became a driving force behind the armed conflict in Colombia. Among the theses analyzed, the following aspects are highlighted, related to the interaction between actors involved in these illicit activities:

[63] FIP, "Neither peace nor war".
[64] Calculation based on the average of the official estimates of the Colombian and U.S. governments.
[65] Commission for the Clarification of Truth, Coexistence and Non-Repetition, Final Report. Findings and recommendations.

1. Drug trafficking, from illicit crops to money laundering, through its production and commercialization, has promoted a wealth and power accumulation model based on violence and the co-optation of different sectors of society, both licit and illicit. This criminal model overlapped with the Colombian armed conflict, reinforcing criminal actions.
2. Drug trafficking financed the war among IAGs; and also contributed to the dispute over power, both political and illegal, local, regional and national, generating institutional ruptures.
3. Drug trafficking is a crucial factor behind the persistence of the armed conflict because its illegal nature provides sufficient resources to continue waging war, corrupts those institutions responsible for combating it and finances private armies for the violent protection of its interests. If this trend does not change, a permanent and circular recycling process of armed conflicts will be generated.

The existence of drug trafficking is strongly connected to the dynamics of international cocaine markets. Faced with this global scenario, the challenge of understanding this problem in a comprehensive manner arises. The dynamics observed today indicate that any decision taken in the home country of the transnational criminal organization ("*headquarters*") may have local implications in Colombia, especially in the production areas of both coca and cocaine. Under the transnational model, this global illicit enterprise operates from one country and then expands to other regions of the world, through the creation and coordination with other related businesses or branches. The following are some of its most notable characteristics:

- They act in a centralized manner, i.e., whatever is defined in the "*headquarters*" has an impact on the rest of the states where the subsidiaries or branches are located, which implies having clear guidelines for countering competition and mitigating risk.
- Their main objective is to obtain the highest profit, exploiting the comparative advantages of each country: to earn more in less time.
- High investment capacity, both with their own capital and in collaboration with subsidiaries or partner organizations; strategically concentrating their activity in a few countries.

Its implementation could be differentiated into three groups, depending on the structural policy:

1. **Vertically integrated,** under a multinational model characterized by the production of intermediate goods that supply other organizations for the development of the complete production line. This model was implemented by the Colombian cartels in the 1960s and 1970s, when the local cartel had primary production processes (cocaine paste and cocaine base) in Bolivia and Peru, and then finished with drug crystallization (cocaine hydrochloride) in Colombia.
2. **Diversified (holdings),** to the extent that the products or services vary according to the country where they are present; although they still follow the original guidelines, these are adapted to local needs. This model could be associated with a process segmentation scenario, not necessarily linked to each other, in order to mitigate risk.

3. **Horizontally integrated,** where the final product is practically the same and is produced in each of the countries where they are present. This business model could be associated with the current connections between the TOC (international cartels), whose organizations buy the raw materials or produce the drug in different countries.

An analysis of the historical trajectory of drug trafficking in Colombia shows that the convergence of different key actors and different ways of interacting in the territories could lead to the implementation of various business models. The main characteristics of each of these three models are outlined below.

a. Local cartel model with connections to the TOC: vertically integrated local criminal organizations (Colombian cartels), from coca cultivation to cocaine production and trafficking at the wholesale level into the consumer countries.

According to the *Commission for the Clarification of Truth, Coexistence and Non-Repetition*[66], in the 1960s and 1970s the absence of an inclusive agricultural policy, emphasizing access to technical assistance, land formalization, market access and loss of food sovereignty were the initial causes for coca to become a productive alternative for agricultural producers. The Commission's report mentions that, at the beginning with the configuration of guerrilla groups in the regions, some organizations opposed the exclusive cultivation of coca, as was the case of the Farc-EP, the ELN or the M-19[67]; subsequently, between 1990 and 1992 there was evidence showing the largest coca cultivation, because people began to cut down the forest and cultivate, then from 1994 to 1996 was the peak of coca cultivation.

This peak came after the "*marimba bonanza*" in the 1970s, which was mainly centered in some areas of the Caribbean region. The 1980s marked the consolidation of the large drug trafficking cartels in Colombia; the model implemented was characterized as vertical integration, whereby the Medellín and Cali cartels, as competitors, began their "illicit enterprises" by clandestinely importing cocaine paste and cocaine base by air from the southern Andes, especially from the Alto de Huallaga region in Peru and the Chapare region in Bolivia; Once the raw materials arrived in Colombia, the cocaine was refined and crystallized and transported mainly by sea, using cargo ships or speedboats, or by air through the Caribbean to South Florida[68]. Drug distribution from these points to the United States was carried out by local criminal networks using cars, vans or airplanes.

In the first half of the 1980s, cocaine production and trafficking generated large profits, which were the source of the

[66] Commission for the Clarification of Truth, Coexistence and Non-Repetition, Final Report. Findings and recommendations.
[67] According to the Commission for the Clarification of Truth, Coexistence and Non-Repetition, this guerrilla group (M-19) began to order people and tell them that they could not only grow coca, but that they had to grow other crops for food.
[68] Bagley Bruce, "Drug Cartels in Latin America: From Medellín to Sinaloa". CRITERIA - Legal Science and International Politics Notebooks. 4. no. 1 (2011, January-June): 233-247, https://revistas.usb.edu.co/index.php/criterios/article/download/1946/1689/4285.

following incentives, among others: 1) a sharp increase in violence; 2) the dispersion of drug trafficking activity throughout the country, settling in areas where there was no state pressure; and 3) the appearance of "narco-politics". Consequently, the cartels in Colombia achieved a high level of development and vertical integration until the mid-1990s, consolidating cocaine production and trafficking networks abroad, mainly into the United States. These organizations were increasingly involved in a vertical integration model, from coca cultivation to trafficking to the port of destination at the wholesale level, without interfering in the consumer markets.

In the first half of the 1990s, the two major cartels were dismantled and their leaders were captured and killed, including the death of Pablo Escobar (1993) and the capture of the Rodríguez Orejuela brothers (1995). These actions did not lead to drug trafficking's extinction in the country, but rather to the proliferation and dispersion of traffickers, who established alliances among themselves and formed new organizations commanded by the former, middle and lower commanders of these cartels[69]. Along with other aspects, their business model was characterized by: 1) a second generation of leaders without criminal records and with a high educational level; 2) the legitimization of criminal activity with social investment; and 3) the formation of the first international alliances with cartels (mafias) in Mexico and Italy[70].

During this period, the IAGs' contribution to these illicit activities was marginal; their relationship was limited to two aspects: 1) to the collection of "*grams*", as a "tribute" proportional to the volumes produced, not only applied to cocaine hydrochloride, but also to transactions of the necessary raw materials (leaf, basic paste and cocaine base), and, 2) their connection with some drug traffickers in regional scenarios and for different services provided to other criminal organizations involved in the business, such as providing security for coca cultivation, charging "taxes" on production infrastructures, using clandestine airstrips and the entire logistics chain of this criminal industry, which served as a means of financing its activities in the country[71].

b. Local segmentation model of the drug trafficking chain as a mechanism to mitigate risk

After the dismantling of the drug cartels, the profile of the drug trafficking organizations changed, shifting from income generation (Medellín and Cali cartels) over to the articulation of IAGs in specific territories for the cocaine market as a source of financing for the armed struggle for political purposes. The realignment of commanders in the old structure of the Cali cartel formed the *Norte del Valle* cartel, without the disappearance of other low and medium-scale drug trafficking groups; their business model consisted of a

[69] José Alfredo Jiménez, 25 years of head-on fight against drug trafficking in Colombia (Bogotá: National Police, Antinarcotics Directorate, 2012).
[70] National Police, Series: Dynamics of the Police Service in the Context of Violence in Colombia 1948-2017 (Volume II: "Police, drug trafficking and crime: criminal economies and their implication in citizen security and coexistence between 1973-1991") (Bogotá: Author, 2019), https://policia.edu.co/memoria/wp-content/uploads/2020/05/policia-narcotrafico-y-crimen-tomo-2_compressed.pdf.
[71] Ibid.; Néncer Losada, "Connection between cocaine traffickers and the FARC - 1980s". Revista Cultura y Droga 15, no. 17 (2010): 89-98, http://200.21.104.25/ culturaydroga/downloads/Culturaydroga15(17)_7.pdf.

greater degree of specialization at different points in the chain, from production to dispatch to Central America and the United States[72]. Additionally, the strengthening of paramilitary groups established since the 1980s in different regions of the country was reported, becoming decisive actors in the dynamics of drug trafficking in the following years[73]; it is worth noting that, at the beginning of the 1990s, these paramilitary groups were operating independently in the territory.

From the late 1980s and thereafter, the IAGs began to manage the production and trafficking logistics chain, which led them to be called narco-guerrillas by the end of the 1980s[74]. In the mid-1990s until the end of the 20th century, the Farc-EP consolidated itself as one of the main actors that stimulated coca cultivation and its transformation into cocaine, through the cocalero marches (1996), among other strategies[75]. At the end of the 1990s, the Farc-EP lost a significant proportion of their territorial domain as a result of State action and direct clashes with paramilitary groups; however, they set support prices in their business model and became direct buyers[76].

By the end of the last decade of the 20th century, paramilitary groups took control of a portion of the areas affected by coca cultivation in different regions of the country and of several strategic corridors for drug trafficking, through alliances with existing drug trafficking groups. Such groups were distinguished by the consolidation of a national project, based on a design for territorial, social and political control. They operated openly illegally; their interests and actions were totally driven by drug trafficking logics and financing, and, in addition, they sought to establish a nationwide project, in some cases under federalized figures and in partnership with some social and political elites in the regions.

This led to a transition to a more segmented business model in the different links of the drug trafficking chain, while maintaining the main nuclei of coca/cocaine production, with connections to suppliers as well as to the mafias engaged in drug trafficking. This situation allowed them to make contact with criminal groups responsible for drug distribution in the U.S. and European consumer markets, while expanding their connections with organizations specialized in laundering illicit funds[77].

During the period between 2000 and 2005, under a federalized structure, the AUC became a determining actor in drug trafficking in Colombia, working alongside the *Norte del Valle* Cartel and absorbing the

[72] Jiménez, 25 years of head-on fight.
[73] Miguel Serano, Evolution of paramilitarism in Colombia after the demobilization of the AUC (2012). Working document as part of the consultancy "Analyzing the activities and structures of organized armed groups that emerged after the demobilization of the Autodefensas Unidas de Colombia" (OACNUDH).
[74] National Police, Series: Service Dynamics (Volume II).
[75] Juan Guillermo Ferro, "Coca Economy and the FARC: Organizational and Political Implications". In: Illicit Crops in Colombia - Memory Forum University of the Andes (Bogota: Universidad de los Andes, 2000), 243-251.
[76] Ibid.
[77] Reinaldo Botero, Terrorism and Security (Bogotá: Planeta, 2003).

small drug trafficking cartels in other regions of the country[78]. Conversely, according to various authors, the Farc-EP weakened its position and structure, after State efforts, which implied a tactical withdrawal, loss of territorial control over several production zones, and the creation of alliances with trafficking organizations and former paramilitaries aimed at cocaine trafficking[79]. In 2006, the AUC demobilization was completed; however, this did not dismantle the drug trafficking networks, as it led to the emergence of a new generation of criminal groups and gangs[80].

Meanwhile, the Farc-EP influenced the coca dynamics (ground rules) in the 2007-2011 period, even though they constituted a secondary actor in the drug trade[81]. *Los Urabeños* (non-demobilized structures of the AUC) and *Los Rastrojos* (emerged from the reconstitution of the *Norte del Valle* Cartel) also increased their control over territory and extended their zones of influence, dominating the shipping routes for the Caribbean market and the Pacific route. State actions in some regions resulted in the migration of production zones, a process that was consolidated after concentrating coca in the Colombian Pacific, mainly in Nariño and Cauca.

c. Global-to-local business model: transnational vs. multinational strategies associated with coca/ cocaine production in Colombia

Formerly, when the Farc-EP was a hierarchical organization with a vertical structure, negotiations with the international cartel for raw materials to produce cocaine were facilitated, since only one intermediary (monopsony) or a few intermediaries (oligopsony) were authorized in the territory, depending on the area they were located[82]. Once the peace agreement was signed in November 2016 and after the Farc-EP demobilization, the drug trafficking business model changed both in terms of the diversification of IAG structures exercising territorial control and subordination towards other illegal actors in the international sphere.

Following the gap in territorial control, cocaine negotiation and acquisition capacity for international cartels was limited; while these international criminal organizations operated under a modality in which they sent "emissaries", whose role was based on surveillance and control of shipments previously agreed upon for international trafficking at ports and borders; upon the demobilization of the Farc-EP, the emissaries approached the cultivation zones to carry out negotiations directly[83]. As a result, in an increasingly globalized scenario, new actors with connections to the TOC arrived in the territories affected by coca cultivations[84].

[78] Francisco Gutiérrez and Mauricio Barón, "Subsidiary orders. Coca, emeralds: war and peace". Revista Colombia Internacional, no. 67 (2008): 102-129.
[79] Service Dynamics Series (Volume III).
[80] Jiménez, 25 years of head-on fight.
[81] Institute for Development and Peace Studies (Indepaz), Colombian Conflict Focal Points. Report on the Presence of Armed Groups (Bogotá: Author, September 2021), http://www.indepaz.org.co/wp-content/uploads/2021/10/INFORME-DE-GRUPOS-2021.pdf.
[82] Miguel Serrano, Monopsony nature of the illegal coca cultivation market in areas free from State intervention (2013). Working paper; Miguel Serrano, Private security and corruption in illegal monopsony markets: The case of illicit coca cultivation (2013). Working paper.
[83] Ombudsman's Office, Illegal Armed Groups.
[84] Ombudsman's Office, Special Report: Illegal economies.

By means of alliances with the TCOs, the new IAGs can access international drug markets; these international drug trafficking cartels do not seek to control large areas of territory, but rather to create conditions at the local level to produce cocaine quickly and efficiently, depending on the drug demand and purity needs of the international market.

In accordance with the report *Illegal Armed Groups and New Risk Scenarios in the Post-Accord, from the Ombudsman's Office*[85], in the post-agreement scenario, the presence of TCOs promotes the cultivation of illicit crops and financing throughout the drug trafficking chain, an activity that has granted access to territory and direct negotiation in production zones with intermediaries or with the owners of laboratories to guarantee the increase in yield and satisfy the growing demand for cocaine in consumer countries. According to Early Alert 045-2020 issued by the Ombudsman's Office, the IAGs, which did not have sufficient resources to finance their expansion, were strengthened with the entry of significant capital from alliances with the TCOs, in order to consolidate and intensify the violent conflict in the area:

> National and even international drug traffickers, along with local drug trafficking structures, are allegedly taking control of illegal businesses, especially to obtain profits throughout the drug trafficking chain, ranging from pretending to manage the credits that might be generated by stabilizing coca paste production flows and mobility routes, especially in territories abandoned by the Farc-EP, to the control of retail drug trafficking[86].

The alliances between local groups and the TCOs have not only focused on transactional and cross-border cocaine trafficking; they have also been used for arms trafficking, illegal transit of persons and human trafficking, and within the framework of the establishment of illegal economies, different illegal activities such as extortion, forced recruitment and selective homicides have been reported, which alternate with the income derived from drug trafficking and strengthen the criminal activities of the various OAGs.

Incentives evidenced in the new means of interaction between local stakeholders, IAGs and TCOs

In the current scenario, one of the most relevant incentives for the IAGs present in the territories to control cocaine cultivation and production areas is to become an intermediary between the local producer, who may be the coca grower, the owner of the primary infrastructure or the owner of the crystallization laboratory, and the cocaine buyers (international cartels' emissaries). This implies local control over the generation and procurement of large volumes of raw material (coca leaf, coca paste and cocaine base) or the final exportable product (cocaine hydrochloride) and connections with the transnational

[85] Ombudsman's Office, Illegal Armed Groups.
[86] Ombudsman's Office, Delegate for Risk Prevention and Early Warning System, Early Warnings Nos. 018 and 045 of 2020, https:// alertastempranas.defensoria.gov.co/Alerta/Details/91777; https://alertastempranas.defensoria.gov.co/Alerta/Details/91659.

criminal group or cartel or organization that has the capacity to traffic large quantities across borders[87].

Significantly, generating agreements and ground rules that favor intermediation implies territorial control that transcends the classic existence of a production zone that facilitates the stockpiling of coca/cocaine. Coca's expansion, concentration and persistence in the territory leads to an increasingly open scenario, where access to plants, cultivation process mysticism and its transformation, and even the location of crystallization laboratories, runways and outbound routes for drugs, tend to become generally known. This situation has been possible due to the fact that the need of generating large volumes of drugs in the territories has changed the way how local actors interact. It has also transformed the paradigm under which coca not only provides a livelihood for the grower but is also a mechanism for the grower to be prosperous by contributing to "better living conditions".

Restrictions on the expansion of coca cultivation were blurred in light of the presence of new actors. Prior to this, there were limitations on establishing coca monocultures, as the IAGs in power were concerned about combining coca with food crops as a mechanism to contribute to local food security; in addition, there were local ground rules that restrained the expansion of cultivation into protected areas and even punished deforestation practices as a means to acquire more land for coca.

Currently, given the incentives to buy in large volumes, growers are increasingly interested in improving field yields under coca monoculture conditions, planting different cultivars in order to obtain greater quantities of leaves and access to better conditions for extracting the alkaloid; moreover, the IAGs have encouraged and promoted coca cultivation in areas of interest for the conservation of Colombia's biological and cultural richness, where deforestation has a great impact. Therefore, actors converge in the common interest of obtaining quick profits, which encourages changes in production strategies, land tenure, and territorial care, among others.

Villagers believe that factors such as the limited State presence and constant IAGs actions are determinant in favoring the increasing yields and better agro-cultural practices in coca cultivation. Upon deepening this vision, the villagers stated that the territorial control exercised by the IAGs over land and fluvial roads generates difficulties for the entry of the security forces

[87] Indepaz, Colombian Conflict Focal Points; FIP, "Neither Peace Nor War"; Ombudsman's Office, Special Report: Illegal Economies; Peace & Reconciliation Foundation (Peers), Mapping the ominous presence of Mexican cartels (Bogota: Author, June 2020), https://e7c20b27-21c2-4f2b 9c38- a1a16422794e. usrfiles. com/ugd/ 7c20b_1249ee35717d47deac2f2 8fa2cd961c.pdf; Diego Rodríguez, Alfredo Fernández and Nadia Perralta, The Present of Colombian Drug Trafficking and its Transnational Criminal Alliances with Mexican Cartels (Bogotá: Escuela Superior de Guerra "General Rafael Reyes Prieto", n. d.), https://esdeguelibros.edu.co/ind x.php/editorial/catalog/downloa /74/87/1229?inline=1. These trends have been identified in the framework of the surveys in areas affected by crop cultivation. These trends have been identified within the framework of the following studies carried out between the Government of Colombia and UNODC/SIMCI in the last five years: 1) Coca cultivation productivity studies, regional updates in Pacífico (2019), Catatumbo (2020), Central (2020) and Putumayo Caquetá (2021); 2) Characterization of cocaine hydrochloride production infrastructures in Colombia (2017 and 2021), and 3) Characterization of two productive hotspot areas: Catatumbo and Valdivia-Tarazá-Cáceres. Additionally, information was reported in the framework of the project "Diagnosis of needs to address transnational organized crime in the border area between Ecuador and Colombia", funded by the Federal Foreign Office of the Government of Germany, conducted by UNODC/SIMCI in coordination with the Presidential Council for Security of the Government of Colombia.

and hinders control and interdiction actions in the area[88]. Coca leaf transportation is carried out without drawbacks, given the territorial control exercised by the IAGs. Leaves are mainly sold in the agricultural production unit with coca (UPAC) with payment in cash and prices change according to cultivation. Ethnographic observation corroborates these observations:

> The main economic activity in the municipalities of Tibú, El Tarra and Sardinata is coca cultivation. This growth has allowed other economic activities to grow. Legal activities are dependent on the revenue flow that this illegal economy generates.
>
> Furthermore, coca cultivation is the main employment-generating activity in the municipality. There are also activities such as coal mining and palm cultivation; however, the number of people employed is less than that required for coca cultivation. Coca growers interviewed stated that coca has given them the opportunity to obtain the resources to engage in licit activities such as palm cultivation and commercial establishments. Thus, their income no longer depends solely on coca cultivation. (Ethnography, Catatumbo hotspot area).

Most of the sources consulted agree that coca is concentrated because authorities do not have the capacity to prosecute traffickers, IAGs or growers. Therefore, constraints in State intervention and in the creation of opportunities facilitate their presence and, in turn, reduce risk perception.

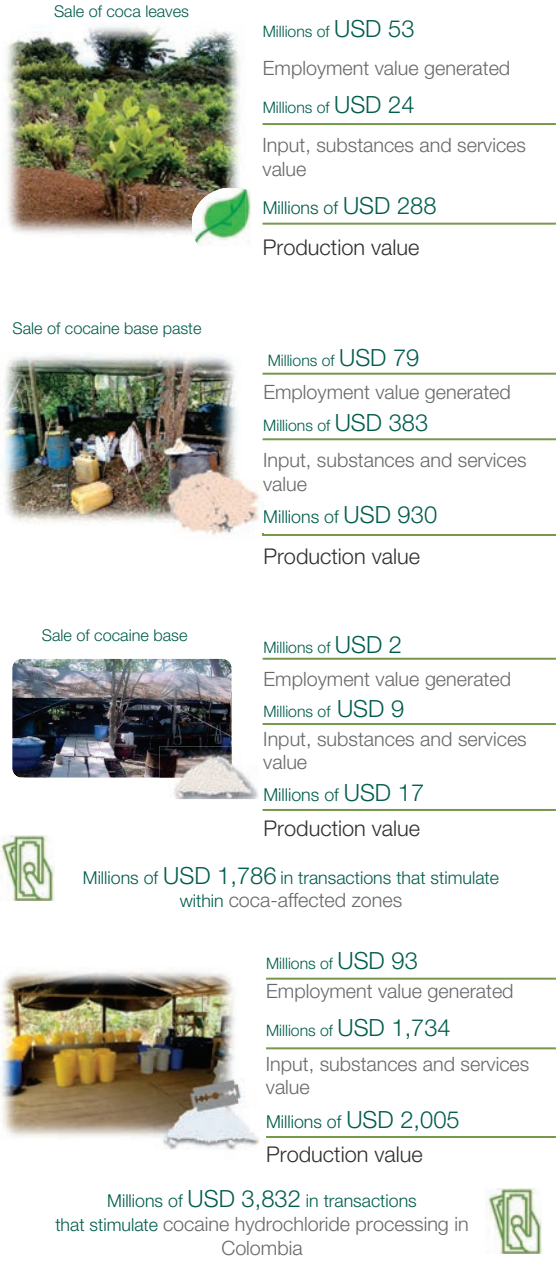
Regarding productive alternatives for coca substitution and its transformation, there is a majority consensus among the villagers regarding the connection between coca concentration and decreased profitability of legal crops in these areas, as well as the absence of other income generation opportunities. There is a majority perception (more than 90%) that the greater presence of coca is due to the fact that legal crops are less profitable and the ease of direct access to buyers.

Thus, the IAGs have implemented coercive and even violent strategies to co-opt the community in order to guarantee the security of these activities in these areas. According to what has been expressed by the inhabitants and coca growers, illegal activities (dominant strategy) allow them to assume the role of regulating security and local coexistence and generate guarantees for the establishment and sustainability of criminal activities, including coca/cocaine production[89].

[88] Alejandro Santos, "The Difficult Battle against Illegal Crops. Caracol Radio (2021, September 29), https://caracol.com.co/programa/2021/09/29/6am_hoy_por_hoy/1632919112_953972.html.
[89] This idea is also reinforced in the report issued by the FIP, "Neither peace nor war".

The existence of a permissive cultural environment for illegality favors the emergence and expansion of illegal economies. The risks of a culture that is permissive with illegality, going from conviction to questioning the usefulness of complying with the law, and even the perception of a greater gain from illegal conduct, minimizing the risk of carrying it out, have a perverse effect on institutional functioning and the welfare of society[90]. Apart from diverting funds and economic resources that could be used for development, some perverse advantages generated by these activities in the territory have been identified[91]: 1) non-taxation, an element that limits territorial wealth generation and its redistribution; 2) the absence of labor guarantees, since being illegal can even generate conditions of forced labor, physical and safety risk, and 3) the precariousness of their operating techniques generates extremely high costs on the environment and human health.

Cocaine market size approximation: incentives generated by coca cultivation and its transformation in the territory



Source: SIMCI/UNODC analysis results

[90] Andrés Molano-Rojas and Juan Moncada, Illegal Economies versus Entrepreneurship: Unfair Competition Implications (Bogotá: Institute of Political Science Hernán Echavarría Olózaga and Konrad Adenauer Stiftung, August 2017), http://www.icpcolombia.org/dev/wp-content/ uploads/2017/11/17.08-EN-CONTEXTO-KAS-15-ECONOMIAS-ILEGALES-1.pdf.
[91] Ibid.

As the illicit drug market is illegal, price composition is subject to scenarios regulated by buyers in the territory. The dynamics between the supply and demand of products are controlled by means of co-optation, violence or imposition, with the purpose of favoring buyers' interests.

Nevertheless, there are local incentives to promote the specialization of on-farm production processes, which could result in greater economic benefits for the grower. This is consistent with price behavior in recent years, where coca leaf tends to be traded below the historical average, while cocaine base paste (CBP) and even cocaine hydrochloride have risen compared to the historical average.

As a result of this interaction, in 2021, in the areas affected by coca cultivations, transactions of approximately COP 6.69 trillion (USD 1,786 million) were stimulated by sales of coca leaf, coca paste and cocaine base, as well as the demand for goods (agrochemicals-chemicals), services and labor. Growers received approximately COP 4.62 trillion (USD 1,235 million[92]), from the sale of these products, 77% of which was generated by 52.4% of the more specialized PAC, who transform the leaf into coca paste and cocaine base.

When analyzing globally the value of transactions for the sale of all coca leaf, coca paste and cocaine base production in coca-affected areas, those required for cultivation establishment and maintenance, as well as those related to inputs and services required for the extraction, refining and conversion of the alkaloid, growers receive less income from coca, when compared to the income received in the crystallization phase. Note that it is estimated that approximately COP 14.40 trillion (USD 3,832 million) corresponds to cocaine hydrochloride processing. The threat to sustainable development and to the strategies to break the gaps between the population and the State lies in the existence of areas affected by coca cultivation with conditions for the productive chain, from cultivation to crystallization, which strengthens the dependence of the coca/cocaine economy at the local level.

In view of the greater coca availability in the territory, cocaine production continues to be one of the main drivers of the local economy, both licit and illicit, mainly in nearby population centers. Being the main source of income generation in the economy implies a high degree of dependence for access to basic goods and services; also, temporary price increases could cause expectations of false prosperity as a result of guarantees in the purchase of products generated in the territory, regardless of the vulnerability conditions in terms of human rights guarantees that may be implemented by the IAGs.

[92] The representative market rate (TRM) used was COP 3.744/US 1 for 2021, as stipulated and published by the Bank of the Republic of Colombia.

Urban-rural transformations

The traditional urban-rural relationship indicates that the municipal capitals and higher category population centers are those where there is greater commercial interaction; these are where goods and service providers are located and where the population living in lower category population centers travels to carry out their exchanges and transactions.

Nonetheless, the coca cultivation concentration trend in productive hotspot areas is beginning to modify the traditional urban-rural relationship and promotes reflection on which are the closest population centers to which producers have access; in which population centers it is possible to integrate into licit markets; and how the presence of illicit activities can stimulate territorial and population growth in some isolated or poorly connected population centers that may limit control actions, institutional presence, and access to goods and services.

Institutional fragility

Coca tends to establish itself in areas with high levels of institutional fragility (IF)[93], territories where the establishment of dominant strategies that promote cocaine acquisition in large volumes is facilitated under an illusion of prosperity, given the "*coca bonanza*" following the proximity to global companies associated with the TOC. As a consequence of the long-standing absence of governance-governability policies that would guarantee the construction of democratic participation and prosperity in these geographically remote societies where coca was settled, the presence of the IAGs and the development of the current security conditions and the delay in the construction and institutional strength are the result.

When comparing the non-monetary poverty indicator generated by the National Administrative Department of Statistics (DANE) for municipalities without coca and municipalities with coca, a more critical situation is evident in those municipalities where coca production hotspot areas have also been identified. In terms of figures, while the proportion of poor households in municipalities without coca ranges between 20% and 37%, in municipalities with coca-cocaine production hotspot areas, the same indicator ranges between 34% (Putumayo Border) and 78% (El Charco-Olaya Herrera). In other words, there is a higher proportion of households with physical deprivation in terms of health, education, housing and work, which makes these territories more fragile and vulnerable to the appearance and co-optation exerted by the IAGs.

The sources reviewed expressed it in terms of State abandonment[94]. Even though this perception on crime expressed by coca growers, interviewed settlers and other related actors is not justified, it may be accepted as a vision that contributes to understand the governance-governability problems, as one of the different elements that have contributed to drug trafficking

[93] Term that corresponds to an approximate translation of institutional fragility used in Castro-Díaz, "Fragilidad institucional".
[94] United Nations Office on Drugs and Crime (UNODC), Characterization of two productive hotspot areas: Catatumbo and Valdivia-Tarazá-Cáceres (2022).

consolidation. This is a progressive phenomenon in which state absence is consolidating agreements that do not consider the State as an interlocutor.

Considering the existence of a preference for coca cultivation, IAGs presence and the established rules and procedures in territories with coca presence, the existence of a dominant strategy established from illegality and a *dominated strategy with the concurrence of informal community* agreements can be assumed. The institutional fragility of a municipality in which coca is established is higher compared to one without coca; It also tends to increase as other activities such as primary processing (mainly with grower participation) expand around the cultivation, being evidently greater in municipalities with reports of an integral productive chain, from coca cultivation to obtaining cocaine hydrochloride and even with the creation of clandestine infrastructures for the production of key chemical substances (for example, hydrochloric and sulfuric acids and potassium permanganate), where the activity tends to specialize.

In this regard, DANE[95] defined a series of categories (Table 1) in order to identify population centers and generate an approximation base to guide land use and infrastructure and equipment provision. There are a total of seven population center categories, ranging from "*No category*", which is an area without a concentration of dwellings that does not reach the level of a population center, to "*Municipal capital*", the administrative seat of a municipality. Municipal land use planning and smaller scales in order to guide and improve the provision of services and citizen participation is the responsibility of the Municipal Councils, according to the 1991 Political Constitution (art. 318) and Law 136/1994; its update is associated with population dynamics (official national census), as well as economic and institutional dynamics.

[95] National Administrative Department of Statistics (DANE), Basic Concepts, https://www.dane.gov.co/files/inf_geo/4Ge_ConceptosBasicos.pdf.

Table 1. Population center category characteristics

Category number	Category	Characteristics
1	No category	Area without a concentration of dwellings that does not reach the level of a population center.
2	Population center	Minimum concentration of twenty contiguous or attached dwellings, located in a rural area of a municipality or a departmental township, including urban characteristics such as the delimitation of pedestrian and vehicular roads. The municipal authority has not given a precise definition to place it in a higher category.
3	Hamlet	A location that features a cluster of dwellings, usually located next to a main road and that has no civil authority.
4	Police Department (municipal, departmental)	A judicial body in an area, which may or may not be a municipal area and which exercises jurisdiction over a given municipal territory, urban or rural, and depends on the department (IPD) or the municipality (IPM). In most cases, this is used for electoral purposes. Its highest authority is a Police Inspector.
5	Municipal township	Rural area division of the municipality, which includes a population center, considered in the Land Management Plans (POT). Pursuant to Article 117 of Law 136/1994, the municipal council is empowered to establish this division by means of agreements in order to improve service provision and ensure citizen participation in local public affairs.
6	Departmental township	Departmental division, according to decree 2274 of October 4, 1991, which includes a population center. According to this same provision, the now departmental "township" are not part of a determined municipality.
7	Municipal capital	Geographic area that is defined by an urban perimeter, whose limits are established by Municipal Council agreements. Corresponds to the location of the municipality's administrative seat.

Source: DANE, *Basic Concepts*.

Based on the latest update of the DANE categories (2018), coca cultivation behavior was analyzed (2021), identifying that 45% of the area with coca in 2021 has a close relationship or is in the periphery of small population centers, in consolidation, which do not yet have a defined category (no category) and are located 8 km away on average (table 2).

Table 2. Distribution of the area with coca and average distance to the population center categories defined in 2018

DANE Category	Area with coca 2021 (%)	Average distance (km)
No category	45	8
Population center	1	7
Hamlet	11	8
Police Department (municipal, departmental)	10	10
Municipal township	26	9
Departmental township	0	39
Municipal capital	8	9

Source: UNODC/SIMCI, 2022.

Some population centers in Colombia have been consolidated due to their proximity to coca leaf production sites; figure 12 shows the distance between population centers, municipal capitals and metropolitan centers. There is evidence of a relationship between populations considered as "no category"; meaning that they do not yet have the minimum conditions to be considered at least as a hamlet. The identification of the nearest population center is based on a proximity analysis, which does not consider topographic features or connectivity infrastructure; therefore, when we talk about distances, we refer to linear distance. The data represent the national behavior where the need to carry out this type of analysis for future targeting related to rural development policies is evident.

This result draws attention to these population centers closest to coca, considered from a historical perspective of the urban-rural gap, as vulnerable rural spaces, with low institutional presence, a complex land tenure structure and lack of land management that has deepened the conflict over the use and exploitation of resources; these territories have been impacted by the penetration of organized crime, forced displacement and land dispossession, and the struggle for control of territories between armed actors and the State[96].

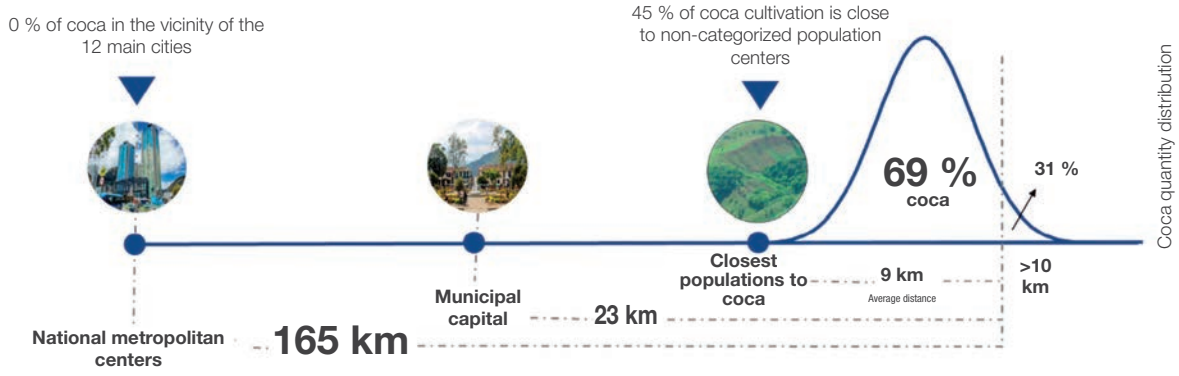


Figure 12. Coca cultivation and distance to population centers

[96] United Nations Development Programme (UNDP), Rural Colombia, Reasons for Hope. National Human Development Report (Bogota: Author, 2011).

However, from a more current perspective and favored by the growing coca cultivation dynamics in the territories, these population centers closer to coca tend to show particular development conditions and to modify their relationship with the municipal capitals, in such a way that they begin to generate a gap with the rest of the population centers of the same characteristics that are not related to coca and that make them attractive both for new population and for the consolidation and generation of new incomes. Nevertheless, these new conditions are generated in areas where low state presence and control conditions persist.

Some research conducted in the territory shows how these population centers are being transformed by the expansion and concentration of the illicit phenomenon, which ranges from cultivation to transformation into cocaine; for example, in the Patía region of Cauca, an area of recent expansion, "a harvester can earn up to 37 dollars per day, significantly more than the minimum wage of 8 dollars per day"[97]. These higher incomes have led to local prosperity: "The coca economy created a community of consumers[98]" which is evidenced by the arrival of ice cream, food and clothing trucks that previously did not reach these population centers; similarly, housing construction, paved access roads and the embellishment of facades are factors that are influencing the fact that these population centers closest to coca do not have the same conditions of an uncategorized population center and are being transformed by drug trafficking.

Another field investigation that reinforces this growth and modification of the rural coca-growing population centers is recorded in the *Truth Commission's Final Report*, where the testimonies collected reveal the impact of illicit economies in the territories: "The economy of many regions depends on coca", as a farmer from Llorente, Nariño, stated to the Commission: "coca is a roundabout: coca departs from here and it turns, today I have the money here with me, tomorrow someone else has it, tomorrow the butcher has it, the greengrocer has it, the supermarket has it, the people who sell cell phones have it. ... the same coca economy infuses work here. And not only here in Llorente, this is happening nationwide"[99].

This reveals that many isolated villages and hamlets have emerged and are locally relevant thanks to the configuration of illicit economies that have allowed them to overcome precarious conditions of access to goods and services and partially compensate for institutional neglect.

Lastly, research carried out directly in the productive hotspot areas has established an unusual growth in the population centers closest to the coca fields, with a greater number of commercial businesses that are atypical for the area (flower shops, brand-name clothing, technology and mobile communications), and buildings with more than two stories, among others.

[97] "In the land of 'San Coca', a journey into Colombia's booming illegal economy". AFP (2021).
[98] Ibid.
[99] Commission for the Clarification of Truth, Coexistence and Non-Repetition, There is Future, if there is Truth. Findings and Recommendations, Final Report (2022).

[…] there is a wide variety of clothing and beauty stores, restaurants, pharmacies and supermarkets where you can find everything from groceries to household appliances, meat shops, bars where prostitution is also found

Ethnography, Valdivia-Tarazá-Cáceres hotspot area

This dynamic is not only manifested at the local level, in direct cultivation and processing zones, but also in nearby municipal capitals, which for the producers are a reference point for progress. For instance, the real estate boom during the drug trafficking bonanza of the 1990s was concentrated in capital cities such as Bogotá and Medellín; recently it has shifted to cities such as Pasto, Popayán and Cali[100], which are closer to the productive hotspot areas.

This new territorial configuration should be analyzed cautiously, since interrupted transitory prosperity could generate social, economic and political problems that weaken the possible implementation of alternatives leading to a transition into licit economies, as well as constraining institutional presence, since these population centers are growing more than what their natural capacity can sustain and the highly vulnerable population is likely to remain in illicit activities that can generate income to meet their needs.

The territorial configuration continues to be altered to the extent that productive dynamics related to cocaine crystallization are developed in the territory. Findings from studies conducted by the Government of Colombia and UNODC/SIMCI show that, despite the fact that cocaine hydrochloride production complexes have been known for maintaining low visibility, an aspect that favors the existence of production "*megalaboratories*"[101], and their implementation, the existence of small and medium-sized infrastructures, including mobile ones, has now been documented, which operate 24 hours a day. This situation leads national or transnational OAGs that exercise control in the area to demand greater involvement of people or itinerant local work teams, based on the production campaign needs; these workers are linked to the illegal activity regardless of the role they may play, from outsourcing activities such as material and input supply and logistics, to food preparation, construction, adaptation and dismantling of the infrastructure, and even surveillance in fixed perimeters. These dynamics increase the community's collective perception of well-being due to the existence of production complexes in the areas, as they are drivers of the local economy and employment sources[102].

[100] "Where does the dirty money from the cocalero bonanza go?". El Tiempo (2018, October 6), https://www.eltiempo.com/justicia/investigacion/asi-se-camufla-la-plata-de-la-bonanza-cocalera-278120.
[101] Indepaz, Colombian Conflict Focal Points.
[102] Government of Colombia and United Nations Office on Drugs and Crime (UNODC), Characterization of the infrastructure and dynamics of illicit cocaine hydrochloride production, 2021 (Bogota: Ministry of Justice and Law, National Police [CIENA-DIRAN], Attorney General's Office and UNODC, Integrated Illicit Crop Monitoring System [SIMCI], 2021).

Access to credit remains the great comparative advantage of coca growers

According to coca growers' testimonies in several of the investigations[103] conducted in the last five years, there are informal credit systems in coca-growing areas established and managed by drug traffickers. Credits are made in the form of an advance payment before the harvest and do not require real guarantees or any documentation, and can cover inputs, labor and resources to support families during the pre-production phase. Resources are usually delivered in cash, without any transit through formal banking entities.

The traffickers also operate as collection agents in cases of delinquency, through the use of violence, which establishes a low level of economic risk for the recovery of credit resources. In some cases, there have been cases of loan "restructuring": if a producer faces cultivation loss due to drought, pests or disease, the debt is not forgiven, instead the drug traffickers grant a new loan to the producer so that he can resume production of the illicit crop and extend the repayment period of the resources.

Unlike the above, access to loans for licit production is mediated by the supply of formal banks in the territory, which is usually classified as high risk for investment due to the presence of armed actors, and requires various guarantees from the grower, while in some cases producers make use of state solidarity guarantee mechanisms. The high level of risk of capital recovery in cases of default acts as a deterrent for banks to offer loan; the uncertainty derived from technical risks and the volatility of licit product prices operate in many cases as a deterrent to loan use for producers.

Trend towards coca concentration in productive hotspot areas.

The consolidation of productive hotspot areas was initially registered as a coca cultivation concentration process in geographically strategic areas (border areas, areas under the control of illegal armed groups); this process began to be analyzed in a differentiated manner since 2016, when not only the concentration of the phenomenon (greater number of hectares of coca planted per square kilometer) but also its persistence began to acquire importance. Starting with the geographic delimitation, a process of analytical deepening began in these territories, where it became evident that there were social and economic factors that generated other types of incentives that could be determinant for the cocaine hydrochloride production process and the configuration of the entire drug trafficking chain.

The findings of the UNODC/SIMCI and Ministry of Justice fieldwork in 2021 indicate that there is a connection with the theoretical elements of the hotspot area definition from the economic perspective, insofar as these zones meet several characteristics established in the available documentation:

[103] Ministry of Justice and Law and United Nations Office on Drugs and Crime (UNODC), Illicit Economies Measurement Report. (Bogotá, 2019). Confidential document.

- The existence of a global market.
- A territorially defined economy.
- Markets influenced by external actors, for example, through prices imposed by illicit drivers; a significant investment component to guarantee production from outside the hotspot area territory and production destined primarily for export.
- High level of social and political instability including illegal participation by the community associated with the territory, among other similarities with the hotspot area definition.

This *territorially defined economy* is based on the fact that territories with special characteristics[104] progress until they become hotspot areas. Their constitution requires initial conditions that allow for persistence and illegal control; subsequently, a high concentration and persistence of coca cultivation, which added to the local territorial control and the approaches of the TCOs, allows for the stockpiling of significant volumes of cocaine, both cocaine hydrochloride for international trafficking and raw materials necessary for its production (coca leaf, coca paste and cocaine base).

However, different changes in the actors and their relationships were necessary for this sequence to occur (see section "*Changes in the presence of actors and how they interact*"). These changes in the key actors, henceforth characterized as dominant, have led to incentives for increasing productivity levels in the plots; in situ integration and linkage (backward with their suppliers and forward with their clients), and production process specialization (cultivation and processing).

The constitution of hotspot areas is a new phenomenon about which there is still scarce information. This shortcoming must be taken into account in the territorial diagnosis, as well as in the formulation and implementation of intervention strategies and, of course, in the identification of research lines. To summarize, the relationships with the illicit drug market revealed to date in the hotspot areas are embodied in the following aspects:

- Coca/cocaine markets are powered by the implementation of *dominant strategies*, the result of local articulation (direct or indirect) with a global illicit drug trafficking business. Dominant strategy implementation is made possible by the existence of cultures that accept the illicit trade and are deeply rooted geographically speaking. Such strategies are developed in a differentiated manner from one hotspot area to another, which is expressed in the use of particular cultivars, yields, agricultural management, cultivation densities and different subordinations to strategies that are also differentiated.

  For instance, as part of the Characterization of the *Catatumbo and Valdivia-Tarazá-Cáceres* hotspot areas study, coca growers and villagers interviewed stated that the IAGs control most of the hotspot areas, although forms of domination are not the same and this explains the differences in the crimes registered in both territories.

[104] The analyses proposed in this document were carried out considering the findings of the study by the Government of Colombia and UNODC, Characterization of two productive hotspot areas.

Resulting from the *dominating and dominated game of strategies*, the IAG contributes in determining the price, as well as in defining a "tax" on transactions and authorizing the presence of buyers at the local level. Within the hotspot area, the non-respect of these and other rules that they establish for security and coexistence imply violent solutions. Thus, the price is not only the sum of the production costs of coca/cocaine, but also of the costs incurred by the IAG's risk in managing the illicit trade and facilitating connections with the local TCOs as an intermediary.

- On the other hand, the hotspot areas report the existence of sufficient *institutional fragility* (IF), measured with a compound index that expresses the state of governability-governance in the municipalities in which the hotspot area has been consolidated. The IF condition enables the generation of sites for coca cultivation and its processing into cocaine. The dominant strategy in this scenario is simultaneous with the dominated strategy that provides, through informal agreements, participation in the development of benefits from the illicit trade[105] and the erosion of the necessary consensus to be able to develop a broad pro-development public administration and effective crime control.

  The conditions that allow the hotspot area configuration must be approached from a multidimensional perspective that considers the social, economic and institutional relations that have been consolidated as an alternative of illicit territoriality:

  when the migration problem started, there were very cheap products... the value of cattle, chicken production, fish farming, a lot of things, and everything was very low, and it was not competitive, so that made people opt for illicit crops (Interview with social actor, Catatumbo, 2021).

  This indicates that, due to economic conditions, the production of licit economic products was devalued, reducing the possibility that activities other than coca cultivation could be profitable. This would also justify why the villagers and coca growers consider that in addition to being the most profitable option, coca cultivation is in fact the only alternative. Villagers expressed that most of the agricultural products traded in the region (both in Catatumbo and Valdivia-Tarazá-Cáceres) come from other departments and regions and that local production is not enough.

  Institutional and social actors consulted mention, in addition to the economic problem, the existence of geographic and environmental conditions that facilitate the consolidation and establishment of the crop. The sources consulted agree that the location facilitates the routes, while half of them think that the geographic or environmental conditions favor cultivation; these perceptions are stronger among those who live within the hotspot area. In this regard, several explanations for these geographic determinants were found from the qualitative approach, for example:

[105] In light of the findings of the study by the Government of Colombia and UNODC, Characterization of two productive hotspot areas.

[...] the geography of the region, because it makes it very difficult for law enforcement forces to be present in those places (Interview with institutional actor, Catatumbo, 2021).

[...] one of the issues is that they have brought people from other places to grow crops here in this region, because here they say that it grows faster, has better quality and is easier to market (Interview with institutional actor, Catatumbo, 2021).

This zone is a strategic zone, because it is a border zone, it is easy to buy, so because it is a strategic zone it is cultivated on a large scale, it is also sold, so there is a lot of commerce and there are routes to distribute it (Interview with social actor, Catatumbo, 2021).

The geography here helps us tremendously for this matter, aside from the fact that we are in the middle of two rivers, Cauca and Nechí, aside from that we have many exits at our disposal, we go out to Cáceres, we go out to Valdivia, to Yarumal, we go out to the Port, so the geography itself helps us, it helps us a lot, enormously, to grow illicit crops (Interview with social actor, Valdivia-Tarazá-Cáceres, 2021).

In analyzing their characteristics, the following stand out: 1) connections to international markets; 2) since these areas favor productive linkages, they tend to be zones with high levels of political and social instability; and 3) community participation in illegal activities is promoted, among others. Each of these is explained below.

Markets heavily influenced by external agents

While the need for a deeper understanding of the functioning of the identified hotspot areas persists, based on the analysis of two of them[106] (Catatumbo and Valdivia-Tarazá-Cáceres), some incentives and rules for their formation and consolidation were identified as diverging from conventional legal market structures and their price-based competitive equilibrium.

Price setting is understood as the way in which prices are set, resulting not only from the costs of inputs, services, labor and capital associated with coca/cocaine production, but also from the costs related to illegal territorial control stemming from the IAGs and the illicit drug trade.

This dynamic is highlighted in the characterization of the Catatumbo and Valdivia-Tarazá-Cáceres hotspot areas, based on the identification of the aforementioned strategies[107]. Although there is a clear benefit for the community associated with the crop, the extraordinary profits of drug trafficking derive from the risk assumed by the IAG, which is expressed in the informal agreements to purchase the entire coca product and its derivatives for their final destination, transport and sale.

[106] Government of Colombia and UNODC, Characterization of two productive hotspot areas.

[107] The instruments developed in game theory are used. Tao You, Hailun Zhang, Ying Zhang, Qing Li, Peng Zhang, Mei Yang, "The influence of experienced guider on cooperative behavior in the Prisoner's dilemma game". Applied Mathematics and Computation 426, (2022, August 1), doi: 10.1016/j.amc.2022.127093; Juan Shi, Die Hua, Rui Tao, Yunchen Peng, Yong Li, Jinzhuo Liu, "Interaction between populations promotes cooperation in voluntary prisoner's dilemma." Applied Mathematics and Computation 392, (2021, March 1), doi: 10.1016/j.amc.2020.125728; Garrett Hardin, "The Tragedy of the Commons: The population problem has no technical solution; it requires a fundamental broadening in morality." Science 162, no. 3859, (1968, December 13), doi: 10.1126/science.162.3859.1243. See Alessio Carrozzo Magli, Pompeo Della Posta, and Piero Manfredi, "The Tragedy of the Commons as a Prisoner's Dilemma. Its Relevance for Sustainability Games." Sustainability 13, no. 15 (2021), doi: 10.3390/su13158125), for cooperative games and strategic Nash equilibria where, in terms of profit, it is more costly to exit than to stay.

Concerning the control of the IAGs and their dominant strategy, the ethnographies show the following:

According to conversations with coca growers and inhabitants of the township, these sales points are defined by the buyer as authorized by the illegal organization, taking into account security factors. Coca base is transported through the main roads of the municipality. (Ethnography, Catatumbo, 2021).

This risk implies three considerations: 1) upon determination by an armed illegal actor, the use of force and disproportionate violent actions (henceforth violent imposition) against individuals in the community[108] is evident, a strategy associated with the determinants that shape the price. Thus, in some zones within the hotspot area, coca-cocaine prices do not seem to generate income incentives, however, these would not include the acceptance of the transaction under violent imposition scenarios, in favor of an action without harm; 2) in the prices determined under the violent imposition scenario, the benefit of the community members is incorporated, in order to seek the common good under that scenario[109], and 3) as any other economic dynamics, this has generated an acceptance culture of the rules and norms implicit in the consolidation of these markets[110].

Social and political instability

The security conditions and illegal territorial control could be analyzed as a basic strategy to consolidate the concentration and persistence of illicit activities associated with coca cultivation and processing. The establishment and consolidation of hotspot areas associated with coca and its transformation have the condition of being spaces where the legitimate State is faced with an order without prior legality, and which opposes with its practices what is historically and socially accepted[111]. In the security dimension, two consequences could be drawn:

1) that there are limitations in the construction of social development and control by the State in hotspot areas, and that rules outside of what is legitimately accepted prevail; 2) that the subversive/military confrontation deepens the ignorance of legitimacy, which impacts the political-economic project embodied by the State, widening the distance between the local citizen and the public authorities.

[108] Ombudsman's Office, Special risk report: "violence and threats against social leaders and human rights defenders" (Bogota: Author, March 30, 2017), https://repositorio.defensoria.gov.co/bitstream/handle/20.500.13061/165/INFORME_ESPECIAL_LIDERES_30-03-17_1.pdf?sequence=1&isAllowed=y. According to the report, during that time a high degree of retaliation and attack risk was identified against community spokespersons, defenders and representatives of victims and other vulnerable populations for the complaints they file or for the vindication of community rights.
[109] International Crisis Group, Colombia's Armed Groups.
[110] International Crisis Group, Watch List 2022.
[111] Norbert Elias, The civilizing process (Mexico: Fondo de Cultura Económica, 1987); Jirí Šubrt, "Time and the Civilizing Process". In: The Sociology of Time (Palgrave Macmillan, Cham, 2021), https://doi.org/10.1007/978-3-030-83289-6_2; Aristóteles Kallis, "'Counter-spurt' but not 'de-civilization': fascism, (un) civility, taboo, and the 'civilizing process'". Journal of Political Ideologies 26, n.º 1 (2021), doi: 10.1080/13569317.2020.1825278.

Hence, the security problem would have two sources to consider: the one derived from drug trafficking action and its *dominant strategy* proposal that has been established with the acceptance of informal agreements or *dominated strategy* by the communities within the hotspot areas; and challenging the existing legitimate control in the zones of influence of the illicit organizations. Both variables point to the consolidation of broad areas of the national geography, where the State is unable or has difficulties to implement itself in its legitimate integrity.[112]

When analyzing the homicide rate per 100,000 inhabitants at the municipal level in 2015 compared to 2021, one could infer that the current presence of IAGs, particularly in hotspot areas, was determined by a homicide increase strategy.[113]. This can be understood as a proxy variable to the perception of citizen security, its impact on security conditions, insofar as the actors of this crime are IAGs or common crime. However, the perception of coca growers and villagers about the dominance of the IAGs rules out the impact on common crime in areas with hotspot area conditions.

Crime growth trends are clearly positive in municipalities with coca; contrasting homicide rates reveals that the current presence of IAG, particularly in hotspot areas, is highly correlated with the increase in homicides[114]. Another noteworthy fact is that in 2015, which marks the beginning of hotspot areas identification, the difference in violence between municipalities with coca within the hotspot area and municipalities with coca outside the hotspot area was insignificant[115] indicating that the existing gap in 2021 between these municipalities responds, to some extent, to the dominant strategy of violent imposition exercised by the IAGs for the consolidation of illicit activities in these territories.

The hotspot area is a terrain of special consideration due to the clashes among IAGs for the control of the area or coca production. The homicide rate trend in the Pacific and Central regions between 2015 versus 2021, evidences the existence of hotspot areas with violent connections in the solution of their conflicts; among them those corresponding to the war between the IAGs in the area with a peak in 2018 from which homicides decreased and the zone of coexistence widened, as expressed by the Ideas for Peace Foundation (2022)[116] in its report.

[112] Elias, The civilizing process ; Elena Chebankova and Piotr Dutkiewics, "Ideology and civilizational discourse". In: Civilization and World Order, edited by Elena Chebankova and Piotr Dutkiewics, 42-58 (Nueva York: Taylor & Francis Group, 2020), doi: 10.4324/9780367822378-2; Kallis, "'Counter-spurt'"; Arqom Kuswanjono and John Abraham Ziswan Suryosumunar, "Analyzing the Role of Moral Values in the Development of Human Civilization Post-Industrial Revolution 4.0". Review of International Geographical Education (RIGEO) 1, n.º 4 (2021), doi: 10.48047/rigeo.11.04.159.

[113] Analysis at the municipal level based on the data of the area detected with coca in 2015 and 2021, separating the following elements: 1) municipalities that register zones with hotspot area conditions; 2) municipalities that register coca cultivation without hotspot areas, and 3) municipalities that do not register coca cultivation. Data for the indicator "Homicides at municipal level" (as of June 2022) were obtained from the Ministry of National Defense, Disaggregated Statistical Information. "1. Crimes against life and personal integrity", https://www.mindefensa.gov.co/i j/portal/Mindefensa/d?NavigationTarget=navurl://7abde66c1fa4f0422ba2a1807437741d.

[114] Compared to municipalities without coca, municipalities with coca/with hotspot area presented in 2015 a homicide rate 1.8 times higher (between 0.3 and 5.7); this difference in violence has increased, reaching homicide rates, on average, 2.6 times higher (between 0.3 and 9.5) by 2021.

[115] When comparing the same with the municipalities with coca/without hotspot area, these municipalities reported a homicide rate in 2015 between 0.9-2.2 times higher (on average, 1.7 times higher), while in 2021 the rate was estimated between 1.3-3.0 times (on average, 1.8 times higher); although the averages do not suffer significant variations, the intervals are shifting with a tendency to increase.

[116] FIP, "Neither peace nor war".

Community involvement in illegal activities

According to the perception of the actors consulted within the hotspot areas, there are two major differences between the perspective of coca concentration and its relation to the local presence of IAGs: 1) the illegal armed actors provide security to develop these activities related to coca cultivation and its transformation into cocaine, or 2) because someone forces the farmers to start coca cultivation.

According to what was said by the actors, the main participation of the IAGs is evident, as well as the strategies used for the collection of cocaine base in the region:

[...] people already know who's who, there is a person here who buys, who is authorized to buy drugs, he is the one who practically collects them, he is the buyer for the illegal groups... The illegal groups buy them, there are mafias in charge of buying drugs... Commercialization is done confidentially, they are not so blatant as to say, I'm not going to put them here in a field or in the park, this is a matter of great secrecy.

(Interview with local authority, Catatumbo. 2021).

CHAPTER 3

Regional context

Geographic, cultural, and biophysical diversity is a substantial feature of the composition of the Colombian territory and, likewise, of the dynamics of coca crops and drug production. This situation highlights the need to understand Colombia as a country of regions, where the design of mechanisms to address the problem of illicit crops must consider these peculiarities. Although each region affected by coca crops experiences similar problems such as population displacement, poverty, presence of armed groups and difficult access conditions, inter alia, the characteristics and magnitude of these problems are different and, as a whole, constitute a particular scenario with conditions associated with the characteristics of the illicit crop production chain.

The Sistema Integrado de Monitoreo de Cultivos Ilícitos (SIMCI, from its name in Spanish, or Integrated Illicit Crop Monitoring System), since 2005, based on the dynamics of the location of coca crops and the identification of drug production mechanisms, has defined eight regions made up of departments. In Colombia, the departments are fundamental territorial units of the political-administrative division of the State, with political and administrative autonomy. One of the instances to face the problem of illicit crops is the Departmental Drug Committee, the main scenario of coordination between the territories and the central government, in charge of implementing the drug policy and defining strategies in the territories through the formulation of the Comprehensive Departmental Drug Plans[117]. Accordingly, the SIMCI project disaggregates and presents data and analysis of the dynamics of coca crops at regional and departmental levels as an input for the agencies that manage and make decisions in these geographic spaces.

This chapter is comprised of the concepts of area identified as of December 31st, 2021, and the measurement of productivity on a regional scale. It is necessary to mention that for production calculations, the concept of productive area is used, defined as the area adjusted according to the conditions that affect productivity throughout the year[118].

[117] Ministry of Justice and Law, V National Meeting on Drug Policy, https://www.minjusticia.gov.co/programas-co/ODC/Paginas/VEncuentro-Nacional-Politica-Drogas.aspx.

[118] Scenarios are defined to quantify the stability of coca crops using as reference the polygons interpreted in the two cutoff dates as of December 31st, 2021. The method consists of the systematization of spatial analysis for each level of available information (forced eradication, aerial spraying, areas without information and vegetation cover). The methodology is designed to consider the greatest number of variables that affect the continuity of coca crops, and three main classes are defined: Stable: areas existing in the current census (t) and in the previous census (t-1); New: areas existing in the current census (t) but not in the previous census (t-1); and Abandoned: areas not existing in the current census (t) but existing in the previous census (t-1).

In summary, the chapter emphasizes the location and trends of coca crops, the characteristics of coca leaf growing and production, as well as the price dynamics of coca leaf derivatives. It is structured in sections by region, where the reader will find two sections: the first with an infographic summarizing the most representative findings of the region and the second with a detailed analysis of the four aspects mentioned above.



Coca crops 2021: Putumayo-Caquetá region

Putumayo-Caquetá ranks **fourth** among the regions with the largest area with coca crops and contributes **16 %** of the national total with **31,874 ha**.

45 % **increase** compared to 2020

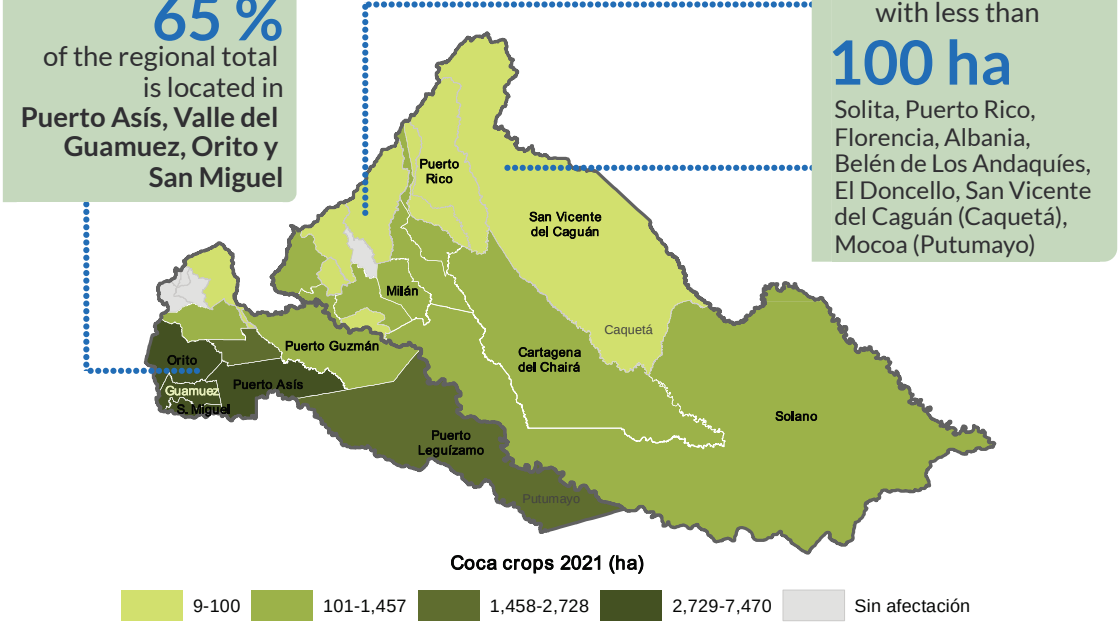
2 departments and 29 municipalities in the region

24 **municipalities impacted** in 2 **departments**

65 % of the regional total is located in **Puerto Asís, Valle del Guamuez, Orito y San Miguel**

8 municipalities with less than **100 ha**

Solita, Puerto Rico, Florencia, Albania, Belén de Los Andaquíes, El Doncello, San Vicente del Caguán (Caquetá), Mocoa (Putumayo)



Putumayo-Caquetá is affected differently per department, with the largest amount of coca crops occurring towards the border with Ecuador. The **Orito-Vides** and **Frontera Putumayo** hotspots continue their consolidation process due to the high concentration of coca cultivation and other characteristics related to coca cultivation and other characteristics related to production.

Production of coca-cocaine



27,540 ha

Productive area 2021

(Area adjusted according to the conditions that affect its yield throughout the year)



190,027 mt

Potential production of fresh coca leaf

Cocaine base yield **10.8 kg/ha/year**

Total cocaine base production **297 tm**

Coca fields profile

Productivity study updated in 2021



6.9 mt/ha/year

Average annual yield of fresh coca leaf (mt/ha/year)



3.5

Number of harvests per year (average)



46 % of the coca fields

most productive age (2 to 4 years)



10,100 plants/ha

Density (number of plants per productive hectare)



106 cultivars

Predominance:
Chipara (9 % fields)
Orejona (7 % fields)
Cuarentana (7 % fields)



55 %

Coca farmers produce **cocaine base paste**

Prices



Fresh coca leaf

COP 2,500 kg

17 % reduction compared to 2020



Cocaine base paste

COP 1,875,000 kg

12 % reduction compared to 2020



Cocaine base

COP 2,280,900 kg

21 % reduction compared to 2020



Cocaine hydrochloride

COP 3,894,600 kg

9 % reduction compared to 2020

Regarding 2020, there was an increase of 45% in the area with coca crops, disrupting the downward trend of the last three years and returning to values similar to those identified in 2016. In 2021, 31,874 ha were identified, out of which 88% are located in Putumayo. This department reported 28,205 ha, 1.4 times more coca than the previous year, which places it in the third place of territories with the greatest impact nationwide. As for Caqueta, it shows a 79 % growth compared to 2020, reaching 3,669 ha, with a differentiated dynamic between the municipalities bordering Putumayo and those in the north of the department. Caquetá reported almost 12,000 ha in 2017 (Figure 13).

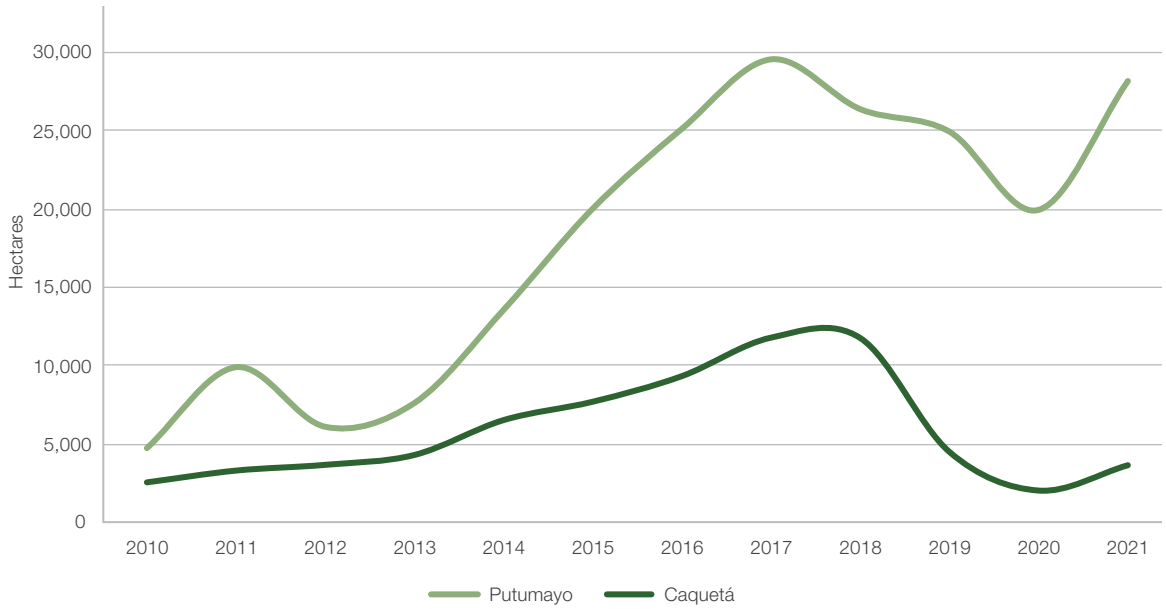


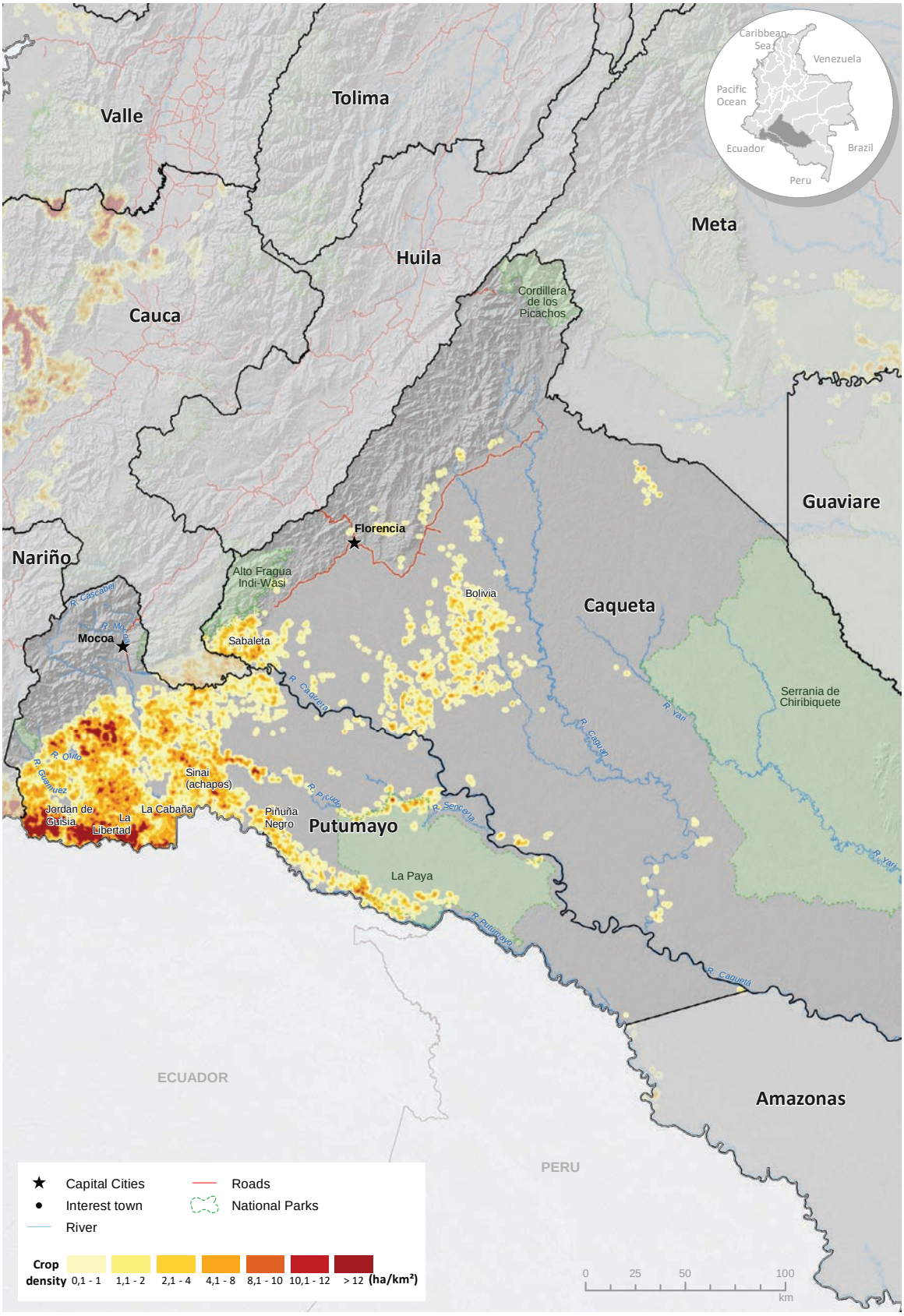
Figure 13. Area with coca crops in the departments of the Putumayo-Caqueta region, 2010-2021

The hotspots of the Border Putumayo and Orito-Vides are located in the region, areas with the highest concentration of coca crops per square kilometer (25-73 ha/km^2); between them, they account for 4.6 % of the total national coca crops and 11 % of the total coca in hotspots.

In the border area, by the San Miguel River basin, the Putumayo Border hotspot, with a privileged position for the integration of the production chain and a territorial extension of approximately 650 km^2 with 7.800 ha of coca crops is being further strengthened. Similarly, the Orito-Vides hotspot, with a much smaller extension (130 km^2), showed a growth of 300 ha from one year to the next (map 4).

On the other hand, in permanently affected areas (10 years) there was an increase of 45 % with respect to 2020.

Map 4. Coca crops density in Putumayo-Caqueta region, 2021



Sources: Colombian Government; National coca cultivation monitoring system supported by UNODC; for national parks: Natural National Parks of Colombia. The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations.

Regarding the territory distribution of the Ruta Futuro (Future Route) policy, 59 % of coca crops were located in strategic management areas such as border areas (9,700 ha) and productive integration areas (8,400 ha) close to Putumayo's municipal capitals such as Puerto Caicedo, Valle del Guamuez, Puerto Asis, Orito and San Miguel, followed by the buffer zones of the PNN (National Natural Parks, 750 ha). The remaining coca crops is mostly located in free intervention zones (8,000 ha). Finally, a low percentage for the region is located in special management areas such as Indigenous Reservations (10 % of the region's total) and Forest Reserve Areas (3 %) (Figure 14).

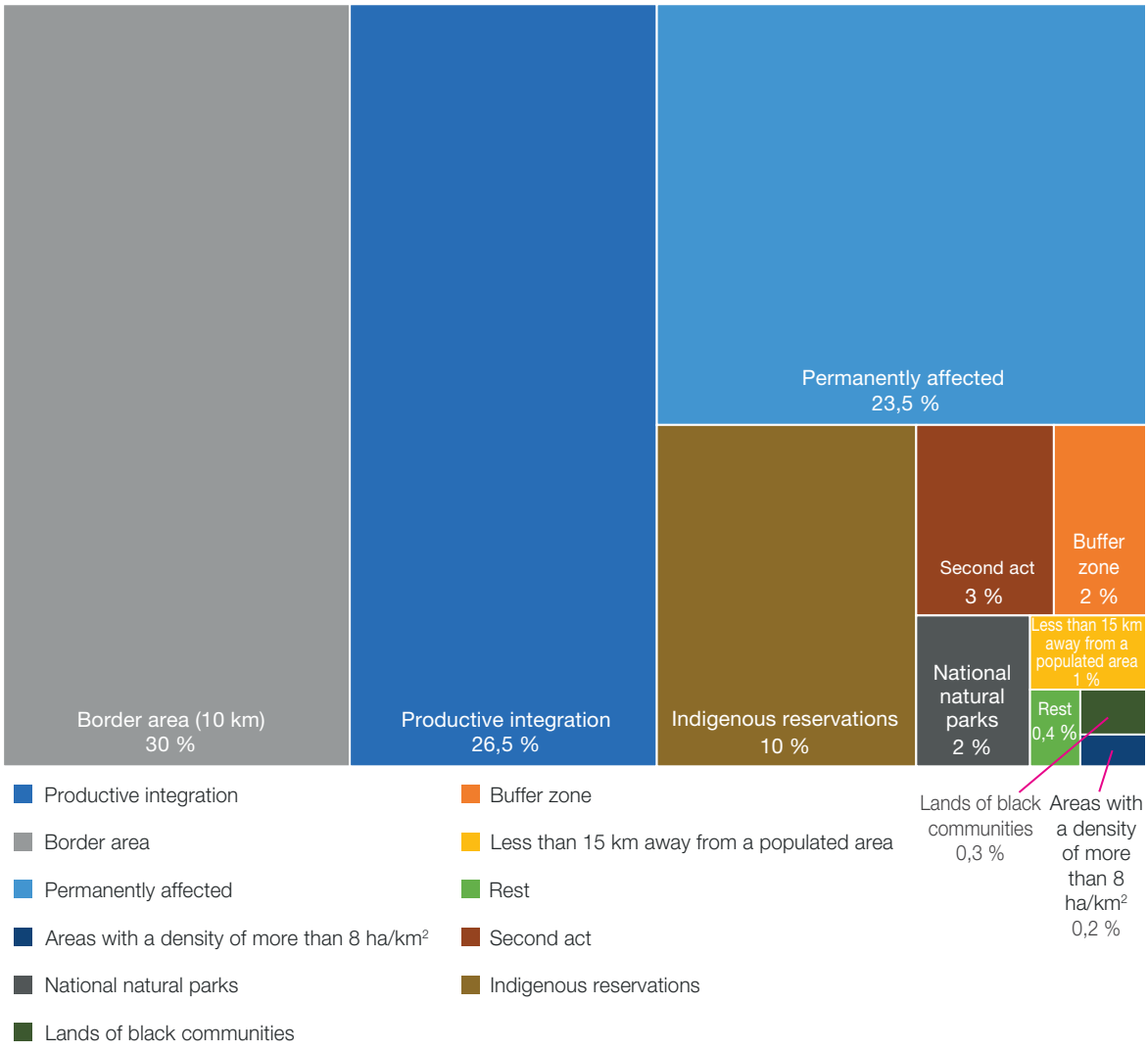


Figure 14. Distribution of coca crops according to Ruta Futuro policy, 2021

Consolidated border area with the existence of coca crops and the presence of national illegal armed actors and transnational criminal groups

The update of the coca crops productivity studies in the Putumayo-Caqueta region revealed the following findings: 1) the development of two hotspots areas (Putumayo Border and Orito-Vides) was verified; 2) more crop yields are reported in less territory; 3) there is greater capacity to obtain fresh coca leaf per hectare; 4) there are changes in agro-cultural practices by the Agricultural Producer with Coca (PAC, from its name in Spanish), in order to obtain greater yields (technical improvements in growing techniques per stake, use of agrochemicals, lower plant density, inter alias; 5) there is a decrease in the size of the Agricultural Production Units with Coca (UPAC, from its name in Spanish), which went from being medium-sized (between 10-50 ha) to small (between 1-10 ha); 6) there is greater participation of the grower, about 53% in the transformation of the leaf to PBC and BC, and 6) the use of key chemical substances in the coca leaf transformation processes.

Characteristics of coca leaf growing and production

In the 2021 study, it is observed that the yield indicators of coca crops in Putumayo-Caqueta have increased since the studies carried out in 2005. In this report, the existence of more productive coca crops was evidenced with the improvement of agricultural practices, shorter harvesting times, characteristics that allow obtaining a higher yield of coca leaf in less territory. The following is an analysis of the trends of the main variables that characterize the productivity of coca crops in this area:

1. ***Decrease in productive area[119] in the region:*** In 2021, the productive area reached a total of 27,540 ha: the majority, which amounts to 18,897 ha, is located outside the hotspots, and represents 68.6 %; the remaining 31.4% is made up of the Putumayo Border hotspots, with 7,222 ha (26.2 %) and Orito-Vides with 1,421 ha (5.2 %).

2. ***An increase in coca leaf production per hectare harvested per year was identified:*** From 2012 onwards, there is a growth in the following two phases, reaching 6,700 kg/ha/year in 2017 and 6,900 kg/ha/year in 2021, which represents an increase of 2.9 % compared to 2017 and 86.5 % compared to 2012.

   By 2021, in the hotspots of Border Putumayo and Orito-Vides, coca leaf production per hectare harvested per year reaches levels of 8,100 kg/ha/year and 7,500 kg/ha/year, higher yields than the rest of the region, which only reaches 6,500 kg/ha/year. Comparing the results of Stages V with those of the previous stages, this region has been characterized by a growth in the indicators of fresh coca leaf production per year since 2012. The lowest coca leaf production yields occurred in Phase III, where only 3,700 kg/ha/year were obtained.

[119] The productive area during the year is the result of the application of a spatial analysis methodology that allows the estimation of the continuity of coca crops through the construction of a factor that allows modeling, plot by plot, the dynamics of the cultivated area during the year, based on the incorporation and systematization of the available information of the variables that directly affect the stability, such as forced eradication, aerial spraying, and vegetation cover, inter alia. This figure is estimated by UNODC/SIMCI.

3. ***The trend in the region is towards a decrease in harvesting times:*** which represents a greater quantity of coca leaf for processing or sale for the PAC. In 2021, an average of 3.5 harvests per year will be recorded, representing a decrease of 16.7% compared to 2017 (4.2 harvests) and 10.3% compared to 2005 (3.9 harvests).

4. ***This region has low planting densities compared to the national average:*** This situation may be an indicator of a better use of nutrients in established crops by extending the distances between furrows. On average, around 10,100 plants per hectare are grown on a regional scale. The density in hotspots in this region tends to decrease, planting between 8,800-8,900 plants per hectare. This practice could have a high correlation with the increase in plot yield.

5. ***The increase in coca yields is related to the age of the plot:*** most of them are in their most productive stages (two to four years of age).

   According to the information reported by the PAC regarding crop age, it is found that both in the hotspots and in the rest of the region, crops aged between two and four years are the most productive ones, since together they represent 46.2% of the total plots and report yields between 8.1 and 8.3 mt/ha/year. Followed by plots less than one year old with 17.9% (yield of 1.7 mt/ha/year), plots between four and five and more than five years old with 12.6% (yields of 7.9 and 8.8 mt/ha/year)).

   Crops five years old and older in Stage V are the ones reporting the highest coca leaf yield (8.8 mt/ha/year), but only represent 3.6% of the total plots in the region. A constant feature in the age of the coca plots in the stages is represented by plots between two and four years old, with average yields between 8.1 and 8.3 mt/ha/year. This allows to understand that the plots between these ages are the ones that have boosted to achieve a higher coca leaf yield.

6. ***More cultivars are reported by the PAC:*** which can be cultivated alone or in mixtures, which could explain the higher production of coca leaf. The different common names do not correspond to different taxonomic varieties. The main characteristics they seek is that they are more productive in coca leaf and with better extraction yields of cocaine base paste (PBC, form its name in Spanish). In this region of southern Colombia, about 106 cultivars are reported, among the main yields and cultivars reported by PAC are: “chipara/boliviana (11.9 mt/ha/year)”, “boliviana negra/rosada (10.6 mt/ha/year)”, “pecueca/chipara (11.9 mt/ha/year)”, “cuarentana (7.8 mt/ha/year)”, “chipara (7.6 mt/ha/year), “boliviana negra and tingomaría (7.5 mt/ha/year)” and “rucia (4.6 mt/ha/year)”, all of which have appropriate characteristics for each PAC.

7. ***Agro-cultural best practices:*** According to the reports of this study in the Putumayo-Caqueta region related to the ways of reproduction of coca plants, the most used planting methods by farmers are stakes, which reaches 95.7% of use, followed by the use of seeds, which reaches 3% of the total. The use of stakes allows the PAC to adapt more effectively and quickly to the weather

conditions of the region in order to obtain harvests in a period of 3-4 months, which would allow a greater number of harvests and, therefore, produce more coca leaf.

Dynamics of the capacity to produce cocaine base and cocaine paste in the region

There are changes in the productive specialization within UPAC: in 2021, 55.4 % of farmers process PBC compared to 51.6 % in 2017, which represents an increase of 7.4 % and, as in the 2008 study, farmers who process the leaf to obtain cocaine base reappear; it is also reported that 11.2 % of the farmers carry out this refining process with potassium permanganate. Finally, there was a decrease of 14.3% in the number of farmers selling coca leaf directly to other processors in the region.

81.1% of the growers report that they sell their crop yield in the same UPAC, 17% do so in the rural areas of the municipalities in this region and only 1.7% do so in the municipal capital. In addition to these results, it is important to note that, in the study of Profiling of infrastructures and dynamics of illicit cocaine hydrochloride production (2021)[120], the different focus groups of institutional and subject matter experts reported that the majority of illegal groups establish who are the people who can move around the area to purchase cocaine paste and base; this is the preferred method for acquiring this type of product due to the territorial control exercised by these groups.

On-farm PBC processing activity in this region continues with the growth trend that has been occurring since Stage III. This indicator may be related to the increase in the productivity of coca crops and the yield of PBC extraction processes in recent years. It is also possible to assert that growers have specialized in PBC extraction processes, with small infrastructures and qualified personnel, in order to obtain greater economic benefit from this processing. Regarding the on-farm PBC extraction capacity, in 2021, farmers reported that for each ton of fresh coca leaf they obtained an average of 2.20 kg of PBC; this implies a slight decrease in the basic paste yield per ton of fresh leaf, compared to what was reported in 2017 (2.21 kg/mt).

Pricing dynamics[121]

When analyzing the price trends of these coca derivatives since 2005 (base), the prices of coca leaf and cocaine hydrochloride showed a slight increase. In 2005, coca leaf and cocaine hydrochloride were sold at COP 2,050 and COP 3,516,700 respectively; by 2021 these prices increased by 21.9% (COP 2,500) and 10.7% (COP 3,894,600) comparatively. The opposite case happens with the prices of coca paste and coca base, which show constant decreases in this period: in 2005 these two products were sold at a similar price of around COP 2,680,000, but by 2021 the difference between them is exacerbated and the price of coca paste in 2021 (COP 1,875,000) decreases by 30.1 % and coca base decreases by 15 % (COP 2,280,900).

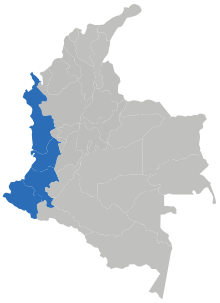
[120] Government of Colombia and United Nations Office on Drugs and Crime (UNODC), Mapping of infrastructure and dynamics of illicit production of cocaine hydrochloride, 2021. Restricted document.
[121] Current prices for the year 2021.

Compared to the previous year, both coca leaf (fresh) and PBC prices decreased by 16.7% and 11.8%. Cocaine base and cocaine hydrochloride also decreased their prices by 21% and 9.2%, respectively, compared to that recorded in 2020.

The information collected in the study of Mapping of infrastructure and dynamics of illicit production of cocaine hydrochloride, 2021, indicates that coca leaf and cocaine paste/base are paid for in cash directly in the territory by the illegal armed groups (GAI, from its name in Spanish) and their corresponding envoys who control the region, and can only be sold to these groups or authorized envoys.

It is also known that, in these departments, several investors prefer to pay to produce the oxidized base and then take it to Cauca and Nariño, where the purchase prices exceed those paid in this region in order to obtain profits of up to COP 300,000 or COP 400,000 per kilogram. The risk is borne by the owners of the drug and the product is taken by couriers or private cars to Llorente in Nariño or Argelia in Cauca.

There is also the modality of production on demand or upon requests from some customers or GAI, which in turn have large orders from cartels in other regions to be delivered to the border with Ecuador, Peru, or Brazil. The times wherein the final product is transported can sometimes be up to 8-20 days to reach the final port, either to the Pacific coast, to Leticia in the Amazon region or Iquitos in Peru.



Coca crops 2021: Pacífico region

Pacífico ranks **first** among the regions with the largest area with coca crops and contributes **44 %** of the national total with **89,266 ha**.

76 % **increase** compared to 2020

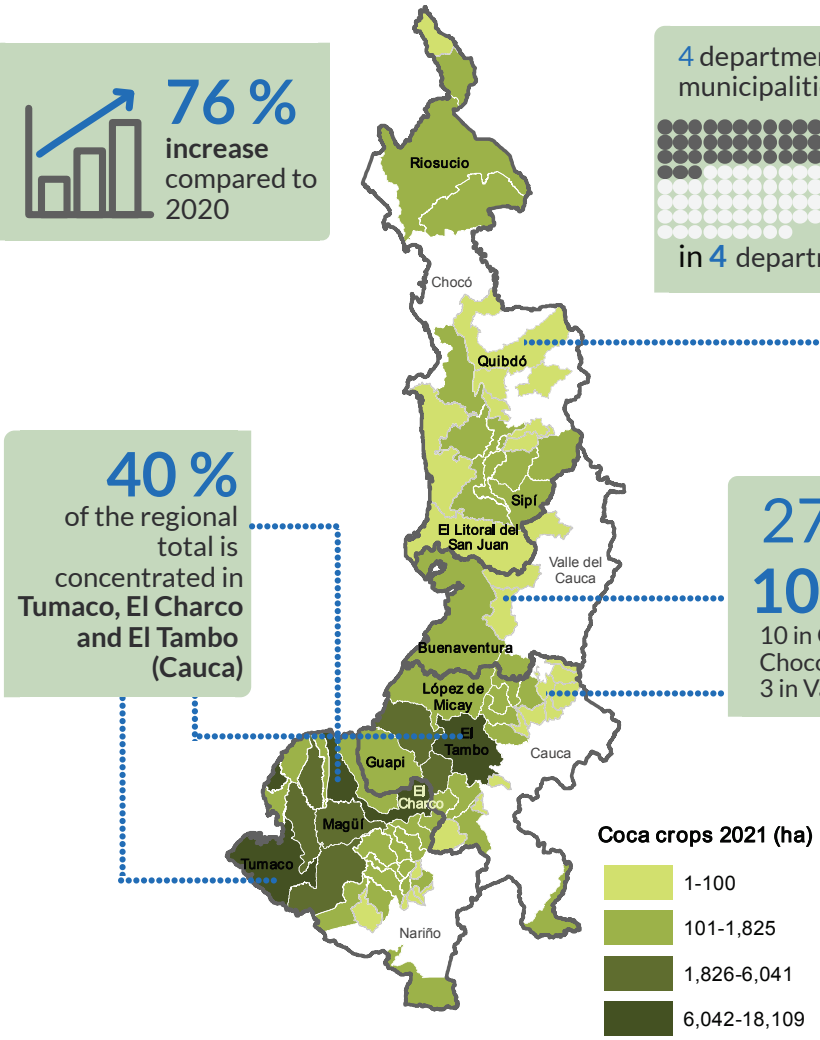
4 departments and 178 municipalities in the region

75 municipalities impacted in 4 departments

40 % of the regional total is concentrated in **Tumaco, El Charco and El Tambo (Cauca)**

27 municipalities with less than **100 ha**

10 in Cauca, 9 in Chocó, 5 in Nariño and 3 in Valle del Cauca



9 of the country´s **14 hotspots** are located in the region. El Charco-Olaya Herrera, Frontera Tumaco, Argelia-El Tambo and El Naya clusters remain, and five new ones were consolidated, one on the Cauca coast and four in Nariño, mainly in mountainous areas.

Production of coca-cocaine



68,917 ha

Productive area 2021

(Area adjusted according to the conditions that affect its yield throughout the year)



410,242 mt

Potential production of fresh coca leaf

Cocaine base yield 8.8 kg/ha/year

Total cocaine base production 607 mt

Coca fields profile

Productivity study updated in 2019



6 mt/ha/year

Average annual yield of fresh coca leaf (mt/ha/year)



3.9

Number of harvests per year (average)



53 % of the coca fields

most productive age (2 to 4 years)



7,900 plants/ha

Density (number of plants per productive hectare)



18 cultivars

Predominance:
Chipara (57 % fields)
Injerta (14 % fields)



85 %

Coca farmers sell **coca leaf**

Prices



Fresh coca leaf

COP 2,300 kg

21 % reduction compared to 2020



Cocaine base paste

COP 1,648,400 kg

19 % reduction compared to 2020



Cocaine base

COP 2,406,100 kg

4 % reduction compared to 2020



Cocaine hydrochloride

COP 4,123,400 kg

4 % reduction compared to 2020

The Pacific region continues to consolidate as the area with the highest concentration of coca crops and productive hectares of coca in the country: it contributes 44% of the detected area and 35% of the potential cocaine hydrochloride nationwide, a situation that is due to the convergence of several factors: the increase of GAI, greater concentration of crops, reduced intervention to control supply and better agro-cultural practices that have promoted greater yields.

The region showed an increase of 76% in the area with coca crops compared to 2020, reaching 89,266 ha, the highest figure in the last twenty years of monitoring. This trend is evident in all the departments that make up the region. In Nariño the figure almost doubled, reaching 56,516 ha, and in Chocó the figure tripled compared to 2020, reaching 5,061 ha (map 5).

As mentioned above, the trend towards crop concentration, combined with other factors, has encouraged the development of productive clusters[122], but there are also areas of expansion, mainly in the border zone with Panama, where 318 ha of coca were identified, almost five times the amount detected in previous years.

85% of the coca crops are located in the territory classified as "permanently affected" (37% of the affected territory). Despite not having a representative weight in the region, it´s noteworthy that 2% of coca crops are found in new areas, reaching 1,967 ha of coca, three times that of the previous year, demonstrating a dynamic of creation of new spots of coca crops, mainly in Chocó and some municipalities of Cauca (figure15).

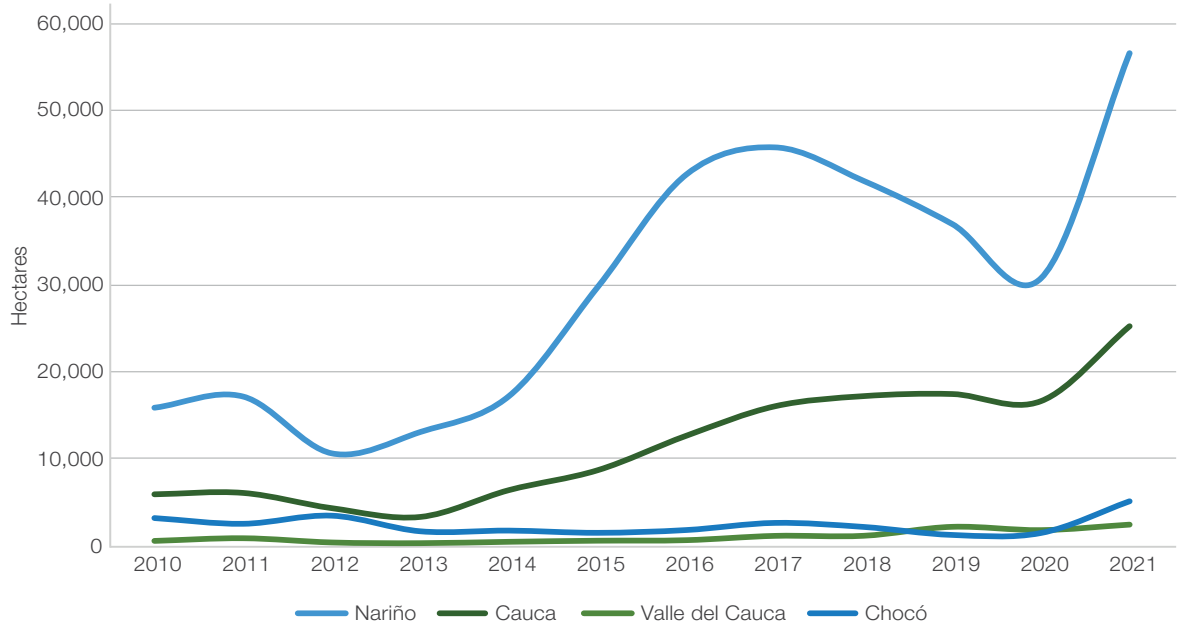
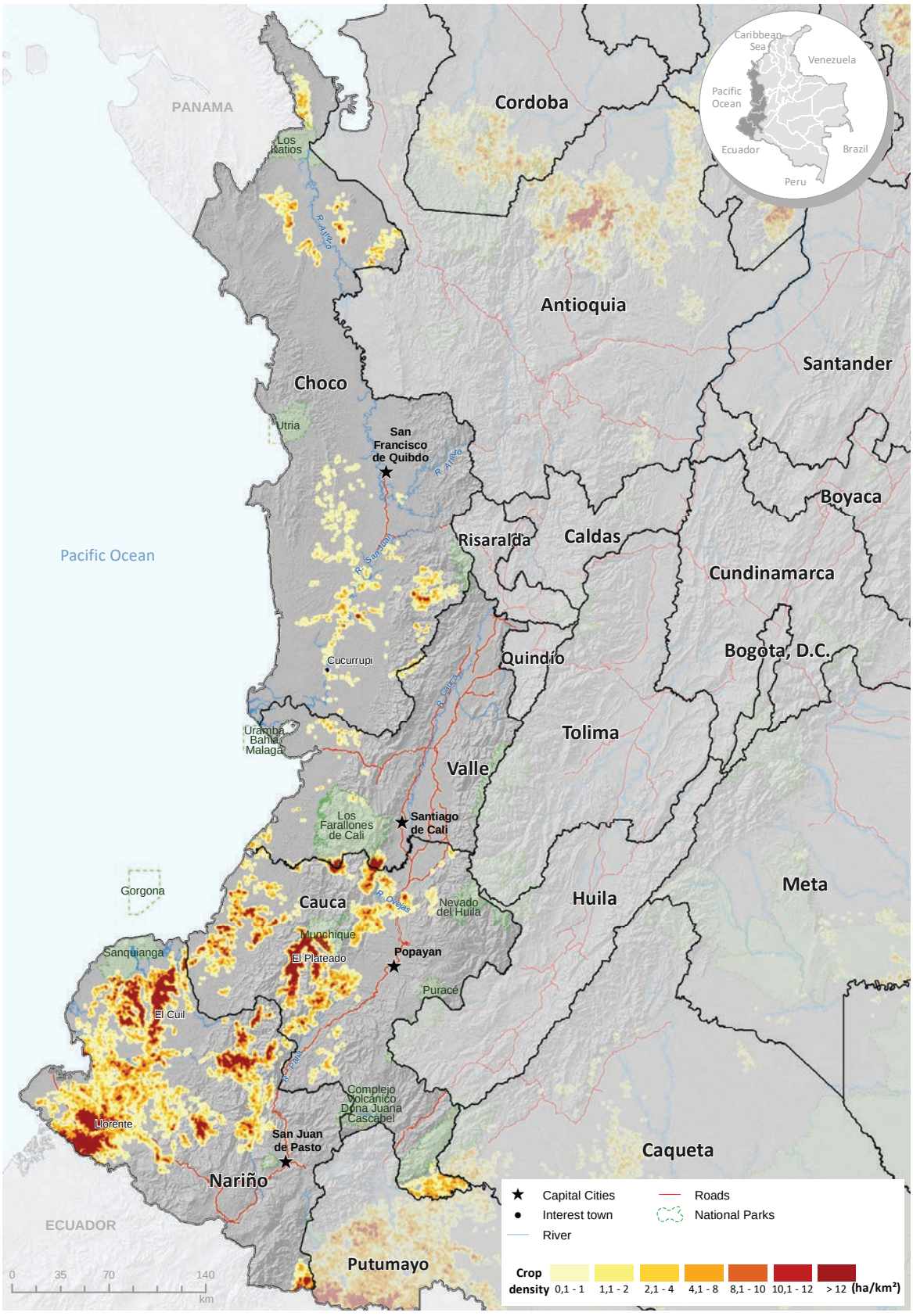


Figure 15. Area with coca crops in the departments of the Pacific region, 2010-2021

[122] The hotspots increased from four to nine in 2021 and are located in Nariño (El Charco-El Turbio, El Charco-Olaya Herrera, Frontera Tumaco, Policarpa-Patía, Roberto Payán-Isagualpi, Telembí-Cristal) and Cauca (Argelia-El Tambo, El Naya, Timbiquí-Saija). These hotspots have the highest densities of coca crops per square kilometer (between 25-70 ha /km2). In Valle del Cauca, on the border with Cauca, there is a hotspot in the Naya river basin, identified by the same name.

Map 5. Coca crops density in the Pacific region, 2021



Sources: Colombian Government; National coca cultivation monitoring system supported by UNODC; for national parks: Natural National Parks of Colombia. The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations.

With respect to the territory distribution established by the Ruta Futuro policy, 73 % of the coca is located in special management areas, which represents about 64,800 ha. In this category, the most affected groups are: Black Communities' lands (66 %), Indigenous Reservations (22 %), followed by protective zones established by the Law 2.a (10 %). In terms of the lands of the Black Communities, the area affected by coca in 2020 doubled from approximately 21,800 ha to 42,500 ha; 42% of the area in these territories is concentrated in only four municipal councils: Pro-Defensa del Río Tapaje (Pro-Defense of the Tapaje River), The Cordillera Occidental de Nariño COPDICONC (Western Mountain Range of Nariño), Alto Mira y Frontera and Río Satinga. The above suggests a challenge for the design of innovative strategies for the control of supply with emphasis on preservation mechanisms and collective actions.

In relation to the other Ruta Futuro groups, 18 % of the total coca crops in the region is concentrated in areas of strategic interest, with a participation of areas of productive interest (55%) and buffer zones (34%); the remaining is located in areas near the border (11%). Finally, for the free intervention areas, 90% of coca crops are located in permanently affected areas (figure 16).

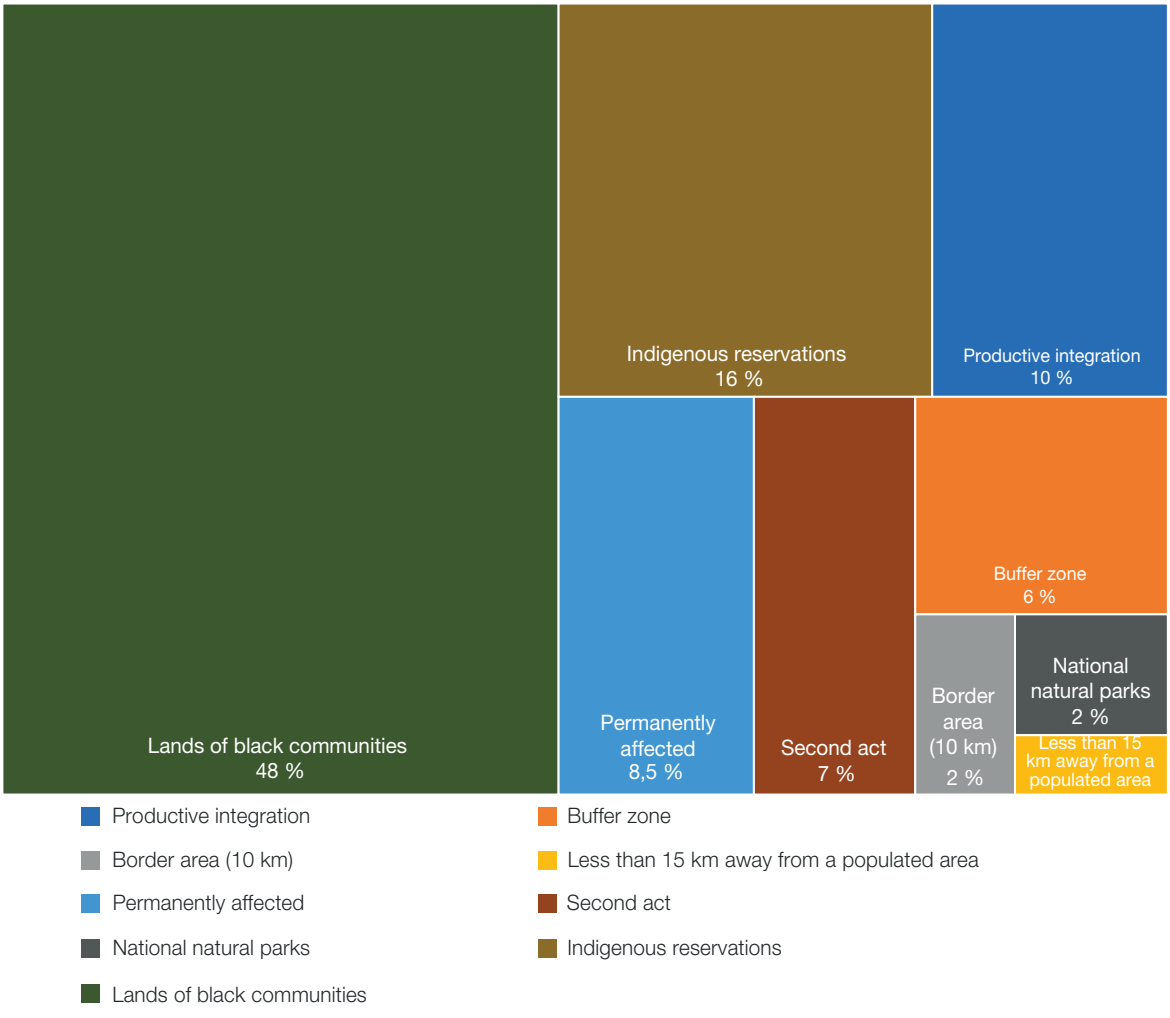


Figure 16. Coca crops distribution according to Ruta Futuro policy, 2021

Increase in detected and productive hectares and consolidation of five new hotspots

One of the factors that may influence the higher levels of crops and yields are the geographical conditions of this region, the availability of the river network and the possibilities of communication by sea, which have turned the Pacific territories into a strategic area for illegal activities associated with drug trafficking; in recent years, this region has become the scene of territorial disputes over the interests of the different illegal actors operating in the area[123].

Simultaneously with the increase in confrontations between GAI and the increase in the mechanisms of control over the territories in this region, there has been an increase in the areas with coca crops, which in turn has become an alternative for the peasant populations faced with the precarious socioeconomic conditions of their environment.

The Ombudsman's Office[124] has issued 79 early warnings, from January 2018 to December 2021, on the serious humanitarian situation on the Pacific coast. It points out in its different reports that, in addition to the presence of the National Liberation Army (ELN), the Gaitanista Self-Defense Forces of Colombia (AGC), national organized crime structures (the Clan del Golfo) and the different dissidents of the Revolutionary Armed Forces of Colombia-People's Army (Farc-EP), these organizations have further aggravated the dynamics of the armed conflict in this area, which is expressed in an increase in coca crops and in acts of violence and insecurity for the region. These organized armed groups (GAO, from its name in Spanish) have diversified their actions, as some of them have forged alliances, disputes or coexisted among themselves[125].

In addition to this scenario, according to the early warning 045-2020[126] and internal reports from the Ombudsman's Office, on the "ostensible involvement of Mexican cartels, who are reportedly providing financial support to both dissident factions and organized drug trafficking groups, which strengthens local armed actors to establish controls and borders in their areas of operation"[127]. Likewise, in some sections of the interviews with people from the region, it is stated that *"the community says that this is why it is not unusual to see armed people in the territory who do not identify themselves with any organized criminal group, but rather are alert to the movements of drug traffickers"*[128].

[123] Observatorio de Memoria y Conflicto del Centro Nacional de Memoria Histórica (Observatory of Memory and Conflict of the National Center of Historical Memory), Boletín Estadístico Trimestral de Eventos de Violencia del Conflicto Armado N.º 1 Región Pacífico (2021) (Quarterly Statistical Newsletter on Violent Events of the Armed Conflict No. 1 Pacific Region (2021), https://micrositios.centrodememoriahistorica.gov.co/observatorio/wp-content/uploads/2021/06/Boleti%CC%81n-Triemestral-OMC-N.-1-v7.pdf.

[124] Delegated Ombudsman's Office for Risk Prevention and Early Warning System, https://alertastempranas.defensoria.gov.co/?page=2&anioBusqueda=2021.

[125] Institute for Development and Peace Studies (Indepaz), Los focos del conflicto en Colombia. Informe sobre presencia de grupos armados (The hot spots of the conflict in Colombia. Report on the presence of armed groups) (Bogotá: Author, September 2021), http://www.indepaz.org.co/wp-content/uploads/2021/10/INFORME-DE-GRUPOS-2021.pdf.

[126] Delegated Ombudsman's Office for Risk Prevention and Early Warning System, EARLY WARNING N° 045-2020, https://sigdefensoria.defensoria.gov.co/satarchivos/alertas/2020/045-20.pdf

[127] Armed conflict reshapes in the Pacific region of Cauca after the promise of peace. El Espectador. 2021. https://www.pressreader.com/colombia/el-espectador/20210829/282776359634375 y Alerta temprana 045-2020. Páginas 7, 17, 19 y 20. https://alertasstg.blob.core.windows.net/alertas/045-20.pdf

[128] Ibid.

The main activities that are part of the illegal economies implemented by the GAOs in the Pacific territory are fuel smuggling, illegal mining, and drug trafficking. After the signing of the peace agreement, the scenario for these criminal actors changed from a context of confrontations between large armed structures to local and focused conflicts, with different dimensions and characteristics in each part of the region[129].

In 2021, this region accounted for 39% of the productive hectares in the country and a capacity to obtain fresh coca leaf of 6.0 mt/ha per year. The presence of a large number of new crops explains that this indicator is 1.6 % lower than in 2020, when 6.1 mt/ha per year was obtained.

The decrease in the potential coca leaf yield per hectare was overcome by the increase in the number of productive hectares of coca by 27.4%, which led to an approximate potential coca leaf yield of 410,000 mt, 24.1% higher than in the previous year.

In the latest update of yield surveys (2019), growers in the region reported producing 2.2 kg of PBC per ton of processed leaf (tantamount to 1.6 kg cocaine base/mt of leaf[130]).

Finally, the potential cocaine base production in the Pacific region is estimated to increase from 81 mt in 2005 to 607 mt in 2021; the region's contribution to the national total has increased from 8% in 2005 to 35% in 2021. In the last year, the potential cocaine base yield increased by 24.0% compared to 2020.

The increased capacity to obtain fresh coca leaf in the region seems to be due to the introduction of new cultivars, agro-cultural practices, and the age of the plots of land, among other key variables, which have contributed to an increase in annual yields from 2.6 mt of leaf per hectare in 2005 (at the time the lowest yield at the national level) to 6.0 mt of leaf per hectare in 2021. The trends of the main variables that characterize the yield of coca crops in this area will be analyzed below:

1. ***The preference for the use of more productive cultivars:*** Among the cultivars mostly used by growers are: chipara, with 57% of the total plots and a yield reported by the PAC close to 5.6 mt/ha/year. It is followed by grafted cultivar, with 14% of the plots and a yield of 5.8 mt/ha/year, and bonita, with 7% of the plots and a yield of 5 mt/ha. Growers are also planting a mixture of these two cultivars and others, wherewith they seek to produce more coca leaf and yields between 4.2 and 7.4 mt/ha.
2. ***A higher proportion of plots in their most productive ages:*** 53% of the coca crops are between 2 and 4 years old, considered the most productive ages, with an average of 3.9 harvests per year and yields between 4.8 and 5.3 mt/ha.
3. ***Increased presence of national and transnational criminal groups operating within the production and commercialization chain:*** This circumstance has an impact on the increase in yield potential. In the region,

[129] Fundación Ideas para la Paz (FIP), "Ni paz ni guerra. Escenarios híbridos de inseguridad y violencia en el gobierno de Iván Duque". Informe 36 (2022) (Ideas for Peace Foundation (FIP), "Neither peace nor war. Hybrid scenarios of insecurity and violence in the government of Iván Duque". Report 36 (2022) https://ideaspaz.org/media/website/FIP_Infome_NiPazNiGuerra.pdf.

[130] Considering that the purity of PBC is 60% and that of cocaine base is 80%.

it is estimated that 85% of growers sell coca leaf to other actors more specialized in the extraction of coca paste or cocaine base, and only 15% have their own infrastructure to extract the alkaloid from the coca leaf. These two phenomena explain the presence of the so-called "envoys", people sent by transnational criminal groups to ensure the delivery of the final product with the required purity and in the required time frame.

4. ***Changes in the UPAC, as well as in the coca-cocaine transformation infrastructure and the presence of new actors with different roles:*** involved in the production and marketing of both leaf and processed products, has had an impact on the steady increase in production potential over the last six years.

Pricing dynamics[131]

It is important to bear in mind that the price is not necessarily related to the available supply of coca leaf; factors such as the COVID-19 context and territorial control by the GAI, inter alia, could have influenced the shaping and determination of the decrease in the price of coca derivatives in 2021.

The presence of national and transnational criminal groups has led to changes in the general conditions of the coca-cocaine market:

- The role of the "envoy" is highlighted, as reported by the different early warnings issued by the Ombudsman's Office[132] and the investigation on the Mapping of infrastructure and dynamics of illicit production of cocaine hydrochloride, 2021[133], which have revealed that several Mexican cartels have arrived in the region to coordinate and guarantee the quality of cocaine production. The investors send envoys to represent them in the production zones and oversee the whole production process. They are also in charge of communications with the GAIs in the area for production and trafficking authorizations, both for the drug and for the chemical inputs needed for its production.
- Cartel envoys verify the weight and purity of drugs leaving Colombia, coordinate shipments abroad by sea or air and, in some areas, they fund the growing of coca leaf[134].
- In addition to money, there have been reports of drug-for-weapons bartering with the GAI as part of the payment modalities.
- The collection of taxes per kilogram of cocaine base and cocaine hydrochloride produced. The GAI in control of the territory sends to the laboratory a delegate responsible for keeping the inventories of cocaine paste/base and cocaine hydrochloride production, in order to control the payment of the tax per kilogram produced[135].
- Distinction of the final product and price depending on its destination. In areas such as Cauca and Nariño, the manufacture of three types of cocaine hydrochloride was described: the first, called "King", with a

[131] Current prices for the year 2021.
[132] Office of the Ombudsman Delegated for Risk Prevention and Early Warning System, EARLY ALERT No. 045-2020
[133] Government of Colombia and UNODC, Profiling of infrastructures.
[134] Luis Jaime Acosta, "Cuatro carteles mexicanos controlan la compra y el tráfico de cocaína en Colombia" (Four Mexican cartels control cocaine purchase and trafficking in Colombia), Reuters (2020, October 22nd), https://www.reuters.com/article/colombia-mexico-drogas-idLTAKBN2772D9.
[135] Government of Colombia and UNODC, Profiling of infrastructures.

high degree of purity and for trafficking to countries such as the United States and Europe; the second, called “Premium”, which is trafficked to Central and South America; and the third type of cocaine for domestic trafficking and consumption[136].

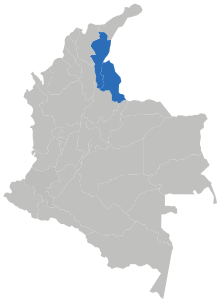
Altogether, the price behavior of coca derivatives in this region, during 2021, had a downward trend. Both coca leaf (fresh) and PBC reduced their prices between 20.7 % and 18.6 %. Likewise, cocaine base and the final product (cocaine hydrochloride) also had a price drop of 3.9% compared to 2020.

Analyzing the price trends of these coca derivatives since 2005 (baseline), the prices of coca leaf, coca paste, and cocaine hydrochloride showed a decrease. In 2005, these three products were sold at COP 3,750, COP 2,270,800, and COP 5,284,300 respectively. By 2021, these prices decreased by 38.7 % (COP 2,300), 27.4 % (COP 1,648,400) and 22 % (COP 4,123,400) comparatively. The opposite is true for the price of cocaine base, which showed a slight increase during this period. In 2005 this product was sold at a price of COP 2,270.00, but by 2021 it increased by 6 % (COP 2,406,100).

According to the information collected in the infrastructure profiling[137], there is a price distinction between what is produced within the hotspots and the rest of the region. Specifically in relation to the purity of the raw material and the final product, coca base and reoxidized cocaine base, which is homogenized to obtain a single product with better purity.

[136] Ibid.
[137] Ibid.

Catatumbo Region



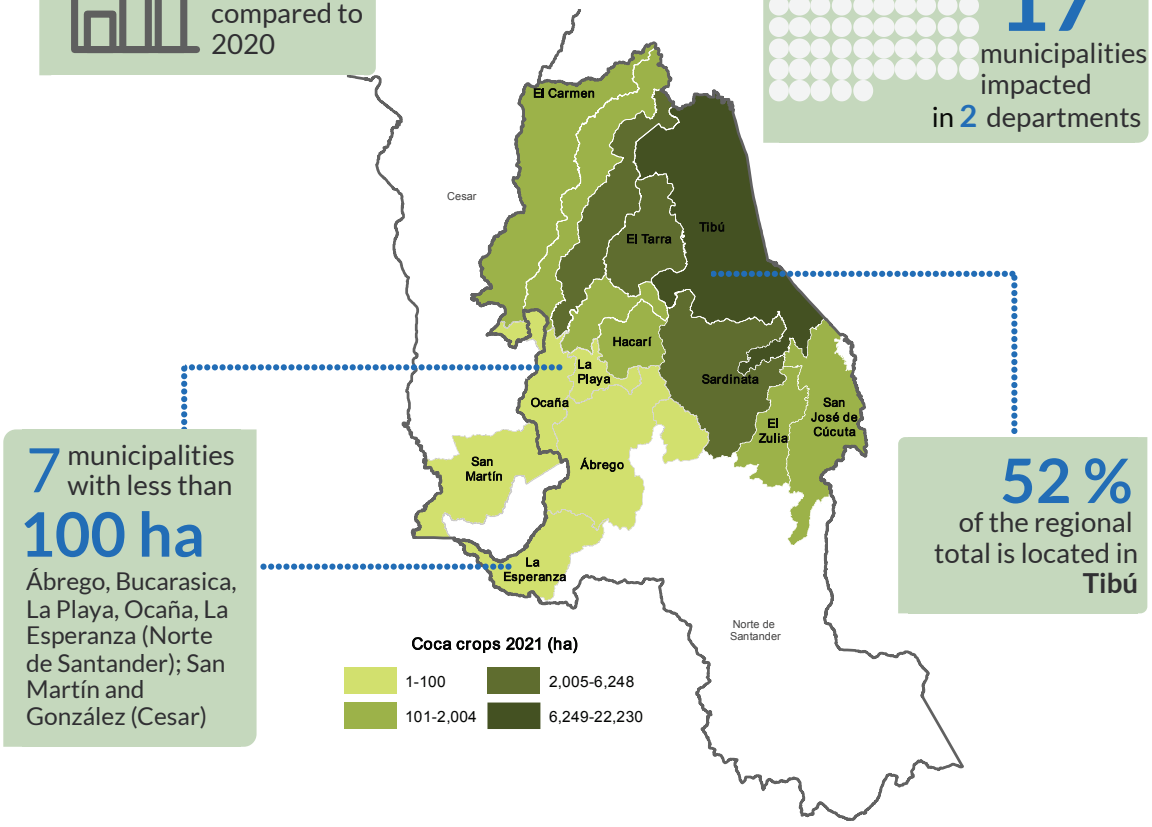
Coca crops 2021: Catatumbo region

Catatumbo ranks **second** among the regions with the largest area with coca crops and contributes **21 %** of the national total with **42,576 ha**.

6 % **increase** compared to 2020

2 departments and 65 municipalities in the region

17 municipalities impacted in 2 departments



7 municipalities with less than **100 ha**

Ábrego, Bucarasica, La Playa, Ocaña, La Esperanza (Norte de Santander); San Martín and González (Cesar)

52 % of the regional total is located in **Tibú**

Made up of the departments of Norte de Santander and Cesar. In the foothills of the Eastern Mountain range and in a plain sector of the department in the border area with Venezuela, it is located in the **Catatumbo hotspot,** identified in 2019, which is still in the process of consolidation.

Production of coca-cocaine



44,339 ha

Productive area 2021
(Area adjusted according to the conditions that affect its yield throughout the year)



261,601 mt

Potential production of fresh coca leaf

Cocaine base yield
8.9 kg/ha/year

Total cocaine base production 393 mt

Coca fields profile

Productivity study updated in 2020



5.9 mt/ha/year

Average annual yield of fresh coca leaf (mt/ha/year)



3.2

Number of harvests per year (average)



49 % of the coca fields

most productive age
(2 to 4 years)



9,800 plants/ha

Density (number of plants per productive hectare)



2 cultivars

Injerto (79 % fields)
Chipara (21 % fields)



79 %

Coca farmers produce **cocaine base paste**

Prices



Fresh coca leaf

COP 1,900 kg

15 % increase compared to 2020



Cocaine base paste

COP 2,851,500 kg

20 % increase compared to 2020



Cocaine base

COP 2,622,400 kg

23 % increase compared to 2020



Cocaine hydrochloride

COP 4,637,200 kg

20 % increase compared to 2020

Note: Catatumbo prices were standardized with those of the Central Region for representative data reasons.

The region continues with the upward trend in coca crops that began in 2010. In 2021, there was an increase of 6% over the previous year, reaching 42,576 ha, which makes it the second most affected region in the national context. Norte de Santander continues with the highest historical levels of detected areas, ranking second among the most affected departments in 2021. On the other hand, Cesar showed a decrease of 66 %, with only 11 ha of coca at the end of 2021, similar to the values reported in 2012, when coca was detected for the first time in this department (figure17).

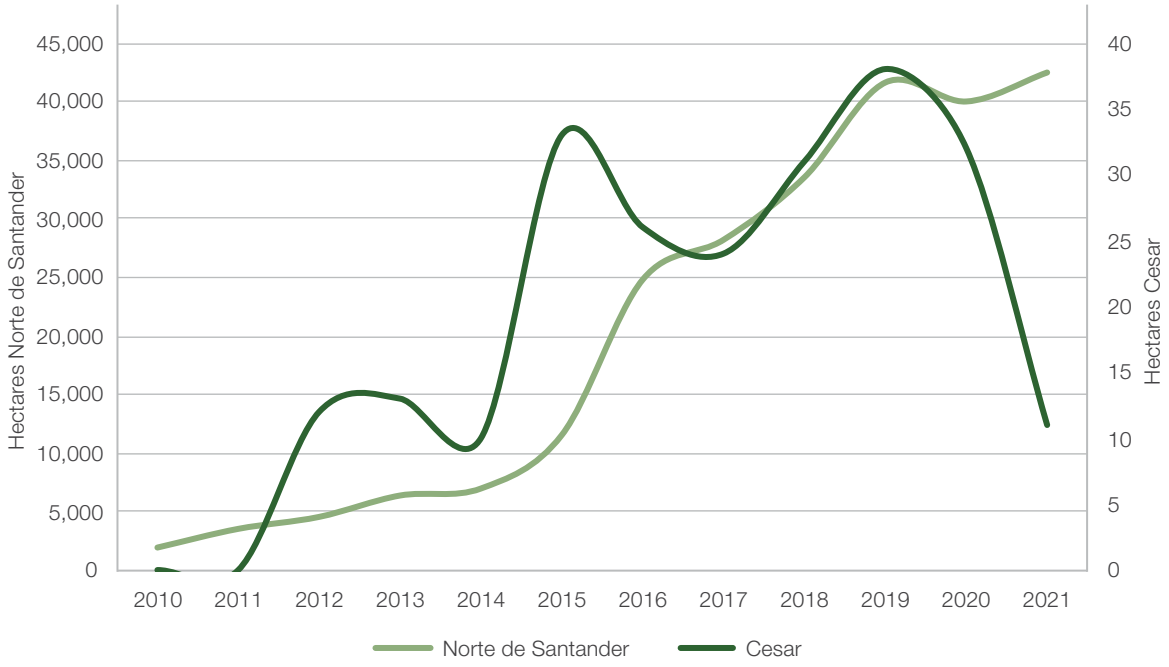
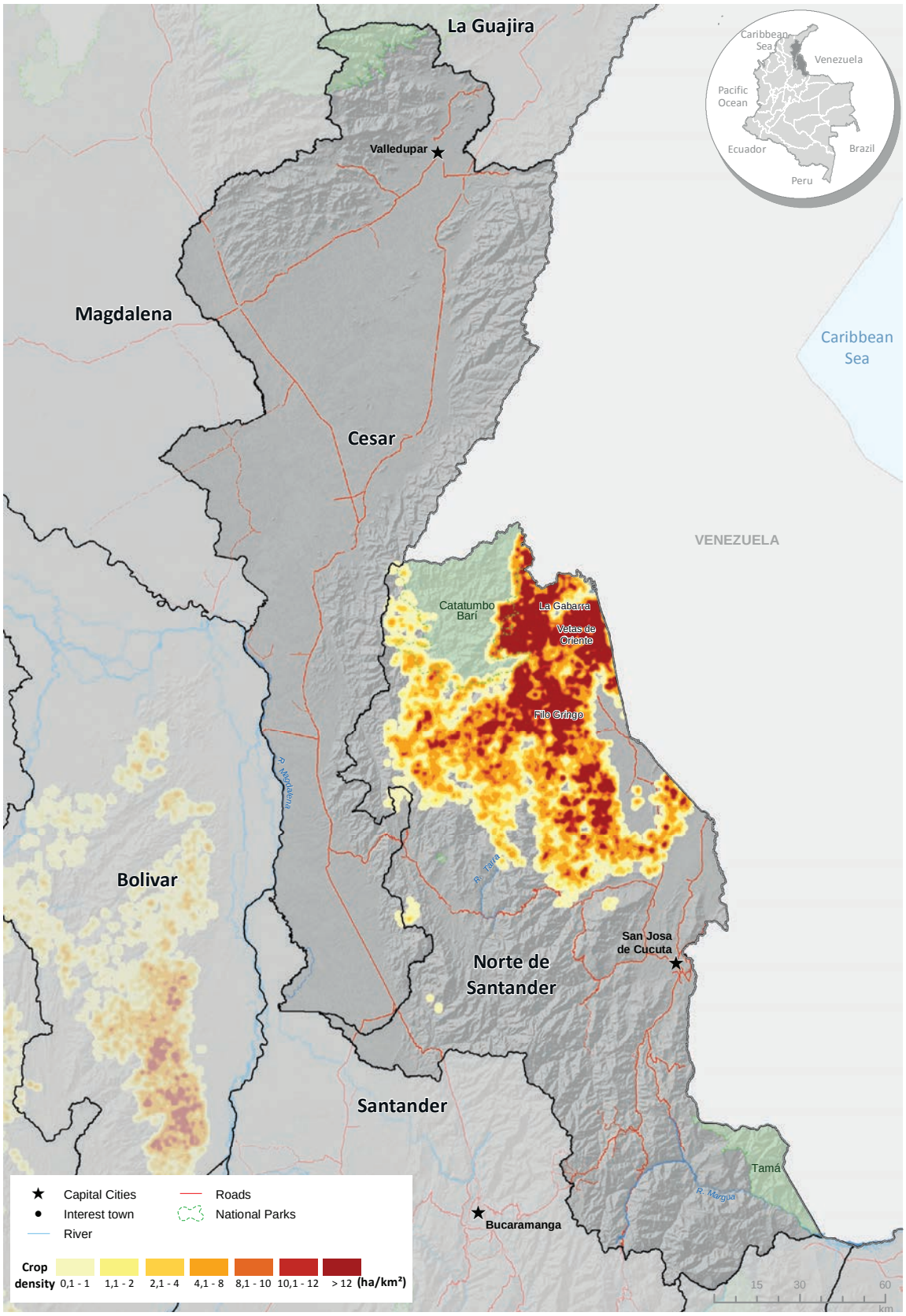


Figure 17. Area with coca crops within the departments of the Catatumbo region, 2010-2021

The productive hotspot of *Catatumbo* is located in the region, which concentrates 32 % of coca crops of all the hotspots, consolidating it as the most affected with nearly 26,000 ha (8,000 ha more than those identified five years ago) and with the largest territory covered, approximately 2,000 km^2, with jurisdiction in five municipalities of Norte de Santander: Convención, El Tarra, Sardinata, Teorama and Tibú.

The highest growing densities, between 25-73 ha/km^2, are located in the municipality of Tibú, bordering the Catatumbo Barí National Park (along the San Miguel River basin and the Catatumbo River) near the La Gabarra population center. Another area with high density is located in the border area with Venezuela (map 6).

Map 6. Coca crops density in the Catatumbo region, 2021



Sources: Colombian Government; National coca cultivation monitoring system supported by UNODC; for national parks: Natural National Parks of Colombia. The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations.

96% of coca crops are found in the “permanently affected areas” and it was in this category that the largest increase in the region was detected.

Regarding the territory distribution of the Ruta Futuro policy (figure18), 44 % of coca crops were located in strategic management areas such as border areas (37 %) and buffer zones of the PNN (34 %, National Natural Parks), followed by productive integration areas near the municipal capitals of El Tarra and Tibú. The areas defined as special management areas include 12,900 ha (30 % of the region’s total), where the forest reserve zones established by the Law 2.a are the most affected, followed by those located in the Catatumbo-Barí National Park.

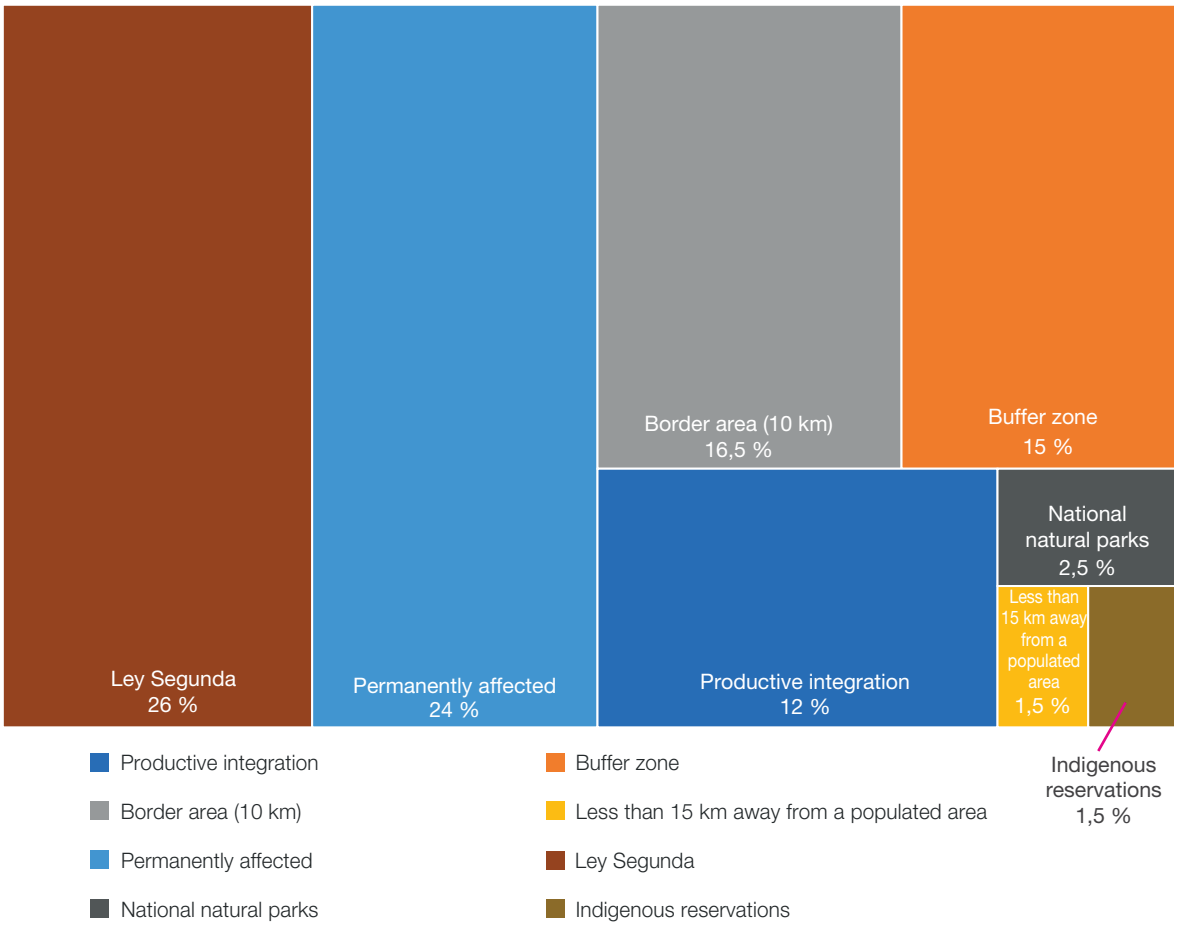


Figure 18. Distribution of coca crops according to Ruta Futuro policy, 2021

Production and yields

This region has been the only one that has recorded a permanent growth in coca leaf production since 2007, a growth that is tending to stabilize in 2021, contributing almost 261,000 mt of coca leaf and 393,272 kg of cocaine base, which places it as the second most important node for the production of coca leaf and cocaine hydrochloride in Colombia, only surpassed by the Pacific region.

In Catatumbo, a complex and fuzzy war is being waged on several fronts with a diversification in criminal activities, controlled by different national and foreign actors; among these are the ELN guerrillas, criminal gangs such as Los Rastrojos, and the Popular Liberation Army (EPL). In addition, the proximity to the Venezuelan border explains the area's importance in the cocaine production chain, which is boosted by the presence of the Cartel de los Soles, responsible for transporting cocaine into Venezuelan territory. Currently, the control of coca-cocaine production in Catatumbo is in the hands of the Sinaloa and Jalisco Nueva Generación cartels which, with the help of front men and envoys of other nationalities, intend to break into the region in order to control the whole drug trafficking chain: growing, production and commercialization[138].

In addition to the above, there are two other criteria: first, gasoline is cheaper in the neighboring country and is a chemical substance necessary for the production of cocaine base paste; second, labor for planting, harvesting, refining and transportation is low-cost, especially nowadays, given the huge influx of unemployed Venezuelan refugees who are willing to take great risks in exchange for low wages[139].

The relevance of the region in coca-cocaine production could be explained as a result of changes implemented in recent years around the development of better agro-cultural practices that have a positive influence on yield indicators. Based on coca crops yield studies[140], it has been possible to corroborate that since 2011 there has been an increase in coca leaf yield per hectare, from 5.5 mt/ha/year in 2011 to 5.9 mt/ha/year in 2021, which represents an increase of 7.3%. These improved agro-cultural practices are associated with five main factors:

1. ***Use of more productive, climate- and fire-resistant cultivars,*** which guarantee a level of loss or decrease in yields. Since 2020, growers in the region have mainly concentrated the use of two cultivars: 79% of all plots use grafts, which generate an average production of 6.9 mt/ha/year, followed by the Chipara cultivar, producing an average of 4.1 mt/ha/year.
2. ***The choice to plant fewer plants per hectare.*** Since 2005, the density of plants grown per hectare has decreased from 14,000 plants per hectare/year in 2005 (Stage I) to 9,800 plants per hectare/year so far in Phase V (2020-2021). This improvement, which has been implemented from an agro-cultural

[138] José Ospina Valencia, "El Catatumbo colombiano: la selva al mando de los narcotraficantes", DW (Colombia's Catatumbo: the jungle under drug traffickers' control) (2020, July 20th), https://p.dw.com/p/3fcLm.

[139] Chirstian Vianna de Azevedo, "El reemplazo de las redes colombianas por las venezolanas en el narcotráfico fronterizo internacional", Real Instituto Elcano (2019, 29 de marzo) ("The Replacement of Colombian Networks for Venezuelan Networks in International Border Drug Trafficking," Elcano Royal Institute (2019, March 29th)), https://www.realinstitutoelcano.org/analisis/el-reemplazo-de-las-redes-colombianas-por-las-venezolanas-en-el-narcotrafico-fronterizo-internacional/.

[140] The coca cultivation productivity studies, developed by the Government of Colombia and UNODC, started with the baseline in 2005. Approximately every four years, information is consolidated for all regions of the country. Phase II was consolidated between 2007-2010; Phase III, 2011-2014; Phase IV, 2015-2019, and Phase V began in 2020 with the updating of information in the Catatumbo, Central, Sierra Nevada and Putumayo-Caqueta regions.

point of view, seeks to ensure that the crop uses agrochemicals rationally and makes better use of the nutrients found in the soil, resulting in higher yields per hectare in each of the harvests, which are 3.2 per hectare per year. In hotspot areas, sowing grafting cultivars generates around 800 kg more than in non- hotspot areas, with 5.6 mt/ha/year.

3. ***There is a higher proportion of coca crops in more productive ages.*** About 50% of the plots are between 2-4 years old, producing an average of 5.8 mt/ha/year.
4. ***Coca production in its first three stages was concentrated in medium-sized UPACs (10-50 ha),*** 67% on average for the first three stages. In the last two updates in 2015 and 2020 coca leaf production was mostly found in small UPACs (1-10 ha).
5. ***Better management of early crop stages around fertilization activities.*** The PACs have a wide range of products specifically for fertilization activities, which is essential to obtain both regular leaf and alkaloid production.

Regarding cocaine extraction and refining capacity, since 2015 the largest proportion of producers have been processing in situ for PBC extraction; for this reason, the dynamics of productive specialization in the region is becoming increasingly relevant, resulting in improved extraction efficiency. From 2015 to 2021, it increased by 21.9%, from 1.6 to 2 kg of CBP/mt leaf; this increase has implications for the potential production of cocaine hydrochloride on a regional scale.

Pricing dynamics[141]

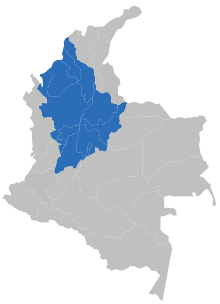
The sales prices of cocaine paste/base and cocaine hydrochloride tend to increase compared to their historical behavior. With regard to coca leaf price dynamics, although a growth in 2021 is reported, the price has to recover its historical levels after a significant decrease registered between 2015 and 2016. The behavior of prices in the region for coca derivatives showed an upward trend: the price of coca leaf increased by 15.2 % and the by-products cocaine base/paste and hydrochloride increased by 20.0 %, 23.1 % and 19.9 %, respectively, compared to 2020.

By 2021, on average, a kilogram of cocaine paste will cost COP 2,851,500, becoming the region with the highest value in the country, while cocaine hydrochloride will cost around COP 4,637,000, a price that is only 2% above the national value.

According to the study Mapping of infrastructure and dynamics of illicit production of cocaine hydrochloride (2021)[142], In the region, the market for the purchase and sale of coca-derived products is dominated by cash transactions: the PACs sell exclusively cocaine paste/base, which is acquired or purchased directly from the crops or from the primary production infrastructure by the group that exercises territorial control. In addition, it became evident that the GAOs are the ones that prevail in the sale of raw material or coca by-products to processors and owners of large production facilities by fixing prices and the availability of the product to be traded.

[141] Catatumbo prices were homologated with those of the Central region for data representativeness.
[142] Government of Colombia and UNODC, Profiling of infrastructures.

Bolívar South-Central Region



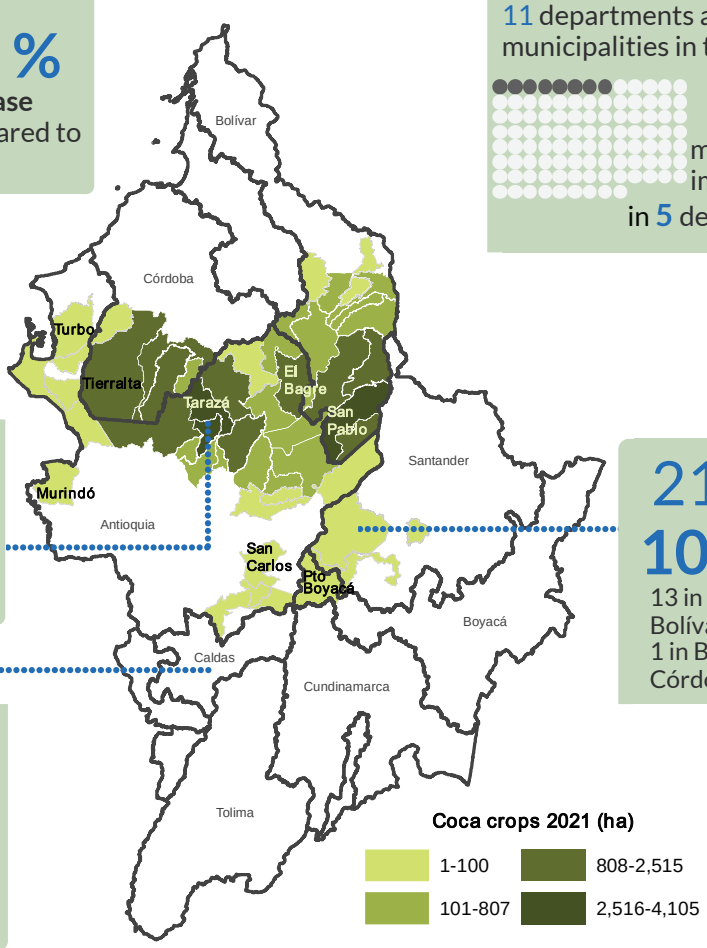
Coca crops 2021: Central-sur de Bolívar region

Central-sur de Bolívar ranks **third** among the regions with the largest area with coca crops and contributes **17 %** of the national total with **34,003 ha**.

35 % **increase** compared to 2020

11 departments and 654 municipalities in the region

50 municipalities impacted in 5 departments



34 % of the regional total is located in **Valdivia, San Pablo and Tarazá**

21 municipalities with less than **100 ha**

13 in Antioquia, 3 in Bolívar, 3 in Santander, 1 in Boyacá and 1 in Córdoba

Caldas department with **declaration of coca-free** territories in 2019

The region includes the **Valdivia-Tarazá-Cáceres hotspot,** identified in 2019, which is still in the process of consolidation. On the other hand, the municipalities of low impact in the Sub-region of Magdalena Medio and western Boyacá are prioritized to move forward with the process of declaring the areas as free of illicit crops.

Production of coca-cocaine



30,415 ha

Productive area 2021
(Area adjusted according to the conditions that affect its yield throughout the year)



234,197 mt

Potential production of fresh coca leaf

Cocaine base yield
13.1 kg/ha/year

Total cocaine base production 399 mt

Coca fields profile

Productivity study updated in 2020



7.7 mt/ha/year

Average annual yield of fresh coca leaf (mt/ha/year)



3.9

Number of harvests per year (average)



80 % of the coca fields

most productive age
(2 to 4 years)



9,200 plants/ha

Density (number of plants per productive hectare)



4 cultivars

Predominance:
Cuarentana (32 % fields)
Chipara (18 % fields)



100 %

Coca farmers produce **cocaine base paste**

Prices



Fresh coca leaf

COP 1,900 kg

15 % increase compared to 2020



Cocaine base paste

COP 2,851,500 kg

20 % increase compared to 2020



Cocaine base

COP 2,622,400 kg

23 % increase compared to 2020



Cocaine hydrochloride

COP 4,637,200 kg

20 % increase compared to 2020

It is the region with the largest number of integrated departments and the only one where a steady withdrawal of coca crops has been achieved of the sub-regions that comprise it[143]; despite this situation, by the last detection it showed an increase of 35% with respect to 2020, reaching the highest number in the 20-year series, with 34,003 ha of coca crops; 7,000 ha above what was detected in 2018, the year of the first historical peak (26,690 ha).

Out of the five departments impacted in 2021, Antioquia with 16,981 ha and Bolivar with 11,514 ha account for 84% of the total area sown in the region, followed by Cordoba with 5,480 ha; these three departments show an upward trend for the second consecutive year (map 7).

The departments of Boyacá and Santander reported a higher proportion of coca crops in the Magdalena Medio sub-region than in the last two years; despite the increase, in the municipalities that make up these departments, the area affected remains below 20 ha. Nonetheless, an alert situation the process of declaring territories free of illicit crops, on which progress is being made (figures 19 and 20).

It is worth noting that Caldas remains coca-free and has no report of manual eradication in 2021.

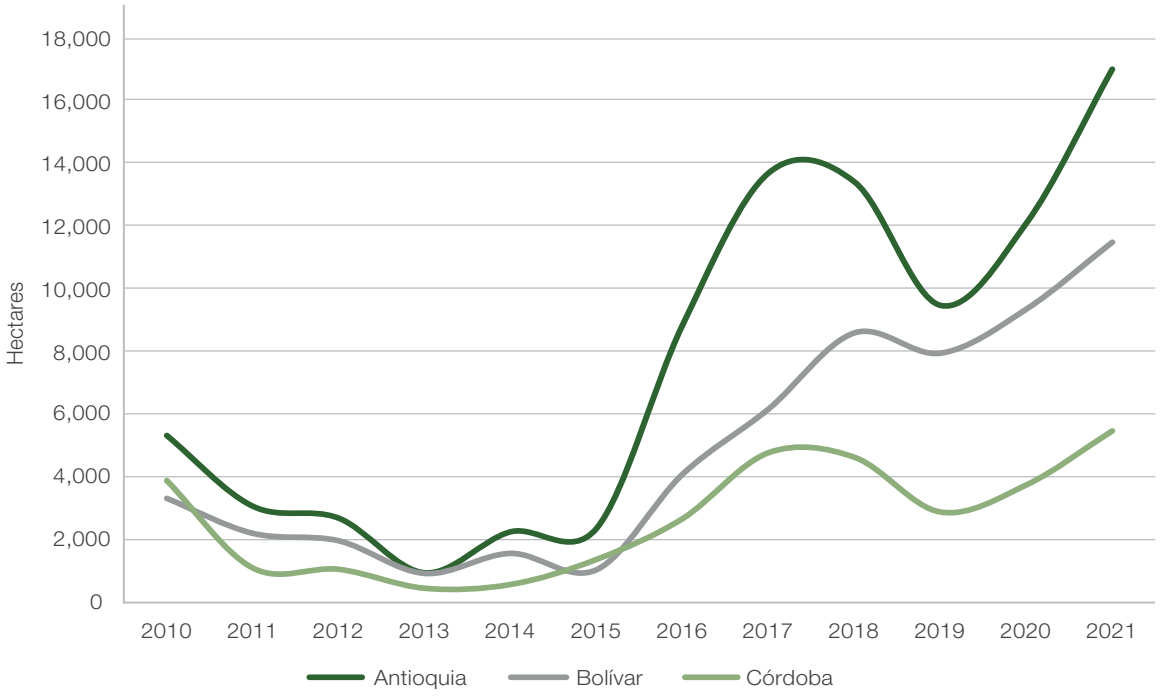
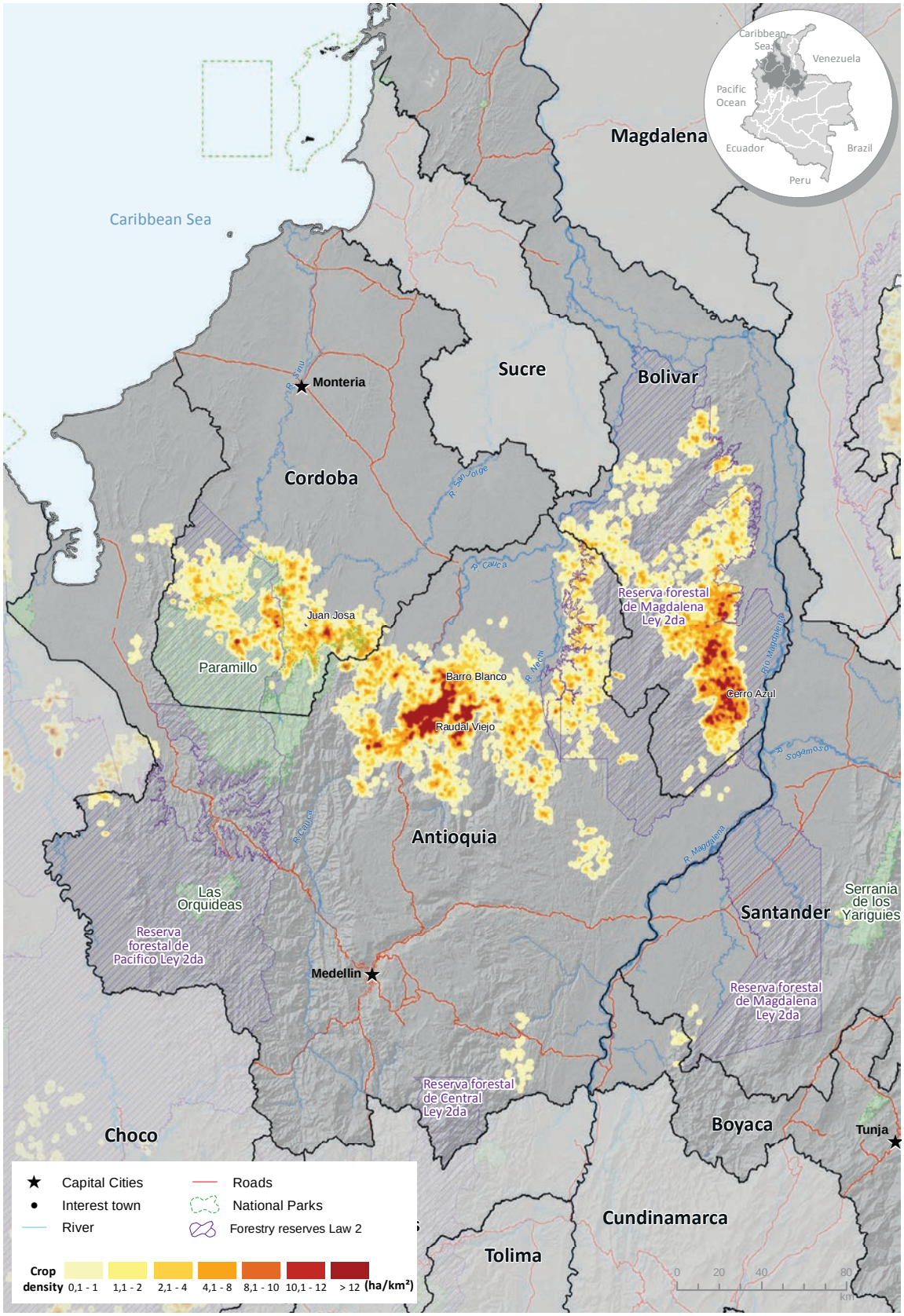


Figure 19. Area with coca crops in the departments with the highest concentration in the Central-South region of Bolivar, 2010-2021

[143] With the Ministry of Justice and Law, UNODC has been working on the process of declaring territories free of coca in the Magdalena Medio and Western Boyacá subregion; in 2021 an action plan was developed to reduce the vulnerabilities of the territory and it is expected that in 2022 an agreement of wills will be signed to enable its implementation. The department of Caldas achieved the declaration in 2019.

Map 7. Coca crops density in the Central-South region of Bolivar, 2021



Sources: Colombian Government; National coca cultivation monitoring system supported by UNODC; for national parks: Natural National Parks of Colombia. The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations.

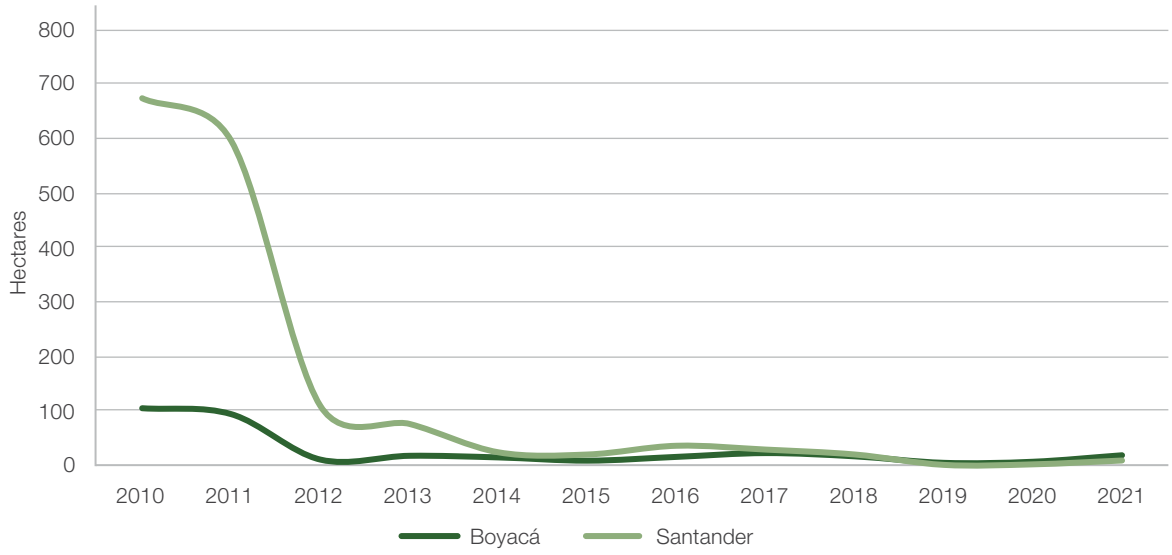


Figure 20. Area with coca crops in the departments with less impact in the Central-South region of Bolivar, 2010-2021

The hotspots of *San Pablo-Taracué* and *Valdivia-Tarazá-Cáceres* are located in the region, where the highest densities of coca crops are observed. Both hotspots account for 23% of the region's coca crops area.

In the areas with permanent coca crops during the last ten years, there was a 28,5 % growth compared to 2020. These areas are mainly located in Antioquia (Bajo Cauca), Bolivar and Cordoba (Paramillo National Natural Park), and are home to 24,317 ha of coca crops, which is equivalent to more than 70% of the whole region. On the other hand, the Magdalena Medio sub-region continues to show a trend towards crop abandonment in most of its territory.

With regard to the territory distribution of the Ruta Futuro policy, 47% of coca crops are in special management areas, especially in forest reserve areas established by Law 2.a and in the Paramillo National Park, which concentrates 24% of the total area in the National Park and is ranked as the most affected National Park, surpassing Catatumbo-Barí, which occupied this position in 2020. Under this region classification, the next most affected areas are the areas of free intervention (30%) and areas of strategic interest, such as those near the municipal capitals of Cáceres, Tarazá, Briceño and Anorí, all in Antioquia. In Córdoba, in the buffer zones of Paramillo National Park, 2,500 ha of coca were detected, which represents a warning of possible expansion of illicit crops in areas within the park (figure 21).

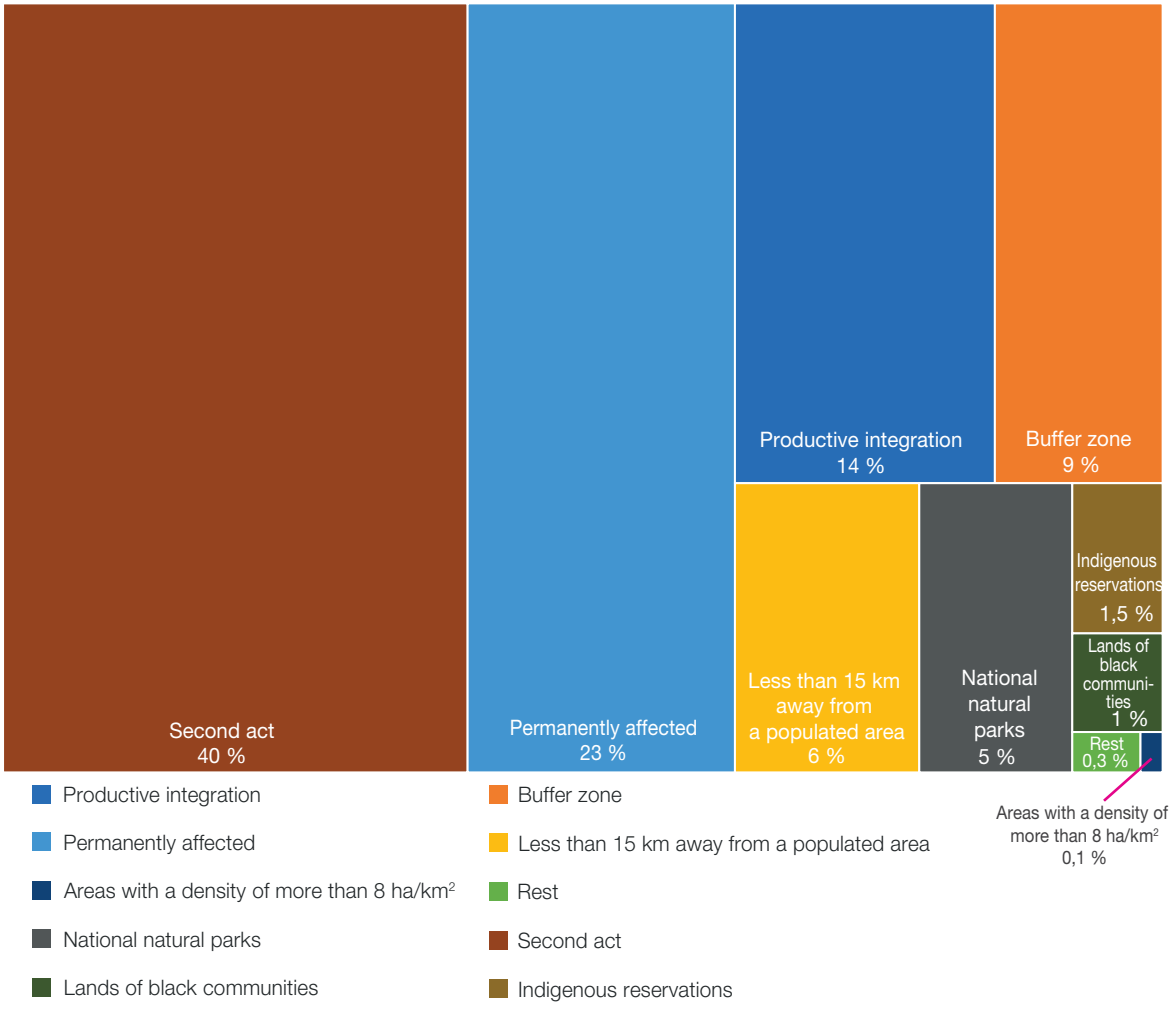


Figure 21. Distribution of coca crops according to Ruta Futuro policy, 2021

For the second consecutive year, the Central-South region of Bolivar recorded the highest increase in coca leaf production in the country.

In the Central-South region of Bolivar, the most reported cultivars are cuarentana (32 %), 7.7 mt/ha/year; chipara (18 %), 7.9 mt/ha/year; grafted (17 %), 8.4 mt/ha/year, and "boliviana negra" (10 %), 7.9 mt/ha/year; In the region with the highest coca leaf production rate in Colombia, 7.7 mt/ha/year, compared to a national average of 6.4 mt/ha/year in 2021.

By 2021, 80% of the coca crops in this region were found to be at the most productive age (2-4 years old) and with a density of 9,200 plants per hectare, as a result of better agro-cultural practices, which together have allowed the Central-South region of Bolivar to boost coca leaf production, reaching 234,197 mt with an increase of 27 % compared to 2020 and representing 21 % of the total production, which is the highest in the historical series since 2005 for the region. Production is mainly found in the departments of Antioquia (50 %), Bolívar (35 %) and Córdoba (14 %). At the departmental level, Antioquia and Bolivar ranked fifth and sixth nationally in coca leaf production, respectively.

The presence in the region of territorial spots of illegal armed structures such as the 36th Front of the Second Marquelia (dissidences), Los Caparros and the ELN guerrilla, mainly in Antioquia, Bolívar and Córdoba, has led to the establishment of alliances or disputes for the management of illegal economies related to the drug trafficking chain, such as territorial control of the areas where illicit coca crops are concentrated, for example, in the municipalities of Cáceres, Valdivia and Tarazá in Antioquia[144,145]. The Ombudsman's Office early warning 045-2020 describes the risk and threat due to the control and intimidation by armed actors of the inhabitants of the Bajo Cauca antioqueño, which, together with economic necessity, makes coca crops a means of livelihood to meet the needs of the population[146].

The production of cocaine base paste by PAC is strengthened in the Central-South region of Bolivar, with the highest yield in the country with 2.3 kg PBC/mt leaf

In the first yield studies (Stage, 2005), it was found that only 5% of the PACs produced PBC; the trend was maintained until Stage III (2011); by 2015 this value changed substantially when 76% of the PACs produced PBC; in the last stage, a complete specialization of the PACs in the processing of coca leaf to PBC was registered. Similarly, the yield of PBC production has increased by 61% from Stage I to the 2021 diagnosis, obtaining 2.3 kg/mt of coca leaf, which is the highest in comparison with other regions.

According to these indicators, the potential cocaine base production in the Central-South Bolivar region is estimated at 399 mt in 2021, with an increase of 27% in relation to 2020, being the second region that contributes the most (23%) to the national production after the Pacific region and surpassing the Catatumbo region. This increase may be due to the increase in the productive area of the region, the PBC production yield, the specialization by PAC for coca leaf processing and the prevalence of coca crops in their maximum production age; additionally, the price of PBC in the region is the highest in the national level, with an average value of COP 2,851,500 and with an increase of 20% in the last year, which may represent an economic appeal for PAC and, thus, encourage local production[147].

144 Instituto de Estudios para el Desarrollo y la Paz (Indepaz), Los focos del conflicto en Colombia. Informe sobre presencia de grupos armados (Bogotá: Autor, septiembre del 2021) (Institute for Development and Peace Studies (Indepaz), The hotspots of the conflict in Colombia. Report on the presence of armed groups (Bogotá: Author, September 2021)), http://www.indepaz.org.co/wp-content/uploads/2021/10/INFORME-DE-GRUPOS-2021.pdf.

145 "Disputas entre disidencias y paramilitares ponen en riesgo a población del norte de Antioquia, alerta la Defensoría del Pueblo", Semana (2021, 15 de junio) ("Disputes between dissidents and paramilitaries threaten the population of northern Antioquia, warns the Ombudsman's Office", Semana (2021, June 15th)).

146 Delegated Ombudsman´s Office for Risk Prevention and Early Warning System, EARLY WARNING No. 045-2020.

147 Government of Colombia and United Nations Office on Drugs and Crime (UNODC), Report on illicit drug prices (Bogotá: Authors,2021).



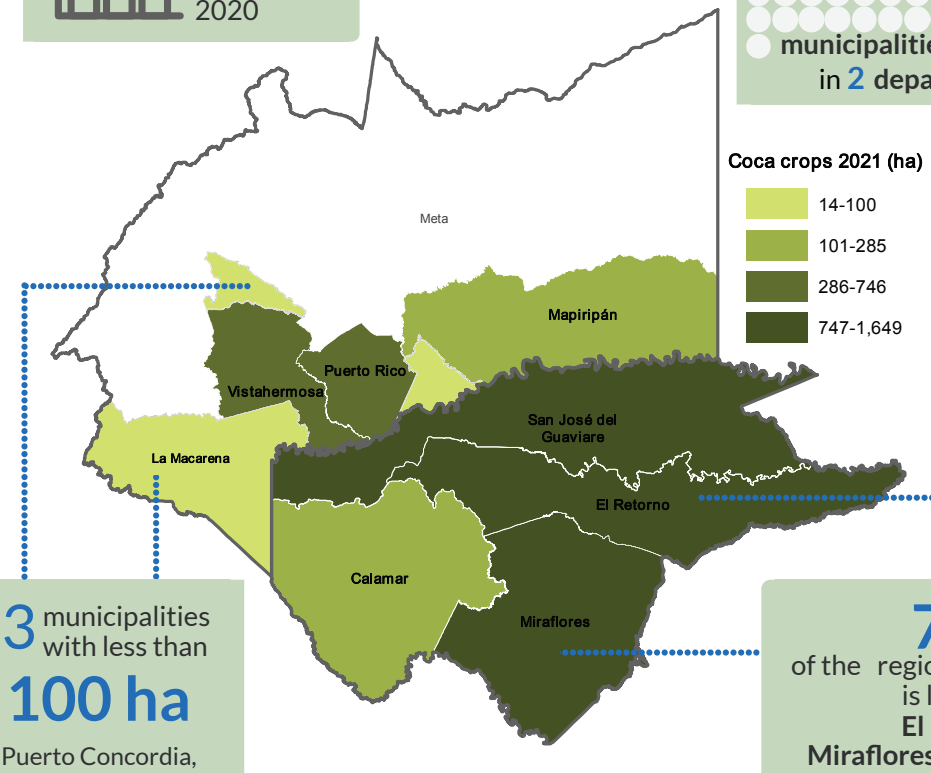
Coca crops 2021: Meta-Guaviare region

Meta-Guaviare ranks **fifth** among the regions with the largest area with coca crops and contributes **3 %** of the national total with **6,075 ha**.

36 % increase compared to 2020

2 departments and 33 municipalities in the region

10 municipalities impacted in 2 departments



3 municipalities with less than **100 ha**

Puerto Concordia, San Juan de Arama, La Macarena (Meta)

70 % of the regional total is located in **El Retorno, Miraflores and San José del Guaviare**

Meta-Guaviare is affected differently in each of its departments. The largest amount of coca crops is found in Guaviare. The region has a strategic location for the trafficking of drugs and chemical inputs, with road connections to the center of the country and river connections through the Guaviare and Guayabero rivers that connect with the Amazon and Orinoco regions. Coca crops are mainly located in special management areas.

Production of coca-cocaine



4,935 ha
Productive area 2021
(Area adjusted according to the conditions that affect its yield throughout the year)



36,517 mt
Potential production of fresh coca leaf

Cocaine base yield
10.4 kg/ha/year

Total cocaine base production 51 tm

Coca fields profile
Productivity study updated in 2018



7.4 mt/ha/year
Average annual yield of fresh coca leaf (mt/ha/year)



5.3
Number of harvests per year (average)



61 % of the coca fields
most productive age
(2 to 4 years)



9,800 plants/ha
Density (number of plants per productive hectare)



4 cultivars
Predominance:
Tingomaría (37 % fields)
Dulce (19 % fields)



87 %
Coca farmers produce **cocaine base paste**

Prices



Fresh coca leaf
COP 2,750 kg
41 % increase compared to 2020



Cocaine base paste
COP 1,800,000 kg
21 % increase compared to 2020



Cocaine base
COP 2,630,000 kg
8 % decrease compared to 2020



Cocaine hydrochloride
COP 5,047,500 kg
6 % increase compared to 2020

After four consecutive years of a decreasing trend, the region shows a 36% growth, reaching 6,075 ha of coca crops by December 31st, 2021. Guaviare contributes 73 % of the coca crops with 4,435 ha and Meta 27 % with 1,640 ha.

The highest coca crop densities, between 5-16 ha/km^2, are located mainly in the jurisdiction of the Sierra de la Macarena (Mountain Range) and Nukak National Parks, with a production core that extends from south to north through the municipality of San José del Guaviare until ending at the Guaviare River, natural border with Meta and with an outflow to the Orinoco region (map 8).

Despite showing an increase of 33 %, the department of Meta still has low levels of damage, if we compare the series of the last ten years: three municipalities reported less than 100 ha and Mapiripán does not exceed 300 ha. In addition, there are still no consolidated core areas of coca crops with four years of frequency that could become productive clusters. On the other hand, Guaviare showed the largest increase in the last fifteen years (figure 22).

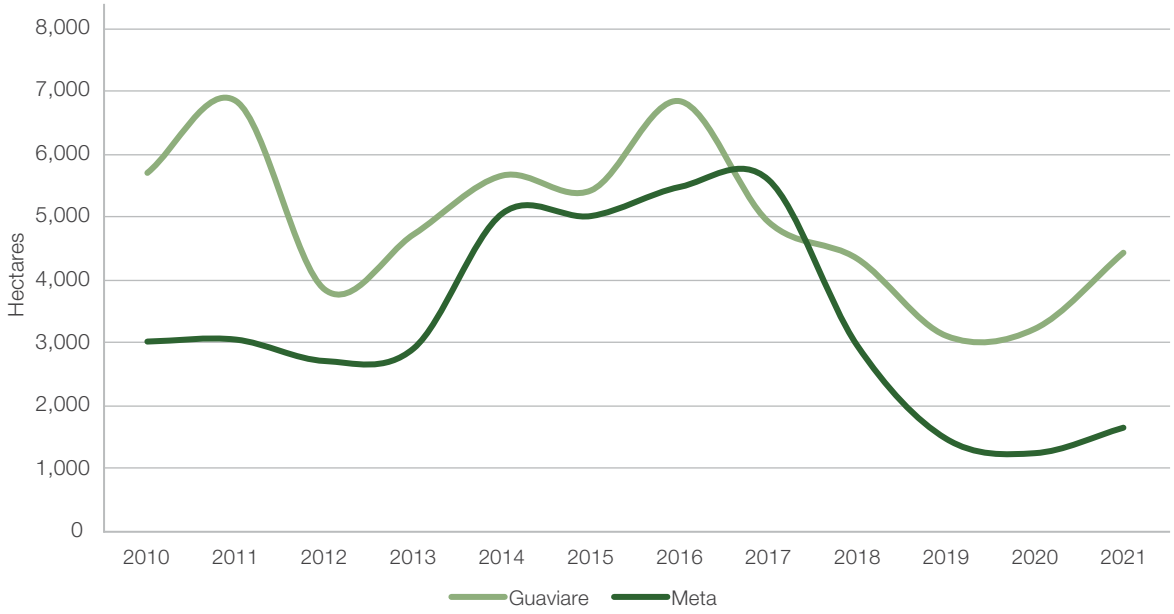
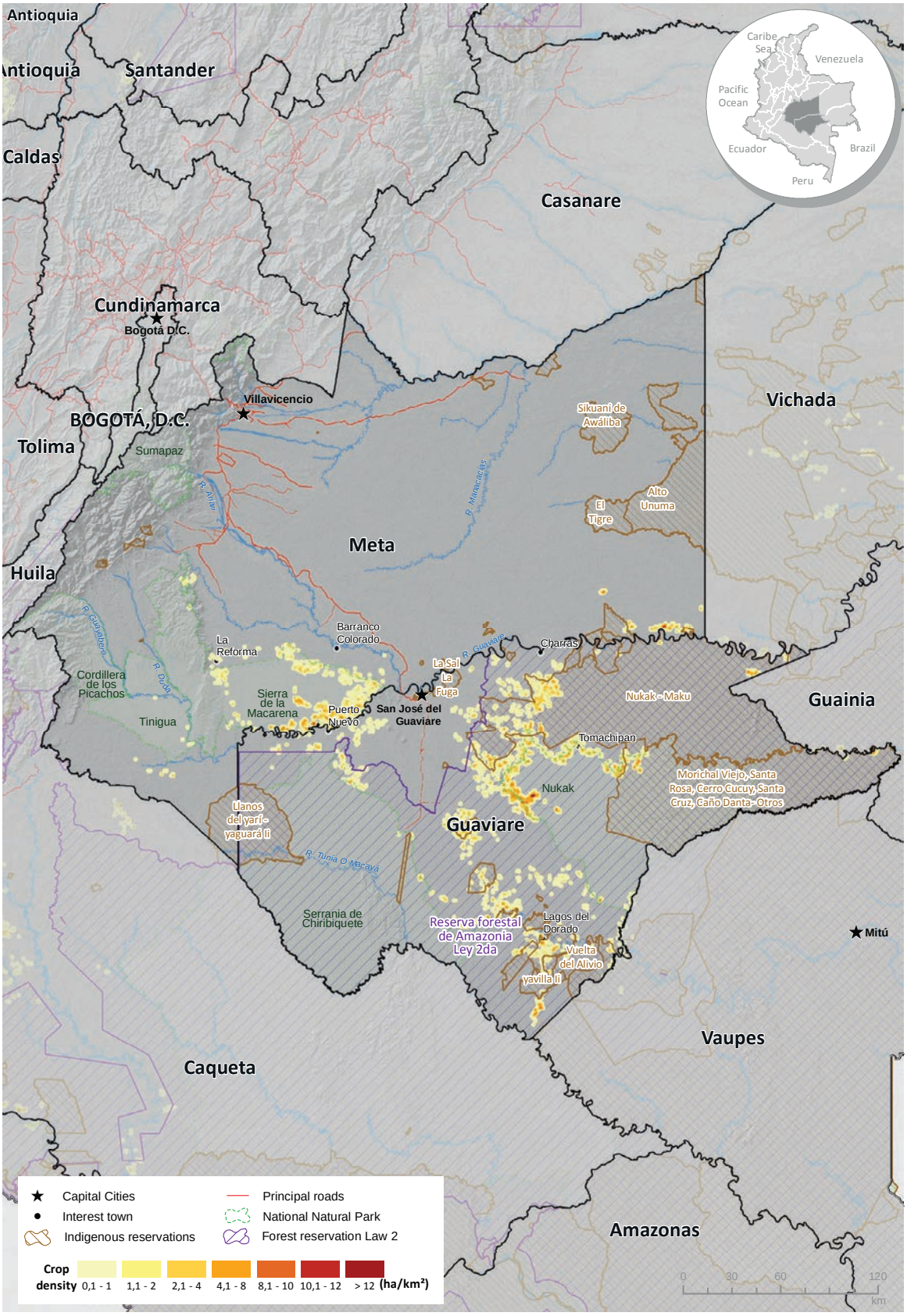


Figure 22. Area with coca crops in the departments of Meta-Guaviare region, 2010-2021

82 % of the coca crops are found in the permanently affected areas, mainly within the Sierra de la Macarena National natural Park, to the north of the Nukak National natural Park (Tomachipán sector) and in the municipality of Miraflores. The new or expanding areas are distributed throughout the two departments and showed growth both in terms of area under cultivation (2.5 times more coca) and territorial coverage (33%). Intermittent areas are on the periphery of the permanently affected territories and showed 86% more coca than in 2020.

It is worth mentioning that new areas reached the category of "abandoned" after completing three years without coca; currently 56 % of the territory that was affected by coca in the region in the last ten years completed three years without coca.

Map 8. Coca crops density in Meta-Guaviare region, 2021



Sources: Colombian Government; National coca cultivation monitoring system supported by UNODC; for national parks: Natural National Parks of Colombia. The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations.

Coca crops in special management areas and consolidation of strategic drug trafficking region

With regard to the territory distribution of the Ruta Futuro policy, 91% of coca crops were located in special management areas such as the National Natural Parks (2,300 ha), the environmental protection areas established by Law 2.a (1,700 ha) and the Indigenous Reservations (1,470 ha), a situation that suggests the development of strategies for the control of supply with emphasis on preservation mechanisms and collective actions (figure 23).

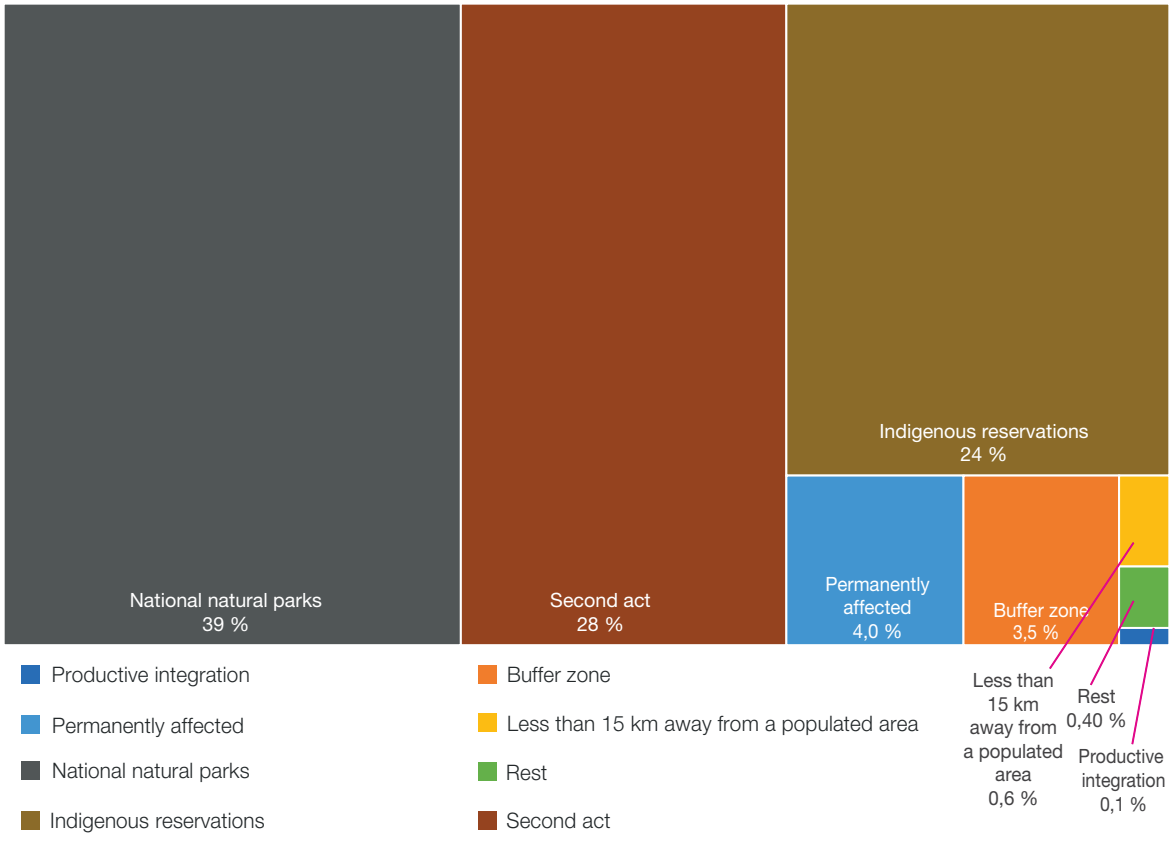


Figure 23. Distribution of coca crops according to Ruta Futuro policy, 2021

This region has been known for the presence of coca crops in special management areas, and historically speaking, these departments have been affected by the presence of GAIs that seek to control certain strategic river routes such as the Guaviare and Guayabero rivers for the trafficking of drugs and chemical inputs necessary for their production. These geographic characteristics have made this area a strategic point for coca crops and the development of other illicit economies such as timber trafficking, mining, and illegal land appropriation, which generates large revenues for the armed actors that operate in the area[148].

[148] Lina. Macías and Daniel Abello, Las cuatro "plagas" que azotan el Guaviare (Partes I y II) (Bogotá: Fundación Paz y Reconciliación, 2019) The four "plagues" that scourge Guaviare (Parts I and II) (Bogotá: Peace and Reconciliation Foundation, 2019).

Growth of the productive area in the region over the last year

When looking at the behavior of the productive area in relation to 2020, there is an increase of 12.2 %. This also represents a similar growth in the potential production of fresh coca leaf, which increased from 32,532 mt to 36,517 mt. Based on yield studies[149] of coca crops by the Government of Colombia and the United Nations Office on Drugs and Crime (UNODC), the increase in coca leaf production may be associated with the application of better agro-cultural practices that influence the yield indicators in this region, including the following factors:

A greater number of harvests per year: About 5.3 harvests and each of them is more productive, each generating 1.4 of coca leaf mt/ha/year.

1. ***The use of more productive cultivars for the purpose of obtaining a greater quantity of coca leaf per year:*** Among them, in first place is the use of tingomaria with 37 % of the plots and a yield of 6.9 mt/ha/year, followed by sweet and bittersweet with 19 % and 18 % respectively of the plots and yields between 7.8 and 8.4 mt/ha/year.
2. ***A significant percentage of the plots are at their most productive age:*** 61 % of the coca crops are at their most productive age (between 2 and 4 years old) and generate an average of 7.9 mt/ha/year.
3. ***The rational use of agricultural inputs such as fertilizers and pesticides are emphasized:*** which are widely used and wherewith they seek to make better use of the soil types in this area.

Regarding the dynamics of PBC extraction capacity, it is observed according to the results of the productivity studies that the largest number of coca growers (87 %) extract PBC within their UPAC, while the remaining (13 %) sell fresh coca leaf; this trend has been consistent in the region since 2013 [150]; However, the PACs reported that for each ton of fresh coca leaf, they obtained, on average, 1.8 kg of PBC, which represents a 33 % increase in the yield of basic paste production per ton of fresh leaf, compared to 2013 (1,41 kg/mt).

Pricing dynamics

With respect to the historical behavior of coca leaf prices, they tend to recover after a significant drop since 2015; however, they are below their historical level. This price behavior encourages the processing of PBC on farms, a product that reflects an upward trend in prices since 2019, which is a determining factor for PACs to decide to process coca leaf into this more sophisticated product. In the last year, the prices of fresh coca leaf (41 %), PBC (21.4 %) and cocaine hydrochloride (5.6 %) increased in the sales markets with respect to their historical behavior. Only the price of cocaine base showed a decrease of 7.9% compared to the previous year.

[148] The coca crops yield studies developed by the Government of Colombia and UNODC started with the baseline in 2005. Approximately every four years, information on all regions of the country is consolidated.

[150] According to data from the Colombian Drug Observatory, in this region there was an increase in all the different categories of interdiction operations compared to the previous year: eradication of illicit crops (14.2%), seizures of coca paste/base (60%) and cocaine hydrochloride (55.9%), as well as the dismantling of primary infrastructures (20.9%) and crystallizers (50%).

The growth in the area detected as productive in Meta-Guaviare in 2021, after almost four consecutive years of decline, may be attributed to the armed actors present in these departments, including: AGC, the dissidents of the FARC-EP Armando Ríos Front (composed of fronts 1, 7 and 16)[151], and the criminal group known as Los Puntilleros, who are engaged in a low-intensity conflict[152], where these armed actors avoid carrying out armed actions or only occasionally use violence in a selective and inconspicuous manner. The different actions carried out by these armed actors in the region allow them to have territorial control by imposing rules, regulations and restrictions on mobility and regulating the entry and exit of people, supplies, among other things.

[151] Instituto de Estudios para el Desarrollo y la Paz (Indepaz), Los focos del conflicto en Colombia. Informe sobre presencia de grupos armados (Bogotá: Autor, septiembre del 2021) (Institute for Development and Peace Studies (Indepaz), The hotspots of the conflict in Colombia. Report on the presence of armed groups (Bogotá: Author, September 2021), http://www.indepaz.org.co/wp-content/uploads/2021/10/INFORME-DE-GRUPOS-2021.pdf.

[152] Fundación Ideas para la Paz (FIP), "Ni paz ni guerra, Escenarios híbridos de inseguridad y violencia en el gobierno de Iván Duque", Serie de Informes No. 36, (Bogotá, Mayo de 2022) (Ideas for Peace Foundation (FIP), "Neither peace nor war, Hybrid scenarios of insecurity and violence in the government of Iván Duque", Report Series No. 36, (Bogotá, May 2022)), https://ideaspaz.org/media/website/FIP_Infome_NiPazNiGuerra.pdf.



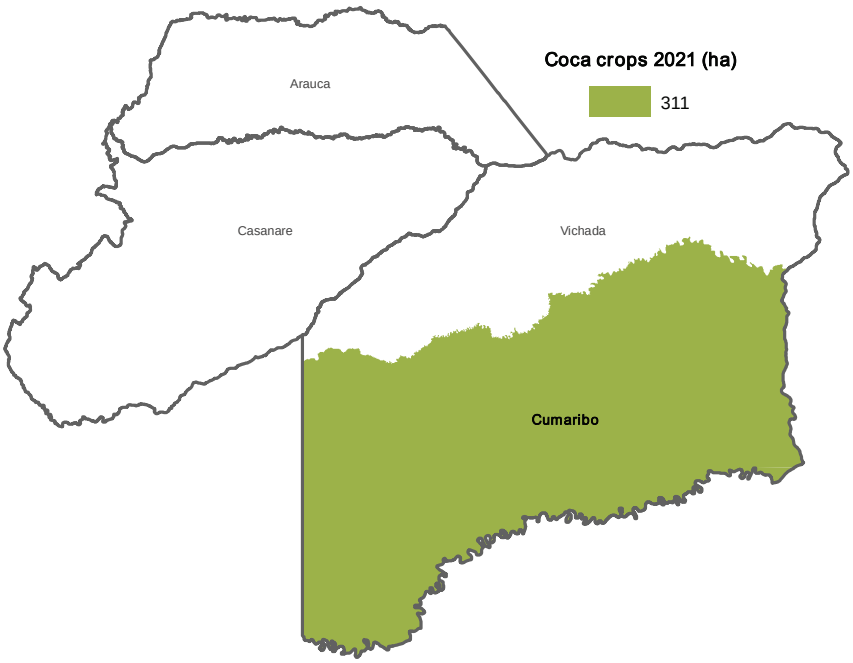
Coca crops 2021: Orinoco region

Orinoco is one of the regions with less area with coca crops, contributes less than **0,5 %** of the national total with **311 ha**.

157 % **increase** compared to 2020

3 departments and 30 municipalities in the region

1 **municipality impacted in** **1 department**



By 2021, the trend of steady reduction of the area with coca crops that had been occurring since 2018 is interrupted. In Vichada, different legal economic strategies have been implemented, such as the consolidation of the cocoa triangle, an activity that has become a hope of legality for people who dependen on illicit crops.

Production of coca-cocaine



257 ha

Productive area 2021

(Area adjusted according to the conditions that affect its yield throughout the year)



1,054 mt

Potential production of fresh coca leaf

Cocaine base yield

3.7 kg/ha/year

Total cocaine base production 1 mt

Coca fields profile

Productivity study updated in 2018



4.1 mt/ha/year

Average annual yield of fresh coca leaf (mt/ha/year)



3.9

Number of harvests per year (average)



42 % of the coca fields

most productive age (2 to 4 years)



13,300 plants/ha

Density (number of plants per productive hectare)



4 cultivars

Predominance:
Peluceña (74 % fields)
Silvestre (13 % fields)



100 %

Coca farmers produce **cocaine base paste**

Prices



Fresh coca leaf

COP 2,250 kg

4 % reduction compared to 2020



Cocaine base paste

COP 2,093,800 kg

13 % increase compared to 2020



Cocaine base

COP 2,580,600 kg

3 % increase compared to 2020



Cocaine hydrochloride

COP 5,462,500 kg

1 % reduction compared to 2020

Comprising the departments of Vichada and Arauca, the latter of which has not been affected since 2019. In Vichada, 311 ha were detected, breaking a reduction trend that began five years ago. Coca crops are located between the Vichada, Tuparro and Uva rivers and roads that connect with the municipal capital of Cumaribo and smaller towns.

In this department in recent years, work has been done to consolidate a legal economy based on cocoa (Cocoa Triangle), mainly in the south of the department between the villages of Puerto Príncipe, Güerima and Chupabe; however, in this same sector, by 2021, the reactivation of abandoned areas has been identified as a threat to the sustainability of this type of actions (figure 24).

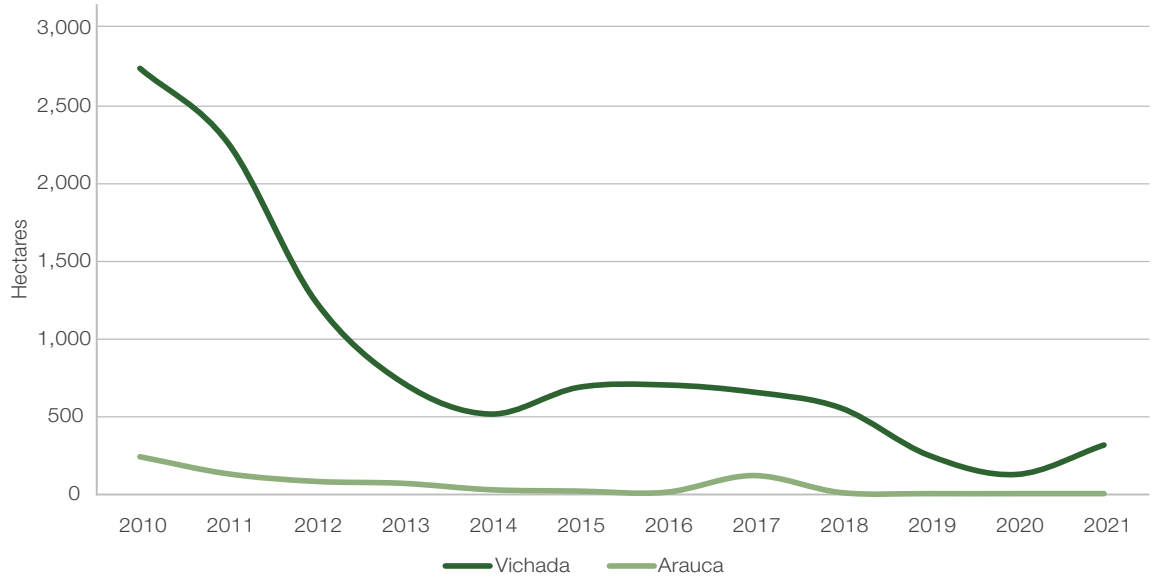


Figure 24. Area under coca crops in the departments of the Orinoco region, 2010-2021

Regarding the Ruta Futuro policy, the largest proportion of crops (60%) is in special management areas of Indigenous Reservations, especially in Santa Teresa del Tuparro, with 126 ha of the 186-ha reported in the category.

There has been an increase in the productive area in the region in the last year

The potential production of coca leaf in 2021 was 1,054 mt with a growth of 10.3% compared to 2020, representing 0.1% of the total coca leaf production at the national level. Despite the growth in the productive area, there was a steady reduction in the annual yield of coca leaf harvested, which was 4.1 mt of coca leaf/ha/year, the second lowest yield reported at the national level. This behavior can be explained by the following factors:

1. ***One of the main characteristics of coca crops in this region is associated with the cultivars that are being used.*** About 74 % of the total plots use the peluceña cultivar, followed by the wild cultivar, which report rather low leaf yields of about 5.0 and 3.5 mt of leaf/ha/year, respectively.
2. ***In this region, one of the highest densities is reported,*** sowing around 13,300 plants per hectare, a factor that influences the yields obtained per unit area, given that there is a greater competition of nutrients per unit plant.

3. ***With respect to the age of the crops, 42% are among the most productive ages,*** between 2-4 years, which for this region are ages that register average yields of 4.6 mt/ha/year.

   With respect to the dynamics associated with cocaine extraction and refining capacity in the region, the update of the last study (2018) reported that all leaf is transformed into PBC within the UPACs; the yield of basic paste obtained per ton of fresh leaf showed a significant decrease of 14 %, going from 1.38 kg PBC/mt leaf in 2013 to 1.19 kg PBC/mt leaf in 2018, one of the lowest yields nationally.

Pricing dynamics

It is important to highlight the positive behavior of PBC prices, which increased by 12.7%, a behavior that stimulates the processing of coca leaf within the farms. On the other hand, the price of coca leaf decreased by 4.3%, which discourages the sale of coca leaf in this region.

Finally, although the Orinoco region does not contribute significantly to the national cocaine market, it has become a border route where drugs can leave Apure through a double tax paid to the different armed groups[153]. The above is evidenced by the interdiction results in this region: in 2021, approximately 497 mt of cocaine paste/base and 1,423 mt of cocaine hydrochloride were seized.

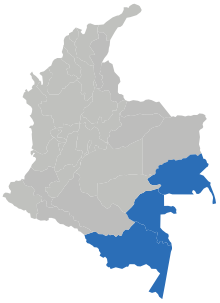
According to the Ombudsman's Office[154], After the departure of the different fronts of the FARC-EP from the territories where they were active, a situation of dispute arose among the other GAIs for territorial control of these areas of the region. These groups include the ELN (Frente de Guerra Oriental (Eastern War Front) [FGO]), which has been expanding towards eastern Colombia through the river routes of Arauca, Vichada, and Guainía, heading towards the Venezuelan border as a drug trafficking route.

There is a dispute between the ELN and Farc-EP dissidents over the use of clandestine drug trafficking airstrips, and there have been a series of homicides over control of illicit economies between members of the ELN Eastern War Front and members of the residual GAO (GAOr) of the Farc-EP dissidents. In this department, the dynamics of territorial control go far beyond drug trafficking, as the control exerted by the ELN is geared more towards fuel smuggling, extortion, and kidnapping[155].

153 "Bandas del narcotráfico tienen pacto de violencia en Arauca". El Nuevo Siglo (2022, 7 de febrero) ("Drug trafficking gangs have pact of violence in Arauca". El Nuevo Siglo (2022, February 7th)), https://www.elnuevosiglo.com.co/articulos/02-07-2022-colombia-sostiene-que-los-grupos-armados-tiene-un-pacto-de-violencia-en-arauca.

154 Delegated Ombudsman's Office for Risk Prevention and Early Warning System, Early Warnings N.º 018-2020 and N.º 023-2021 (2021, October 21st), https://alertastempranas.defensoria.gov.co/Alerta/Details/91811.

155 "Arauca, bajo un conflicto armado más allá de las drogas ilícitas". Verdadabierta.com (2022, 9 de enero) ("Arauca, under armed conflict beyond illicit drugs". Verdadabierta.com (2022, January 9th)), https://verdadabierta.com/arauca-bajo-conflicto-armado-mas-alla-de-las-drogas-ilicitas/.



Coca crops 2021: Amazon region

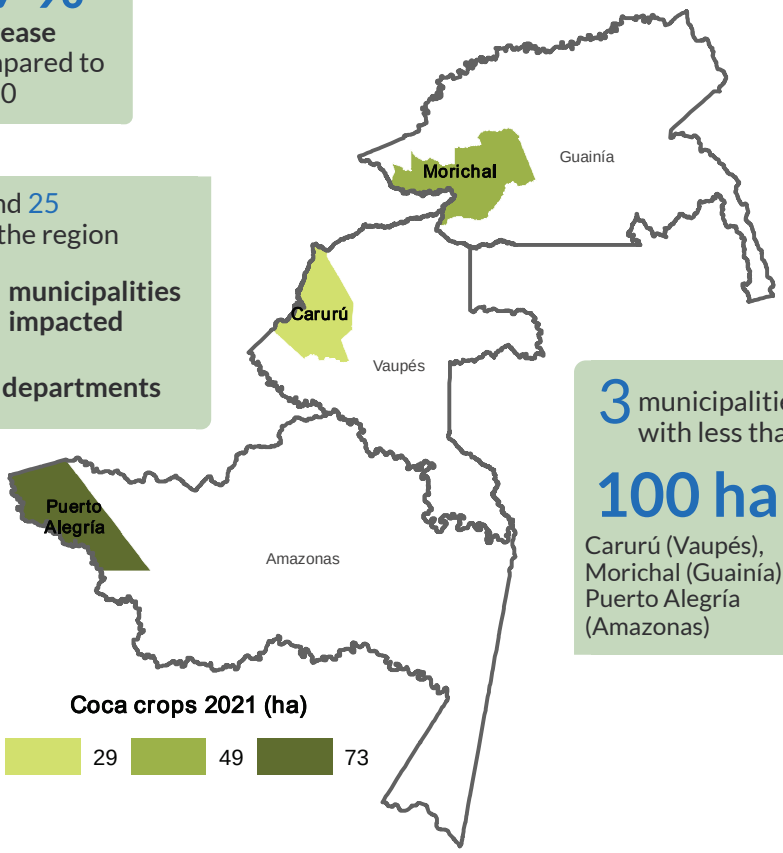
The Amazon region is one of the regions with less area with coca crops, contributes less than **0,5 %** of the national total with **151 ha**.

27 % **increase** compared to 2020

3 departments and 25 municipalities in the region

3 **municipalities impacted**

in 3 **departments**



3 municipalities with less than **100 ha**

Carurú (Vaupés), Morichal (Guainía) and Puerto Alegría (Amazonas)

Made up of the departments of Guainía, Vaupés and Amazonas, it is characterized by dispersed coca crops in areas that are difficult to access and difficult to intervene in. As a border zone, it is a strategic area for drug trafficking.

Production of coca-cocaine



154 ha

Productive area 2021

(Area adjusted according to the conditions that affect its yield throughout the year)



1,064 mt

Potential production of fresh coca leaf

Cocaine base yield

10.8 kg/ha/year

Total cocaine base production 2 tm

Prices



Fresh coca leaf

COP 2,900 kg

18 % reduction compared to 2020



Cocaine base paste

COP 1,972,300 kg

26 % increase compared to 2020



Cocaine base

COP 2,416,700 kg

8 % reduction compared to 2020



Cocaine hydrochloride

COP 5,059,100 kg

24 % increase compared to 2020

Comprising the departments of Amazonas, Guainía, and Vaupés. This region showed an increase of 27 % compared to 2020, interrupting the downward trend that began in 2010. Out of the three departments, only Vaupés showed a reduction in coca crops. On the contrary, Guainía showed 2.5 times more coca than in 2020, from 19 ha to 49 ha, and the Amazon Region from 61 ha to 73 ha in 2021 (figure 25).

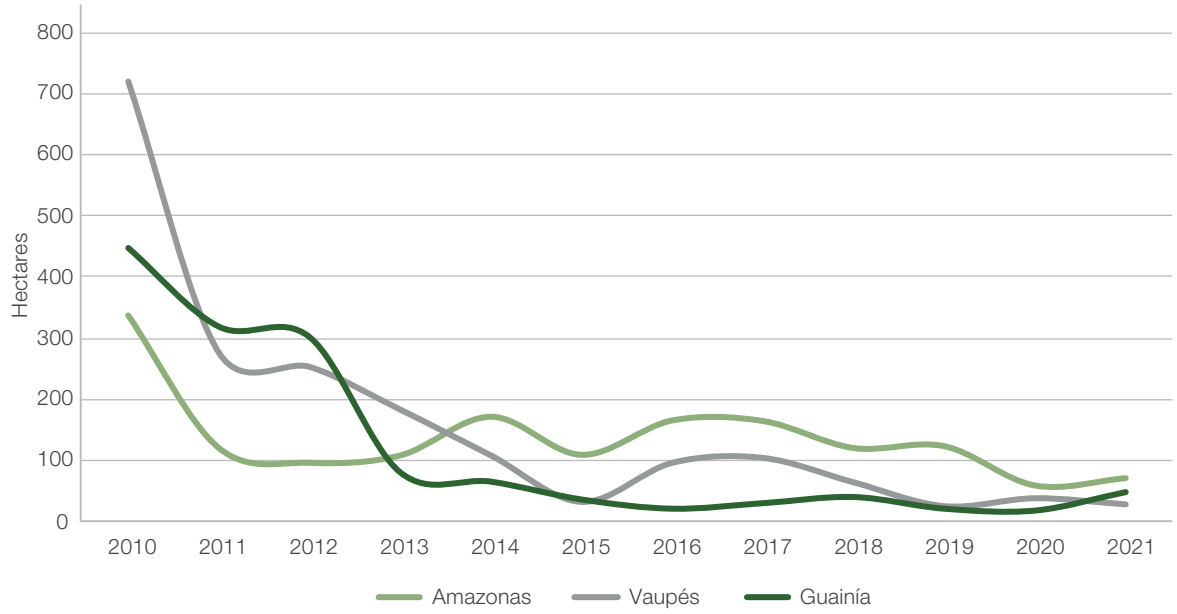


Figure 25. Area with coca crops in the departments of the Amazon region, 2021

With respect to the Ruta Futuro policy, most of the crops (98%) are in special management areas, particularly in Indigenous Reservations, especially the Putumayo Premise, followed by the Middle and Upper Basin of the Inírida River and Arara, Bacatí, Carurú and Miraflores. The rest of the crops are located in territories associated with forest reserves established by Law 2.a and in the border zone with Peru.

Between illegal economies and drug trafficking by transnational criminal groups

Since production and yield studies began, the Amazon region has been known for having few coca crops, so its potential coca leaf production has always been among the lowest in the country. This region has become a strategic area for drug trafficking and transportation.

With regard to price dynamics, it is worth noting that PBC and cocaine hydrochloride showed increases of 25.5% and 23.9%, respectively, while prices of fresh coca leaf and cocaine base showed a downward trend of 18.3% and 8.4%, respectively. It is important to note that this region is more associated with international trafficking of coca derivatives, as there are records of seizures of PBC and cocaine in border areas.

According to the results of the report *Un clima peligroso (A Dangerous Climate)*, one of the main findings is that “the escalation of resource hoarding and illegal economic

activities such as illicit crops and drug trafficking, mining, cattle ranching and agriculture, not only drove environmental degradation and deforestation in the region, but also increased violence"[156].

This region's dynamics are enhanced by other criminal activities such as human trafficking, drug trafficking, illegal mining, and deforestation, which facilitates the existence and operations of criminal gangs, common criminals, mafias and, in particular, drug traffickers. The Amazon region has been of great interest to the different illegal armed groups involved in the conflict, including guerrillas, paramilitary groups, drug traffickers and organized crime, and more recently dissidents of the FARC-EP.

The presence of armed actors in this region is associated with Farc-EP dissidents, which have strengthened in the departments of Vaupés and Guainía and exert significant control over the population[157]. They operate differently in the Amazon region, as the dissidents are in alliance with transnational criminal organizations -- mainly Brazilian, such as the Primer Comando de la Capital (First Capital Command, PCC) -- wherewith they maintain a strong territorial control over drug trafficking and illegal mining routes. These routes supply the local consumer market in Brazil as well as international trafficking, especially to Africa and Europe[158].

[156] Ideas for Peace Foundation (FIP) and Adelphi, with support from WWF, Foundation for Conservation and Sustainable Development (FCDS, from its name in Spanish), Frankfurt Zoological Society (FZS) Colombia, Amazon Conservation Team (ACT), Gaia Amazonas Foundation, Tropenbos and the Amazon Territorial Directorate of National Natural Parks of Colombia, A Dangerous Climate. Deforestation, climate change and violence against environmental defenders in the Colombian Amazon (Berlin WWF Germany 2021).

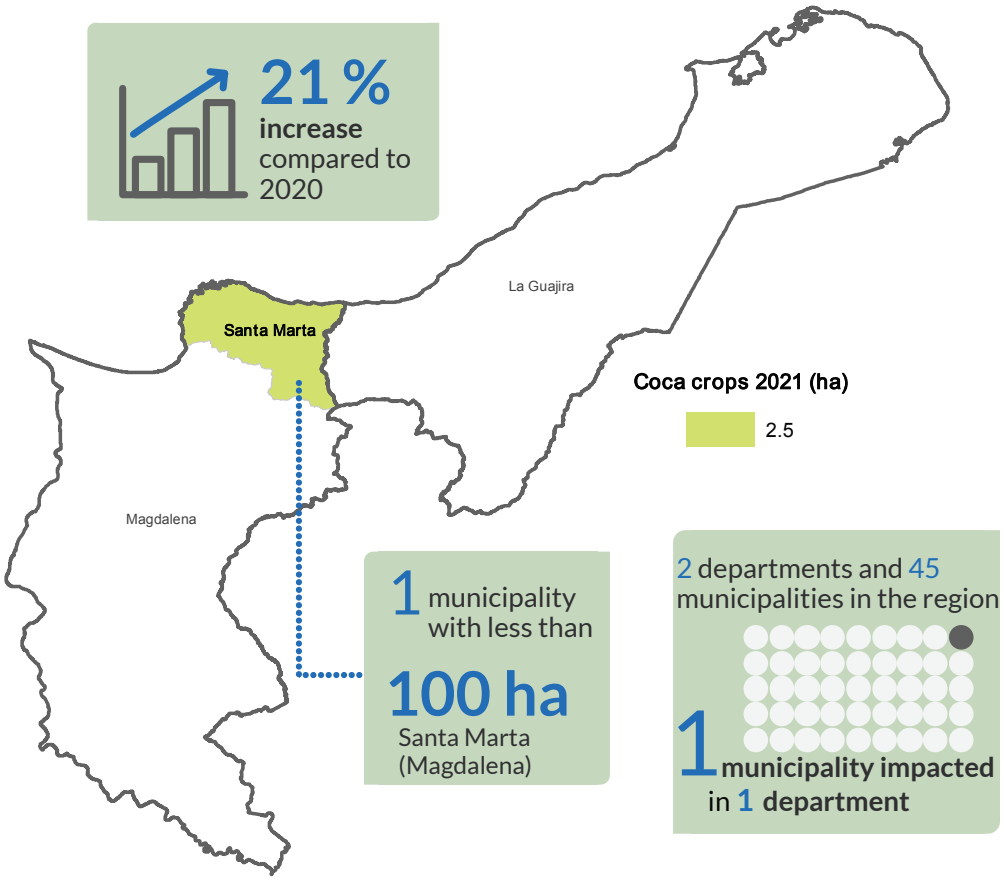
[157] Fundación Ideas para la Paz (FIP), "Ni paz ni guerra, Escenarios híbridos de inseguridad y violencia en el gobierno de Iván Duque", Serie de Informes No. 36, (Bogotá, Mayo de 2022) (Ideas for Peace Foundation (FIP), "Neither peace nor war. Hybrid scenarios of insecurity and violence in the government of Iván Duque". Report 36 (2022), https://ideaspaz.org/media/website/FIP_Infome_NiPazNiGuerra.pdf.

[158] Instituto de Estudios para el Desarrollo y la Paz (Indepaz), Los focos del conflicto en Colombia. Informe sobre presencia de grupos armados (Bogotá: Autor, septiembre del 2021) (Institute for Development and Peace Studies (Indepaz), The hotspots of the conflict in Colombia. Report on the presence of armed groups (Bogotá: Author, September 2021), http://www.indepaz.org.co/wp-content/uploads/2021/10/INFORME-DE-GRUPOS-2021.pdf.



Coca crops 2021: Sierra Nevada region

Sierra Nevada is the region with less area with coca crops, with just **2.5 ha**.



Comprised of the departments of La Guajira and Magdalena, the region has low coca impact and because it has only one affected municipality, low growing densities and is isolated from other production centers, it can be prioritized for coca crop eradication.

Production of coca-cocaine



3 ha

Productive area 2021

(Area adjusted according to the conditions that affect its yield throughout the year)



5 mt

Potential production of fresh coca leaf

Cocaine base yield

2.9 kg/ha/year

Total cocaine base production **0,01 tm**

Prices



Fresh coca leaf

COP 1,350 kg

4 % reduction compared to 2020



Cocaine base paste

COP 1,300,000 kg

12 % reduction compared to 2020



Cocaine base

COP 1,946,500 kg

7 % reduction compared to 2020



Clorhidrato de cocaína

COP 3,820,900 kg

24 % increase compared to 2020

Comprised of the departments of Magdalena and La Guajira (no coca crops reported for the last three years). Although coca crops impact remains low (2.5 ha), coca crops continue to be grown in the buffer zones of the Sierra Nevada de Santa Marta (Mountain Range) National Park and in the indigenous reservation of the same name in the municipality of Santa Marta (map 9). According to the Observatorio de Drogas de Colombia (Colombian Drug Observatory), in 2021, 2 ha were eradicated (figure 26).

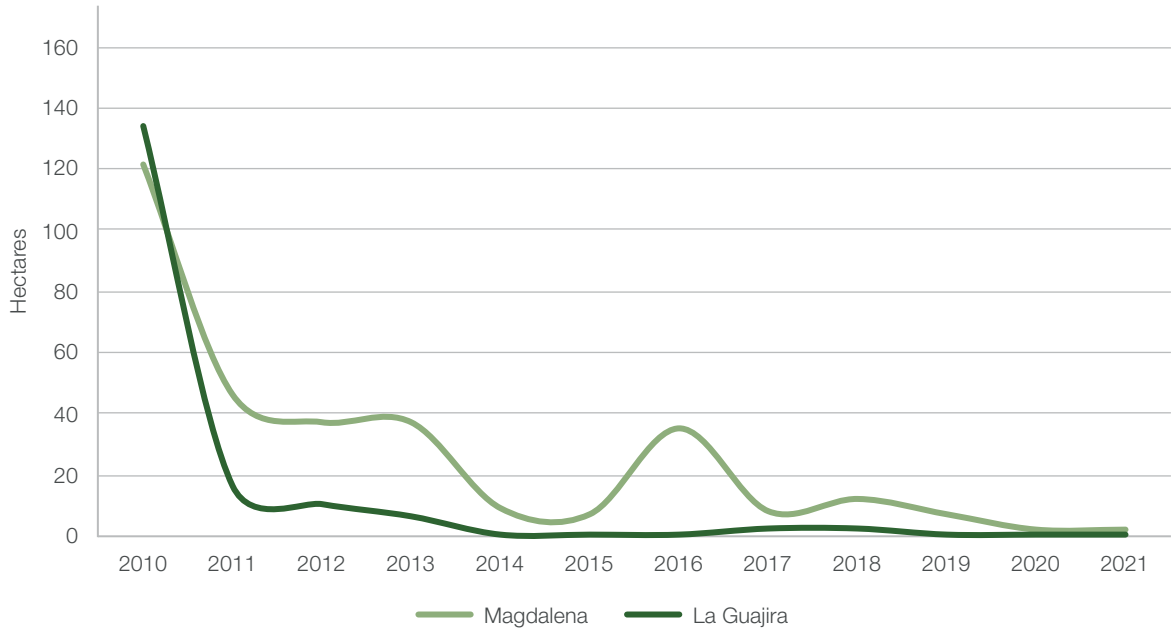


Figure 26. Area with coca crops in the departments of the Sierra Nevada region, 2010-2021

Since 2005, the Sierra Nevada region has shown a remarkable reduction of 99.9%, with only 5 mt of coca leaf potential in 2021, mainly due to the voluntary eradication by the indigenous communities of the area, the consolidation of ecotourism in the Sierra Nevada of Santa Marta and the National Program for the Integral Substitution of Illicit Coca Crops in La Guajira and Magdalena, embodied in the growing of cocoa and coffee[159].

Regarding price dynamics in the region, cocaine hydrochloride showed an increase of 24 % reaching COP 3,820,900 per kilogram in 2021; even so, it is one of the lowest records since the beginning of the historical price series, considering that for 2018 it reached a maximum of COP 5,835,400. Conversely, the price of coca leaf decreased by 4% and the by-products basic paste and cocaine base showed a decrease of 12 % and 7% respectively, becoming the lowest

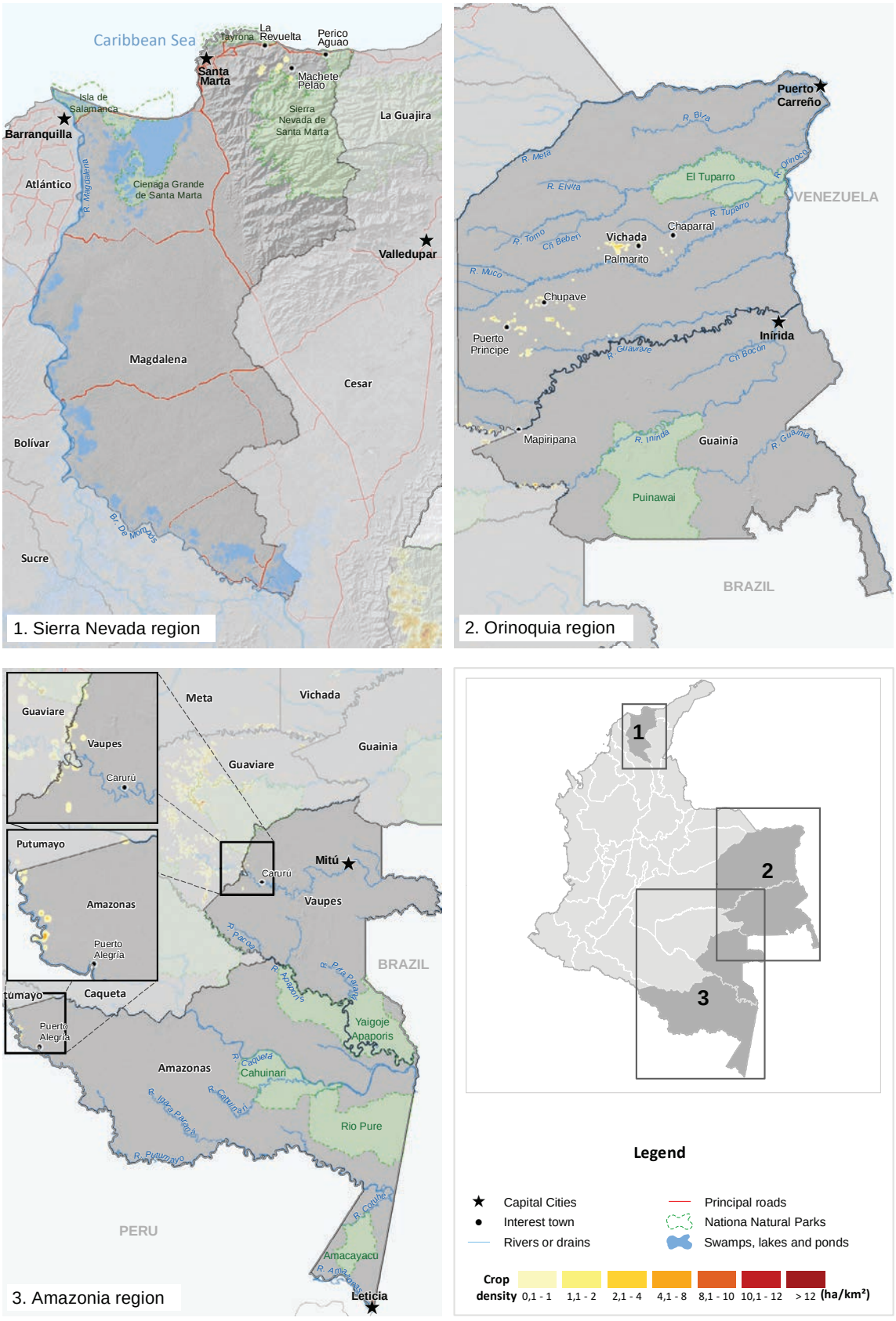
[159] See: Fernando Vega, "Turismo y posconflicto. Una reflexión a partir del escenario del Camino a Teyuna (Ciudad perdida)". Turismo y Sociedad, n.º XXI (2017) (Fernando Vega, "Tourism and post-conflict. A reflection from the scenario of the Road to Teyuna (Lost City)." Tourism and Society, no. XXI (2017): 165-192): 165-192; "Sierra Nevada de Santa Marta: de la Marihuana y la Coca al Cacao", Portafolio (2017, 27 de agosto) ("Sierra Nevada de Santa Marta: from Marijuana and Coca to Cacao," Portfolio (2017, August 27th).

prices in the series since 2005. It is worth noting that the Sierra Nevada region is linked to the interdepartmental transportation and international trafficking of coca products, especially cocaine hydrochloride.

The presence of armed groups in the Sierra Nevada region, such as Los Pachencas, which have had control of transportation and drug trafficking routes in the north of the country to the United States, the Dominican Republic and Europe[160], may be related to the significant amount of cocaine hydrochloride seized in the region by authorities in 2021, which was 49.3 mt (7% of the total amount seized in Colombia) and comparable to the record peak of 2018[161], coming from other regions such as Bajo Cauca in Antioquia and Catatumbo with destination to the Colombian Caribbean.

[160] Instituto de Estudios para el Desarrollo y la Paz (Indepaz), Los focos del conflicto en Colombia. Informe sobre presencia de grupos armados (Bogotá: Autor, septiembre del 2021) (Institute for Development and Peace Studies (Indepaz), The hotspots of the conflict in Colombia. Report on the presence of armed groups (Bogotá: Author, September 2021)), http://www.indepaz.org.co/wp-content/uploads/2021/10/INFORME-DE-GRUPOS-2021.pdf.
[161] Colombian Drug Information System, Colombian Drug Observatory, Ministry of Justice and Law. Data generated by the Ministry of National Defense (https://www.minjusticia.gov.co/programas-co/ODC/Paginas/SIDCO-Incautaciones.aspx), June 2021.

Map 9. Coca crops density in the Sierra Nevada, Orinoco, and Amazon regions, 2021



Sources: Colombian Government; National coca cultivation monitoring system supported by UNODC; for national parks: Natural National Parks of Colombia.
The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations.

CHAPTER 4

Colombian government's actions to reduce drug supply

The Comprehensive Policy to Confront the Drug Problem - Future Route is the strategic framework adopted by the National Government for the 2018-2022 period, which is based on four strategic pillars and a cross-cutting pillar: 1) Reduce the consumption of psychoactive substances and its impact; 2) Reduce drug supply for internal and external markets; 3) Disarticulate and disrupt criminal structures; 4) Impact criminal economies and revenues; and 5) Territorial transformation and transition to licit economies.

Future Route gathered a series of experiences, lessons learned, guidelines, as well as national and international commitments in force at the moment of its formulation and issuance in 2018, so it adopted a broad and comprehensive view that addresses not only cultivation, but also the drug value system in all its components, including cultivation, production, trafficking, drug consumption and related crimes, and has set as its goals the disarticulation of organized crime structures and the disruption of criminal revenues and economies derived from drug trafficking.

Through a broad consultation and coordination process, the Future Route Policy Action Plan was developed with the participation of the National Planning Department (DNP) and 29 entities, which defines 268 interinstitutional actions in the implementation of which 43 entities are involved nationwide. Therefore, this plan constitutes the National Government's road map for the development of actions aimed at the sustainable reduction of the drug problem in the country.

In this context, the Future Route Policy is articulated with other policies concerning peace, defense, coexistence and citizen security; mental health; youth; children; family; gender; education; human immunodeficiency virus (HIV); stabilization; asset laundering, among others.

Although - as mentioned - the policy goes beyond cocaine production reduction and this report emphasizes on strategies towards that end, focusing on the following aspects:

1. Reduce coca cultivation and the conditions that facilitate its cultivation.
2. Reduce the capacity to transform coca leaves into cocaine.
3. Reduce the amount of cocaine reaching national or international markets.
4. Dismantle and disrupt criminal structures.

Actions to reduce coca cultivation and the conditions that facilitate its cultivation

Coca cultivation eradication

According to the Permanent Ministerial Directive 013/2020 "Guidelines for the coordination, articulation and monitoring of illicit crop eradication and prohibition activities carried out by Law Enforcement Authorities" of the Ministry of National Defense, Colombia has four different modalities for illicit crop eradication:

- **Modality 1:** aerial spraying, in accordance with the guidelines established by the National Narcotics Council. This modality has been suspended since 2015.
- **Modality 2:** eradication carried out by Mobile Eradication Groups (GME) with the security provided by Law Enforcement authorities.
- **Modality 3:** eradication carried out directly by Law Enforcement personnel, through different programs and tools authorized by the National Government.
- **Modality 4:** eradication carried out by growers through different alternative development or crop substitution programs, with or without the support of Law Enforcement authorities.

In order to carry out the eradication tasks - as part of its planning processes - Law Enforcement authorities verify the exclusion of areas susceptible to prior consultation and identifies areas with "Substitution Agreements in Force", in accordance with the information reported by the Illicit Crop Substitution Directorate of the Agency for Territorial Renewal (ART). Additionally, a security assessment of the area is carried out and tactical assessments made by the field commander are considered to define the most appropriate intervention modality.

In 2021, eradication actions were mainly conducted in Putumayo, Nariño, Bolivar, Guaviare, Antioquia and Norte de Santander, as they were identified as the departments where the main productive hotspots areas are located. Thus, between August 7, 2018 and December 31, 2021, Law Enforcement authorities reported the eradication of 358,566 ha of illicit crops in total.

Also, during this period, 53% of the eradication (189,919 ha) was concentrated in the Future Zones - meaning - in those regions most affected by violence, illegality and institutional weakness, places where Unified State Action has been implemented through differentiated, comprehensive and interinstitutional strategies taking into account the characteristics of each zone.

Meanwhile, the eradication of 10,498 ha of illicit crops in strategic ecosystems of the country - such as National Natural Parks (NNP) - by Law Enforcement authorities between August 7, 2018 and December 31, 2021, has been of special importance.

Illicit Crop Substitution Integral National Program (PNIS)

The persistence of illicit crops is linked to the vulnerability of the afflicted territories; for this reason, in addition to the efforts to eradicate illicit crops, the Government promotes the transition into legal economies by encouraging the abandonment of illicit production and promoting local entrepreneurship. This purpose involves the joint work of the ART, the Rural Development Agency (ADR) or the National Land Agency (ANT), which offer a wide range of sustainable and profitable projects for producers under these initiatives.

The Illicit Crop Substitution National Program (PNIS) stands out in this context, whereby the National Government has invested COP 1.3 trillion (USD 341,000,000) through the Colombia in Peace Fund between August 2018 and December 2021. The accumulated amount of resources for the Program is COP 1.7 trillion (USD 453,000,000), which correspond to operating expenses, contracts and agreements with operators.

A total of 99,097 families were linked to the PNIS, located in 56 municipalities in 14 of the country's departments. Among these beneficiaries, 35,834 women are the heads of their families (24,541 female growers, 6,121 female non-growers and 5,172 female harvesters). During the administration's mandate, 21,437 families, who were already linked to the program, entered the intervention route.

Under this Program, 45,761 hectares of illicit crops have been voluntarily eradicated. Moreover, the United Nations Office on Drugs and Crime (UNODC) - as part of the PNIS monitoring processes - verified a 98% of compliance with the voluntary eradication commitments regarding illicit crops. During the administration's mandate, 19,543 hectares of illicit crops have been reduced through voluntary and assisted eradication, with an investment of COP 29,058.68 million (USD 7.6 million).

On the other hand, follow-up activities for the replanting or regrowth of crops on compromised lands reported a persistence of 0.8%.

The following is a list of some of the achievements accomplished with the implementation of the PNIS:

- A total of COP 143,989 million (USD 37 million) in resources have been allocated to provide Comprehensive Technical Assistance services to 75,139 families in 56 municipalities and 14 departments. Out of the total number of beneficiaries receiving Comprehensive Technical Assistance, 27,908 are women.
- A total of COP 151,626 million (USD 39,000,000) has been invested, 66,029 families have received goods and supplies for the implementation of Home Vegetable Garden projects as part of the Self-Sustainability and Food Security

component. Among these beneficiaries, 24,684 are women.

- A total of COP 290,112 million (USD 76,000,000) has been allocated for the execution of Productive Projects for 26,083 families, of which 11,252 women are the heads of their households.

- An investment of COP 115,565 million (USD 30,000,000) for the hiring of 5,816 former coca leaf collectors under service contracts with local organizations to carry out community interest activities. Out of the total number of harvesters hired as community representatives, 2,094 are women.

Land access for Integral Rural Development

By 2021, the National Land Agency (ANT) regularized a total of 245,581 hectares. This was achieved through the issuance and registration of 10,753 property titles for the benefit of 17,880 peasant and ethnic families throughout the country.

Similarly, ANT contributed a total of 515,647 hectares to the National Land Fund. It also granted 155,898 hectares through the Land Fund, benefiting 4,330 families.

A total of 39 collective titles were regularized for ethnic communities in 2021 (31 for indigenous communities and 8 for black communities), with a total area of 163,344 hectares for the benefit of 7,124 families.

A total of 19,524 rural women with tenure rights recognized through titles issued in their names or with their partners were benefited, with an adjudicated area of 47,598 hectares.

Territorially Focused Development Programs (PDET)

PDETs are a special planning and management instrument aimed at implementing rural development and the structural transformation of the countryside more rapidly, based on a plan built on a participatory basis from the territory.

Therefore, 170 municipalities grouped into 16 subregions were prioritized based on the following criteria:

1. Levels of poverty, particularly extreme poverty and unsatisfied basic needs.
2. Level of impact derived from the conflict.
3. Weak administrative institutions and management capacity.
4. Presence of illicit crops and other illegal economies.

The following results are presented under this initiative as of December 31, 2021:

- More than COP 11.73 trillion pesos have been allocated through different mobilizing sources such as OCAD PAZ, Works for Taxes, National General Budget Peace Tracer, International Cooperation and ART Projects - FCP (Colombia in Peace Fund); and among them, more than COP 433 billion thanks to the decisive support of international cooperation.
- The OCAD PAZ has approved 563 projects in PDET and non-PDET municipalities with an investment of COP 6.25 trillion distributed across the 16 PDET subregions:

- 1186 transportation projects totaling COP 2.6 trillion (including 1 national project for tertiary road improvement amounting to COP 86,183 million, in 14 subregions and 68 PDET municipalities).
- 140 mining and energy projects worth COP 1.38 trillion.
- 111 water supply and basic sanitation projects amounting to COP 1 trillion.
- 53 agriculture and rural development projects worth COP 739,972 million.
- 14 ICT projects totaling COP 175,430 million.
- 12 housing, city and territory projects worth COP 128,553 million.
- 20 educational projects worth COP 119,139 million.
- 6 environmental and sustainable development projects worth COP 52,218 million.
- 9 healthcare and social protection projects worth COP 25,711 million.
- 4 sports and recreation projects worth COP 21,049 million.
- 6 statistical information projects worth COP 19,816 million.
- 1 social inclusion project worth COP 1,523 million.
- 1 territorial government project worth COP 1,141 million.

- Works for taxes: A total of 76 projects have been approved in PDET municipalities and PDET- Zones Most Affected by the Armed Conflict (ZOMAC) worth COP 607,456 million, of which 8% are structured and financed; 54% are under execution and 38% have been completed.

Peace Tracer

In compliance with the provisions of Article 220 of Law 1955/2019 (National Development Plan [PND][162]), several sectoral roundtables have been held with the Presidential Advisory Office for Stabilization and Consolidation, the Presidential Advisory Office for Compliance Management, the DNP, the Ministry of Finance and Public Credit and more than 28 national entities, the Ministry of Finance and Public Credit and more than 28 national entities whose purpose has been to provide support in aligning investment project value chains with the Implementation Framework Plan (PMI) indicators and the initiatives of the Regional Transformation Action Plans (PATR) according to the guidelines defined for marking.

As a result of this exercise, between 2019 and 2021, 34 national entities corresponding to 16 sectors have been able to identify the budgetary allocations destined to the attention of the Final Agreement, with a special emphasis on the PDETs implementation; by December 31, 2021, these entities have made available resources equivalent to COP 3.68 trillion. The social inclusion, labor, education, mines and energy, agriculture and rural development, Presidency of the Republic and housing, city and territory sectors represent 86.6% of the total resources executed by these entities in the PDET municipalities.

[162] Colombia. Congress of the Republic. Law 1955/2019. National Development Plan, 2018 - 2022: Pact for Colombia, pact for equity (May 29, 2019).

Other PDET projects

A total of 404 projects have been approved for COP 729,067 million. This group includes projects financed by the Sustainable Colombia Fund, territorial intervention projects, productive projects and PDET-ART works.

- **PDET-ART works:** 1,800 projects have been approved in 170 PDET municipalities in the 16 subregions with an investment of COP 355,433 million. Out of the approved projects, 64.8% have already been completed or delivered, 24.3% are under execution, 7% are being structured and 3.9% are already structured.
- **Productive projects-ART:** From August 2018 to December 31, 2021, 97 projects worth COP 85,872 million were approved, out of which 94 projects are completed and 3 are under structuring.
- **Territorial intervention projects:** 104 interventions have been approved for COP 49,547 million, out of which 11 are structured, 44 are under execution and 49 have been completed.
- **Sustainable Colombia Strategy"**
  - **Phase I:** 69 projects worth COP 243,206 million are under execution.
  - **Phase II:** 134 projects worth COP 350,441 million are under execution.
  - **Total:** 203 projects worth COP 593,647 million have been approved.
- **International cooperation:** 256 projects or interventions carried out by different cooperating partners have been identified with an investment of COP 433,534 million, out of which 6 are structured and financed for COP 246,491 million; 27 are under execution for COP 129,393 million and 223 have been completed for COP 57,651 million.

The Government has a total of 1,879 completed projects with an investment of COP 2.70 trillion; of these, 10,331 initiatives count with an active implementation path.

Alternative Development

UNODC assists the Government of Colombia in the formulation, implementation, monitoring and follow-up of various crop substitution and Alternative Development programs. These programs are part of the pillars of the strategy: 1) voluntary substitution of illicit crops, 2) land access and formalization, 3) agricultural products commercial competitiveness, 4) comprehensive project monitoring, 5) rural development projects and 6) environmental protection and conservation projects, which involve gender and ethnic differential approaches in a transversal manner.

As part of the efforts of the Presidential Agency for International Cooperation (APC Colombia) and the coordination of the Presidential Council for Stabilization and Consolidation (CPEC) through ART, a contribution of USD 6.2 million has been arranged by the Korea International Cooperation Agency (KOICA). These resources are intended to co-finance the "Strengthening of the agricultural economy of the Department of Putumayo through cultivation" project, which will benefit 700 PNIS families in 7 municipalities of the

Department of Putumayo with productive projects that include the production of 490 ha of sacha inchi as main crops and also 490 ha of cocoa and 195 ha of banana as complementary crops over a six-year period (2020-2025).

Moreover, UNODC supports the monitoring and implementation of the "Tailor-made" substitution strategy, with which voluntary substitution agreements are reached and economic alternatives are built within the framework of the existing productive lines in the territory to be intervened. The objective is the voluntary eradication of illicit crops in the territory and the integral intervention of the State with the legal productive transformation and environmental sustainability components; socio-corporate and commercial strengthening; technical training; ownership formalization; implementation of PDETs and the Integral Plans for Substitution and Alternative Development (PISDA), the latter for those territories that are not part of PDET territories.

Indigenous peoples: looking for their own way out of drug trafficking

The recent increase in coca cultivation production in indigenous territories generates a high level of concern, due to the differentiated impacts caused by this illegal economy in the cosmovision and institutionality of the indigenous peoples affected by this problematic in the country. In order to contribute to the development of combined actions to address this reality, the Ministry of Justice and Law, together with UNODC for the Andean Region and the Southern Cone, continue working on the design of action strategies to address the drug problem in indigenous territories. In 2021, research was carried out with the Nasa peoples of Cauca and the Inga and Awá peoples of Putumayo, with whom differentiated action strategies were designed in an articulated manner and focused on the consolidation of autonomy and self-governance, the strengthening of cultural identity traits, the promotion of local productivity, the pursuit of stability in security conditions, as well as the fostering of life horizons and good living in community to address the drug problem in the afflicted territories.

Afro-descendant Communities: an opportunity to address the increasing problematic

The increasing vulnerability conditions have led to an increase in coca cultivation production in the territories of black communities in the country. In the search for strategies to overcome this problem in the Afro-descendant Communities, the Ministry of Justice and Law and UNODC for the Andean Region and the Southern Cone carried out the first study focused on the design of action strategies to transform the drug problem in the Guajuí River Afro-descendant Community, located in the municipality of Guapi (Cauca), whose result is the characterization of households and the definition of a series of strategies focused on rights and ethnicity aimed at strengthening licit production and promoting an integral and sustained development, recognizing the capabilities and cultural identity traits as elements that contribute to overcoming the drug problem and strengthening the community's life project.

Colombia-United States long-term plan

It is a bilateral strategy that aims to invigorate comprehensive rural development within the 120 PDET municipalities most affected by illicit flows, dynamics of criminal groups and related violence. The plan is designed from a holistic, multidisciplinary, articulated and sequential approach led by the administration of President Ivan Duque, to achieve sustainable and lasting solutions.

The plan is based on Colombia's lessons learned and experiences in the war on drugs, seeking an adequate articulation and efficient combination of actions that will lead to the stabilization of the territories, an effective institutional presence and comprehensive rural development. Given the complex and changing criminality, the plan is strengthened by the mainstreaming of approaches and differential factors such as innovation and sustainability, environmental protection, a gender approach, respect for human rights and a commitment to the youth living in rural areas of the country. Accomplishing this objective will unleash the development potential of these afflicted territories and contribute to the benefit of all Colombians and countries adversely affected by cocaine production and trafficking.

In this regard, the plan articulates actions with a social and economic development emphasis, as well as a focus on fighting cocaine production and related illicit economies. Thus, it is an efficient combination and sequencing of actions aimed at territorial stabilization through an effective institutional presence and comprehensive rural development. Supported by the use of new technologies of the fourth industrial revolution and other technological innovations that continue to emerge, the plan for Colombia will be implemented under five pillars:

- **Pillar 1.** Comprehensive rural transformation.
- **Pillar 2.** Market access.
- **Pillar 3.** Rural defense and security.
- **Pillar 4.** Rule of law and institutional strengthening.
- **Pillar 5.** Trust and legitimacy.

Finally, it is important to mention that the plan is strengthened by the mainstreaming of approaches and differential factors, as commitment towards sustainability in light of the changing characteristics of the threat and the current context. Some of the approaches that make it different and more sturdy are:

- Innovation and sustainability.
- Environmental protection.
- Gender focus.
- Youth inclusion.
- Respect for human rights.

Actions to reduce the capacity to transform coca leaves into cocaine

Between August 7, 2018 and December 31, 2021, 151,513 mt (metric tons) of solid substances and more than 106,000,000 liters of liquid substances were seized.

In 2021, 56,475 mt of solid chemical substances and 42,000,000 liters of liquid substances were seized in Colombia; this represents an additional 29% over what was done in 2020, according to the Colombian Drug Observatory (ODC).

Additionally, in 2021 there was an increase in the dismantling of primary and cocaine hydrochloride production infrastructures by 11% and 1.3% - respectively - compared to 2020. As of December 31, 2021, President Duque's administration had destroyed 947 crystallization sites and 17,639 primary production infrastructures.

According to ODC, an entity part of the Ministry of Justice and Law - by 2021 - nine infrastructures used for clandestine manufacture of potassium permanganate ($KMnO_4$) were dismantled nationwide, 28.5% more than in 2020, out of which 33.3% were located in the department of Putumayo and the remaining ones in Antioquia, Cesar, Meta, Nariño and Norte de Santander. In Bogota, an infrastructure for clandestine production of potassium permanganate was detected and dismantled - a situation that had not occurred since 2013[163] - which can be interpreted as the autonomous supply to obtain the chemical substances necessary for various drug production processes by resorting to artisanal practices, without relying directly on the deviation of the licit industry to avoid limiting the processes due to the lack of the chemical substance (figure 27).

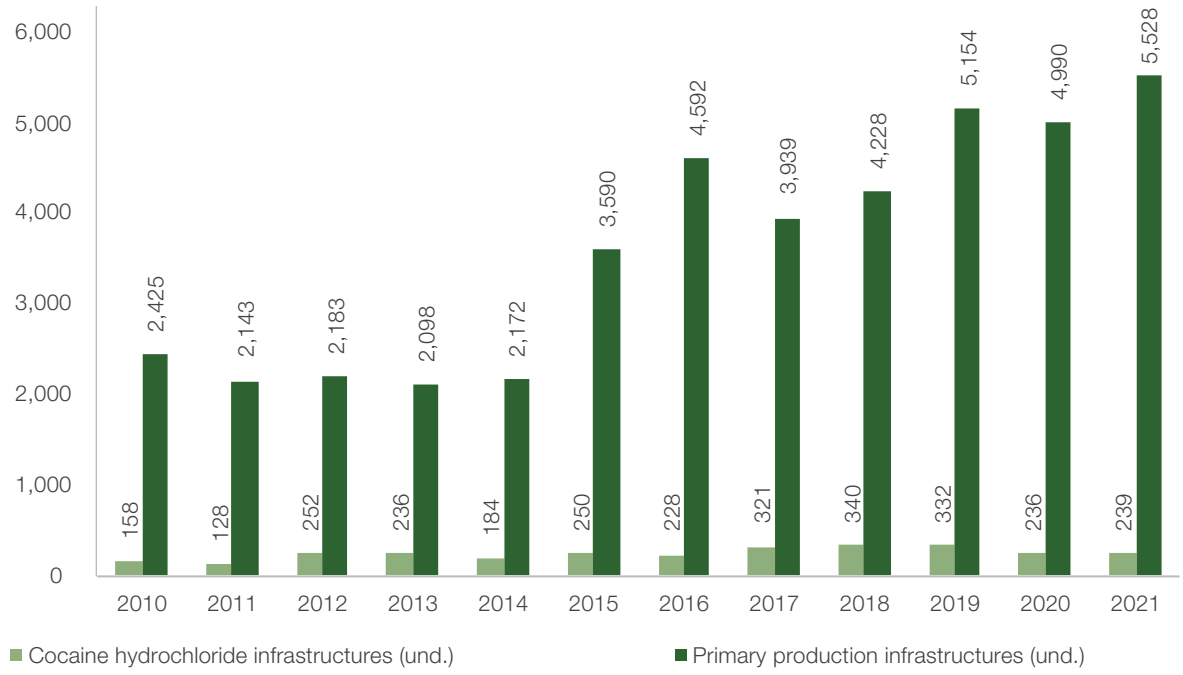


Figure 27. Operations reported in the dismantling of cocaine production infrastructures in Colombia, 2010-2021

Source: Colombian Drug Information System, Colombian Drug Observatory, Ministry of Justice and Law. Data generated by the Ministry of National Defense. Cut-off date: June 2022.

163 Colombian Drug Information System, Colombian Drug Observatory, Ministry of Justice and Law. Data generated by the Ministry of National Defense. August 2022.

Actions to reduce the amount of cocaine reaching national or international markets

Seizures

The Colombian government's regional commitment to strengthening drug seizure operations has been one of its top priorities, as this is a time when it can have a greater impact on drug trafficking organizations' profits. Colombia carries out the largest amount of cocaine seizures in the region (close to 40%), followed by the United States with 20% and Ecuador with 10%.

Since 2018, cocaine seizures in Colombia have been increasing: in 2021, a record 669 mt was reached, representing an increase of 32% in relation to the results achieved in 2020. Additionally, 88,655 kg of cocaine paste/base were seized in 2021, 19% more than in 2020. This is the largest amount of cocaine paste/base seized in one year in the country (figure 28).

During the period from August 7, 2018, to December 31, 2021, results obtained in terms of seizures include 1,520 mt of cocaine hydrochloride, 240 mt of cocaine paste/base and 1,664 mt of cannabis.

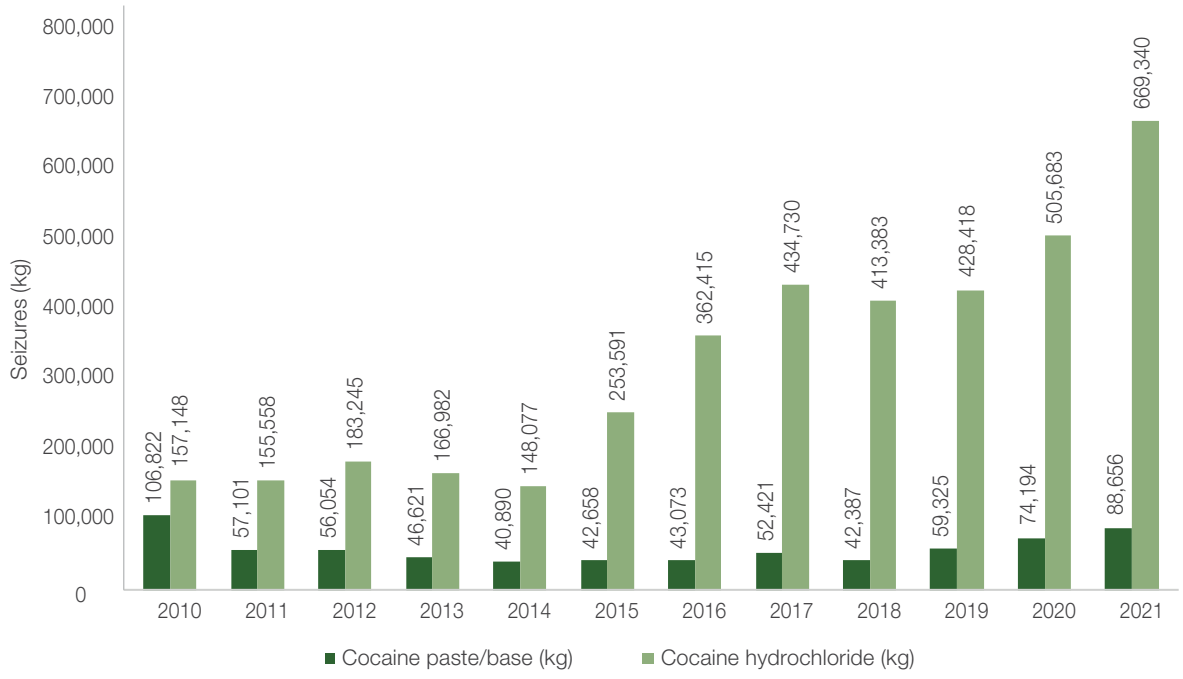


Figure 28. Reported cocaine seizure operations in Colombia, 2010-2021

Source: Colombian Drug Information System, Colombian Drug Observatory, Ministry of Justice and Law. Data generated by the Ministry of National Defense. Cut-off date: June 2022.

Based on regional and subregional cooperation actions, joint investigations and knowledge and information exchange, the operations and strategies reported in the framework of the "Orion" Naval Campaign have been implemented.

Eight versions of the "Orion" Naval Campaign, or International Naval Campaign to Combat Drug Trafficking (Operation Orion), were executed during President Duque's administration, together with more than thirty countries. The results achieved in its various phases demonstrate the effectiveness of this initiative (table 3).

Table 3. "Orion" Naval Campaign Results, 2018-2021

Seized material	Orion II	Orion III	Orion IV	Orion V	Orion VI	Orion VII	Orion VIII	Total
Cocaine (mt)	27.2	48.3	49.3	50.3	90.7	116.3	145.3	527.4
Cannabis (mt)	5.6	19.7	10.2	7.3	18.6	95.1	66.2	222.7
Individuals Arrested	143	160	227	150	413	539	575	2,207
Countries involved	13	18	22	26	29	38	40	-
Operating days	30	45	45	45	45	45	45	-

Source: Orion campaign operational results, Colombian Navy.

In terms of economic impact, it is estimated that cocaine seizures from the "Orion VII and VIII" Naval Campaign had an impact of more than USD 9,956 million - which directly affects the finances of criminal organizations and their logistical support – representing some substantial achievements in supply reduction, security and public health worldwide.

The Orion Naval Campaign indeed reflects the fulfillment of the commitments acquired by the Colombian State in multiple international instruments - including those contemplated in the 1988[164] United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances - to deal more effectively with the various aspects of the illicit narcotics traffic. It is noteworthy that Operation Orion continued to be implemented amidst the health emergency caused by COVID-19.

Actions to dismantle and disrupt criminal structures

Dismantling criminal structures, reducing revenues and strategic control of border territories are among the main strategic objectives of the Future Route Policy.

As part of the development of operations against criminal drug trafficking networks, in 2021 Law Enforcement authorities dismantled criminal structures dedicated to the trafficking of cocaine by air, river and sea, to countries in Africa, Asia, Europe and North America. In this regard, the arrests of high-value targets or kingpins eliminated, especially in October - such as the arrest of Dairo Antonio Usuga alias "Otoniel", leader of the Clan del Golfo - are noteworthy, as well as the arrests of members of the same criminal

[164] United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988, Vienna, 20 December 1988.

structure in Panama. Furthermore, the cooperation of Law Enforcement authorities and the Prosecutor General's Office[165] with international counterparts led to the capture of alleged members of transnational drug trafficking networks, as well as the dismantling of drug trafficking groups in Spain, France, the Dominican Republic and Ecuador.

As a result of this approach, the government has worked to impact and dismantle criminal structures such as the Organized Armed Groups (OAGs), which, through drug trafficking, promote various criminal activities both nationally and internationally.

Moreover, between August 7, 2018, and December 31, 2021, Colombia has extradited 638 people under different offenses, of which 523 people (82%) correspond to drug trafficking-related offenses; in 2021, 198 people were extradited due to drug-related offenses.

Additionally, the Future Route Policy is articulated with the National Criminal Policy Plan 2021-2025 through the implementation of the Territorialized Strategy against Organized Crime (ETCO), which is supported by UNODC for the Andean Region and the Southern Cone. ETCO seeks to tackle organized crime and activities related to drug trafficking, criminal economies and crimes that affect the safety of Colombians.

Regarding the impact on criminal economies, the Special Assets Society (SAE) has consolidated the Resource Administration and Generation Model. In total, the SAE has collected COP 2.2 trillion during the Administration's mandate as a result of the assets forfeited as a result of drug trafficking and other crimes.

Between 2018 and April 30, 2022, the SAE wired $ 635,267 million pesos in transfers, allocated as follows: National Government ($ 148,209 million), Prosecutor General's Office ($ 92,705 million), Judicial Branch ($ 92,927 million), National Police Judicial Police ($ 37,177 million), Drug Policy ($ 224,437 million), Victims Reparation Fund ($ 9,007 million) and the San Andres Governor's Office ($ 30,806 million).

In 2021, the Prosecutor General's Office reported the entry of 559 cases (criminal news) concerning asset laundering: 503 of these are under preliminary investigation, 11 under investigation, 39 under trial, 5 under sentence execution and one was terminated in advance. During that same year, the report of the Prosecutor General's Office on the total value of seizures performed in Colombia for confiscation purposes amounts to COP 15,000,000 million.

It is also reported that the amount imputed due to asset laundering was nearly COP 8 trillion, with a total of 69 imputed processes. The average value per asset laundering case imputed was COP 117,000 million. The report of the Prosecutor General's Office for these cases in 2021 was COP 6.4 billion.

Regarding the number of assets with asset forfeiture precautionary measures, in 2021 the figure was 7,824 and the value of these assets is estimated at COP 9.9 trillion.

[165] With investigative capacity and presence in the territories, Prosecutor's Office tripled results against drug trafficking groups in 2021" , 31 December 2001, Attorney General's Office. Boletín 41676, https://www.fiscalia.gov.co/colombia/noticias/con-capacidad-investigativa-y-presencia-en-losterritorios-fiscalia-triplico-resultados-contra-los-grupos-narcotraficantes-en-2021/

The approval of CONPES 4042/2021[166]- National Anti-Asset Laundering Policy, Against the Financing of Terrorism and Weapons of Mass Destruction Proliferation Financing - is also noteworthy.

At the same time, with the support of the United States, the Coordination Center against Transnational Crime and Terrorism Organizations (CFI) was established, a tool that will allow greater effectiveness in the prosecution and dismantling of money networks, assets and goods of illicit origin or employed in illicit activities, asset laundering and terrorism financing.

[166] National Planning Department (2021, August 9). National Anti-Asset Laundering Policy, Against the Financing of Terrorism and Weapons of Mass Destruction Proliferation Financing (CONPES Document 4042). Bogota D.C., Colombia: DNP.

CHAPTER 5

Methodological aspects

This document is based on information obtained through remote sensing, geographic analysis, surveys and harvest tests, and qualitative and quantitative research as part of the Integrated Illicit Crop Monitoring System (SIMCI) in Colombia.

In the Colombian case, information needs go beyond the estimation of the area with coca cultivation and cocaine production; it is also important to know coca distribution in the territory, the characteristics of the affected territories, the spatial-temporal dynamics and how coca is related to other illegality and violence phenomena. Therefore, the Colombian Government has defined an annual census approach that will provide information that will contribute to the design and implementation of public policies.

The monitoring process begins with reconnaissance of the territory where conditions for coca cultivation exist, which defines the census frame. In practical terms, the census frame covers the entire Colombian territory; however, it is not possible to plant coca in all areas of the country. For example, biophysical conditions such as weather or altitude limit cultivation. In the period between 2010 and 2020, the area of influence of these crops covered about 204,500 km^2.

The census frame is covered with satellite images in which coca cultivation is detected, through visual interpretation techniques and the use of interpretation keys adapted to the conditions of the territory. The size of the census frame has two implications that affect the methodological approach: 1) it is difficult to cover the entire census frame due to cloud presence and 2) it is not possible to obtain all the images at the same time; thus, the interpretation is complemented with adjustments related to coverage and temporality.

Coca, a difficult cover to detect

Satellite image interpretation includes three areas of interest: 1) coca cultivation;

2) evidence of alluvial gold mining; and 3) areas lacking information (clouds and shadows)[167]. The aspects related to coca cultivation interpretation in Colombia are discussed below.

Coca cultivation interpretation initially took place in a forest matrix, with few land purposes other than coca; however, the recent evolution of the phenomenon is strongly influenced by the fact that people are growing closer to coca: other crops, roads and even urban centers are present in an increasingly complex landscape, where instead of a forest matrix with coca, different crops are found in which coca is just one among others.

In addition to understanding landscape changes, it is necessary to consider the complexity of coca establishment and dynamics. By 2021, cultivation densities range from 7,940 plants/ha (in Pacific, 2019) to 13,330 plants/ha (in Orinoco, 2018), according to coca cultivation yield studies. Although this crop is predominantly established in well-defined furrows, it is common to find "in plain sight", intercropped, stubble or mixed crops.

From a botanical perspective, it is a crop of which only two cultivated species have been detected to date: *Erythroxylum coca* and *Erythroxylum novogranatense*, with at least four validly published botanical varieties: *Erythroxylum coca var. Coca (ECC), Erythroxylum coca var. Ipadu (ECI), Erythroxylum novogranatense var. Novogranatense (ENN)* and *Erythroxylum novogranatense var. Truxillense (ENT)*[168]. For each of these botanical varieties, different cultivars have been identified, defined as common names assigned in Colombia by growers (local nomenclature), which are not recognized by the international botanical code[169]; 34 cultivars[170] have been identified in Colombia, each of them with their own characteristics and particularities. Coca is harvested (scraped) between 40-70 days, depending on the region, determining a total change in the spectral response of the crop. Hence, the keys to coca interpretation are not based exclusively on pictorial-morphological conditions[171], but also include spatio-temporal considerations.

[167] A critical element here is to reduce as much as possible the areas lacking information. To this end, new images are explored in cloud areas; although the territory of interest is covered with 58 Landsat images, using an average of 200 images each year.

[168] Information generated during the Taxonomic and chorological aspects of coca plants grown in Colombia study conducted by the Government of Colombia, UNODC/SIMCI and Universidad Distrital Francisco Jose de Caldas (Bogota, 2014). It is also noteworthy that according to the Study of the coca leaf by variety, carried out by the Colombian National Police Anti-Narcotics Directorate in (Bogota: 2021), the six following taxonomic determinations were identified: Erythroxylum coca lam. var. Coca, Erythroxylum coca lam. Cf. var. Coca, Erythroxylum coca cf. Var. Ipadu plowman, Erythroxylum novo-granatense (Morris) hieron. Var. Novogranatense, Erythroxylum novo-granatense (Morris) hieron.var. Truxillense plowman and E. coca x E. novo-granatense G (intermediate). For further information, see: https://www.policia.gov.co/centro-estudios-narcotrafico/productos.

[169] This term was adopted according to the criteria of Aida Galindo Bonilla and Jose Luis. Fernandez-Alonso. "Coca plants in Colombia. Critical discussion on the taxonomy of grown species of the genus Erythroxylum P. Browne (Erythroxylaceae)". Rev. Acad. Colomb. Sci. 34, n.° 133 (2010): 455-465.

[170] Based on interviews with agricultural coca producers (PAC), the following common names for these plants have been reported: 1) peruvian, 2) caucana, 3) bitter, 4) bitter sweet, 5) sweet, 6) pajarito, 7) tingo maria, 8) tingo negra, 9) cuarentana, 10) red bolivian, 11) black bolivian, 12) white Bolivian, 13) peluceña, 14) wild, 15) pinguana, 16) liliana, 17) pink bolivian, 18) caturra, 19) guava, 20) nacedora, 21) pategurre, 22) rojalisa, 23) anguilana, 24) pomarosa, 25) chipara, 26) giant, 27) leafy, 28) tingo palo, 29) montuna, 30) grafted, 31) lemon, 32) anguileña, 33) pretty, and 34) bolivian.

[171] The pictorial-morphological characteristics or visual criteria for interpretation are: tone, color, texture, spatial context, acquisition period, shadow, pattern, contour and shape. Emilio Chuvieco, Basics of Spatial Remote Sensing, 2nd ed. (Madrid: Ediciones RIALP, 1990), 459.

The objectivity of the interpretation data has a direct impact on reliability. By virtue of the above, the SIMCI interpretation model is based on decision trees as a key to interpretation. This tool leads to - through a hierarchical decision-making model and the interaction of factors that have an impact on reliable coca cultivation identification - the generation of results that lead to a reliable thematic identification.

Decision tree factors (figure 29) start with the interaction of interpretation or pictorial-morphological base elements, and end with the articulation of secondary geographic information such as the history of detections and the recording of control activities. Consequently, the tree generates three types of results: 1) coca cultivation thematic identification, 2) non-coca cultivation identification and 3) spectral confusion covers, which within the tree contain another set of criteria to resolve the confusion that will result in one of the first two types of results or, otherwise, in the requirement of actions such as field work, use of high spectral and spatial resolution images.

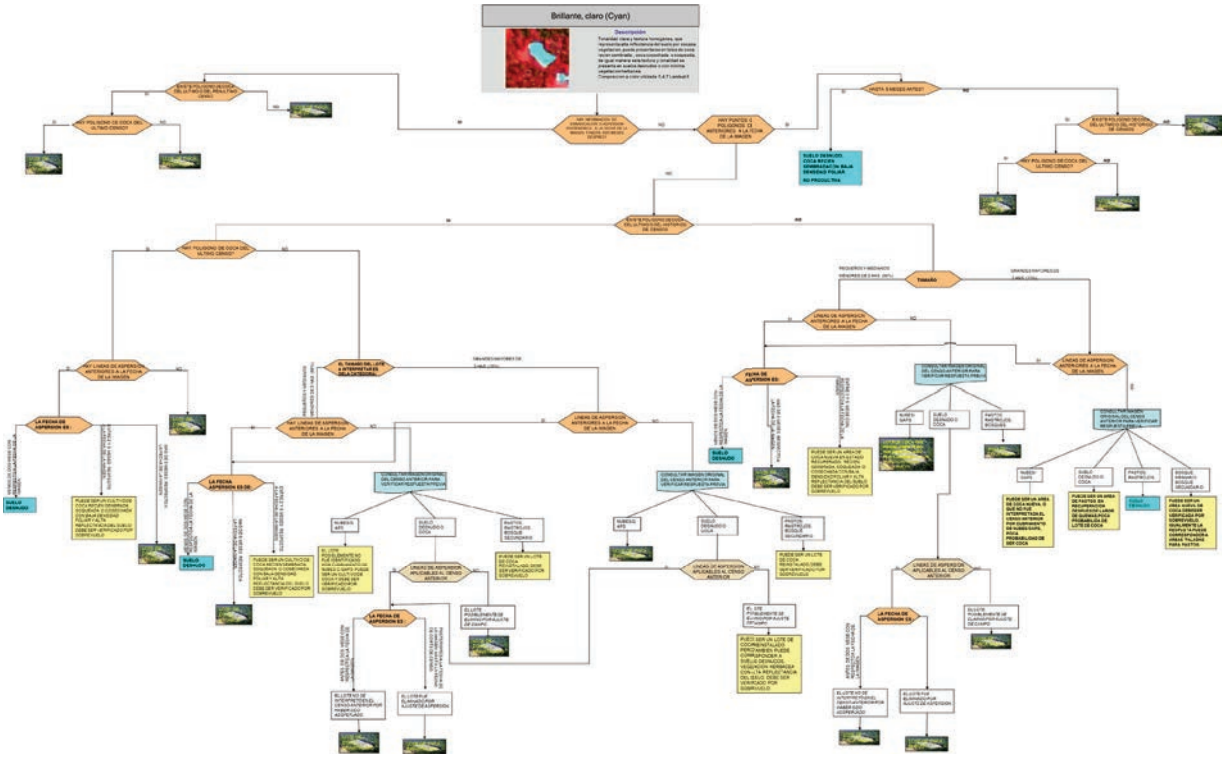


Figure 29. Decision tree for coca cultivation identification, Eastern region.

The census frame extension, the landscape complexity and the coca cultivation spectral behavior diversity pose a challenge for coca detection. This requires the use of images with enough spectral resolution to: 1) differentiate covers and 2) cover the 204,500 km^2 of the census frame. For this reason - during the last five years - Landsat images have been used as a basis for interpretation and to support the traceability of dynamics, monitoring of phenological states and strengthening the definition of boundaries, Sentinel, Planet, Spot and Pleiades images have been used.

Landsat's temporal, spectral and spatial resolution makes it ideal for natural resource dynamics studies, global monitoring programs, forest monitoring, and regional-scale development planning[172]. Landsat has been acquiring images with periodic coverage of the Earth for fifty years. Since the first mission in 1972, the program has improved the capability of the sensors to record information both spatially and in the range and tuning of the electromagnetic spectrum. Nine Landsat missions have been launched in total; the most recent, on September 27, 2021, corresponds to Landsat 9; like its predecessor, Landsat 8 (2013) it features the OLI (Operational Land Imager) and TIRS (Thermal Infrared Sensor) instruments, and introduces improvements in data from water masses, soil moisture and vegetation.

Landsat 9 collects data in eight spectral bands with 30 m spatial resolution, two thermal bands at 100 m and a 15 m panchromatic band; along with Landsat 8, both satellites collect images every eight days.

Digital image processing tools allow improving images in two ways: first, focused on visualization and spectral discrimination, focusing on the use of different kinds of filters and distribution of digital levels; second, the ability to capture elements of smaller size or spatial resolution by merging the panchromatic band, 15 m of spatial resolution, with multispectral images of 30 m of resolution. This process, known as pansharpening, allows a better delimitation and interpretation of coca cultivation due to a better visual discrimination of the cultivation boundaries and maintains the spectral discrimination of the spectral confusion cover.

Since 2014, with the technological offer of the Landsat 8 sensor and as a result of the interpretation reliability evaluation, SIMCI implemented the pansharpening process to improve geometric accuracy, regardless of the thematic reliability. Currently, there is a better delimitation and interpretation of land plots over 0.0675 ha.

The complexity in coca cultivation identification makes the use of different verification tools essential to guarantee the reliability of the detection:

- *Data from the Eradication Recording and Validation Platform (PREVER):* It allows counting the eradicated land plots - both in the manual forced eradication modality as well as ground spraying - which have been captured in situ with the Ecapptura application. This application facilitates the standardization, traceability, quality and reliability of the process that results in the generation of technical evidence

[172] Emilio Chuvieco. "Environmental remote sensing: observing the earth from space". Ariel Ciencia, 2006.

pertaining to the intervention. The exercise is complemented with a record validation process that allows the user to know if the plot meets the minimum requirements and the qualification of dimensions to be identified as a validated, invalidated or erroneous record.

The data from the platform is proof of the illicit activity captured directly on site, associated with a photographic record and the plot's boundaries. This information allows validation of the agricultural characteristics of the plot, the vegetation at the date of intervention and the location, with which the interpreter can validate the spectral response identified in the image. It also offers the possibility of corroborating new areas of expansion or recurrence.

- *Use of high and medium resolution images:* In order to assist the interpretation process, SIMCI makes use of high and medium resolution images conducting to a traceability process (evaluating landscape transformation focused on the areas affected by illicit crops), confirmation of the presence of illicit crops in areas with a wide spectral confusion matrix and improvement of plot delimitation.

  About 43 Sentinel images (10 m) concentrated in Guaviare, Vichada, Choco and Bolivar; 87 Planet images (4 m) with national coverage to improve geometric accuracy; 26 Pleiades images (50 cm) located in Putumayo, Caqueta, Guaviare, Bolivar and Norte de Santander, and 5 Spot images (1.5 m) in Guaviare and Antioquia were used for this census.

Additionally, the verification and contrast work is carried out with ground truth. This verification is carried out in two ways:

- *Aerial verification overflights:* These seek to check the findings of the interpretation process in satellite images compared to ground truth, alerting the interpreter about the dynamics of cultivation at the date of the overflight. Data is captured on plot typologies (stubble, mountain, high density, associated, recently sown, average size, type of sowing, among others). Additionally, general data on the impact of recent intervention processes (replanting, abandonment, expansion) on the territory is collected.

  On the other hand, this method makes it possible to verify the veracity of secondary information, since in some cases it points to areas of expansion or recidivism of illicit activities where there is no recent evidence.

  The verification overflights are carried out in National Police Cessna Caravan aircraft together with the SIIMA technical team (Integrated Information and Monitoring System for Anti-Narcotics) of the National Police's Anti-Narcotics Directorate, in order to validate joint dynamics and make efficient use of resources. These operations are carried out at an average altitude of 3,000 m above the ground with an average speed of 120 nautical miles. The route is designed based on the information provided by the interpreters, secondary information, the last semester of intervention (forced and voluntary) and the last three years of census interpretation.
- *Videos recorded with Flir:* As part of the support and teamwork that SIMCI carries out with the technical teams of the National Government, the National Police's SIIMA provides videos from

the flir star safre 380 camera of the areas where it monitors and focuses intervention activities. The use of this information allows the interpreter and the field engineer to evaluate plot typologies, validate atypical spectral responses and identify areas of replanting and expansion of the phenomenon. For the 2021 census, videos of Caqueta, Guaviare and Vichada were reviewed with a coverage of 650 km^2.

The field work phase produces a series of information such as geographic files with data on approximate hectares, coca cultivation identified by aircraft, alert areas for high coca density and expansion, and videos that facilitate the visual interpretation of coca. Consequently, this information is correctly ordered and standardized to assist the interpretation process.

Reliability studies measure the final accuracy of the interpretation data. Meteorological conditions, availability and timeliness of images and the diversity of territories affected by coca cultivation have limited the collection of a representative sample to measure national reliability. As a result, the analyses are based on "case studies" that report data on a regional scale, varying in measurement year by year.

These studies have been carried out since 2002, referring to the images used in the census detection methodology and are compared with high spatial resolution images such as Worldview, and in recent years SPOT 6 and 7 and Pleiades. The regions evaluated have focused on study areas between 100 km^2 and 200 km^2 and have been located in the departments of Meta, Guaviare, Nariño, Putumayo, Caqueta, Bolivar, Norte de Santander and Cauca.

These studies emphasize the thematic ability of experts to identify coca cultivation and differentiate it from confusing spectral covers (licit crops, pastures, grasslands, stubble). For geometric delimitation the project incorporated - since 2014 - the pansharpening process - which improves spatial resolution - while maintaining spectral resolution, resulting in 94% of geometric accuracy[173].

The reliability model contemplates (figure 30): 1) ground truth building based on sub-meter spatial resolution images; 2) comparison with interpretation data, and 3) acquisition of the spectral confusion matrix, i.e., with spectral covers that can be confused with coca cultivation areas and accuracy statistics. The results obtained report average user accuracies of 86% and producer accuracies of 91%.

[173] The geometric accuracy is calculated by evaluating the contrast between the polygons identified in the images used in the detection with the polygons obtained in images of sub-meter spatial resolution.

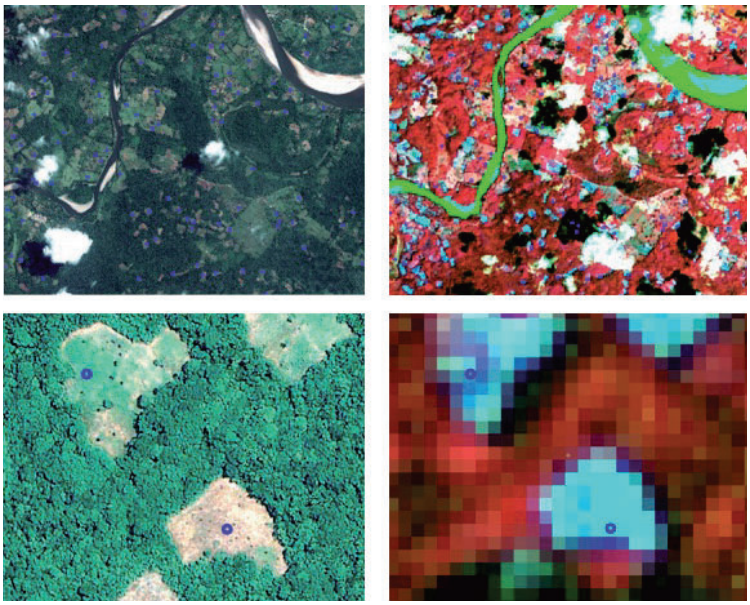


Figure 30. Putumayo study area, Puerto Asis municipality.

In blue circles, reliability sampling points. Top left: Pleiades CC 321-True color image. Top right: Landsat 8 CC 432-True color image. Bottom left: Pleiades CC 321-True color detail image. Bottom right: Landsat 8 CC 432-True color zoom detail image.

Geographical analysis

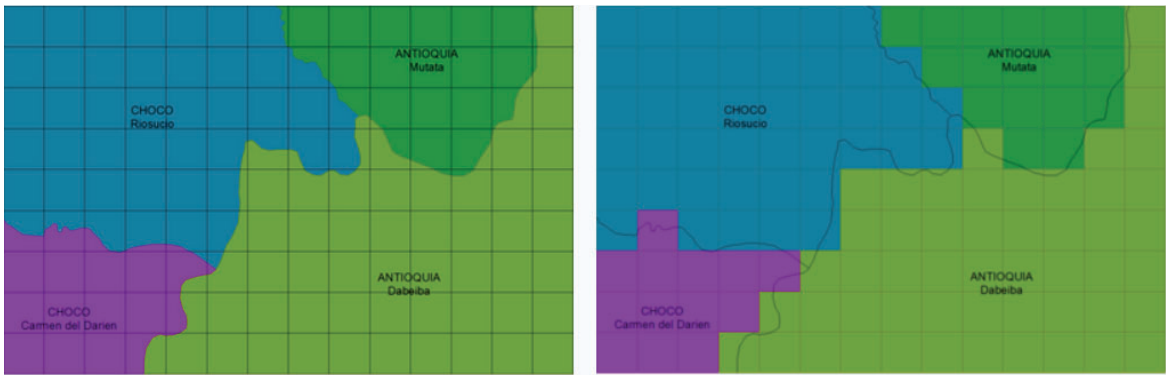
Once the satellite image interpretation is completed, the information is integrated into the census frame where - in addition to interpretation - there is data related to interventions, territorial conditions, administrative units, among other variables. The grouping of various information - both primary and secondary - is materialized in the Master Framework of Areas, a tool that constitutes the heart of the SIMCI. This framework is built by grids of 1 km^2, which can be grouped to form larger territories of 5 km^2 and 10 km^2 according to research needs. The grid is not a variable dependent on changes in the territory; therefore, changes in administrative boundaries or the creation of new territorial entities do not alter the results, a feature that facilitates spatio-temporal analyses in a comparable and simple manner.

The frame covers the entire country with a systematic arrangement of 100 ha units and is part of the UNODC/SIMCI cartographic tools for the calculation and monitoring of indicators with a geographic approach. It is used to facilitate information analysis, as well as the generation of methodologies for statistical purposes, to the extent that it offers a description of the universe to be investigated related to territories affected by illicit crops.

Under the concept of Spatial Data Infrastructure (SDI), understood as the set of technologies, policies, standards and human resources to acquire, process, store, distribute and improve the dissemination of geographic information and in accordance with the Implementation Guide of the Integrated Geospatial Information Framework (GGIM - IGIF) [174] that sets the guidelines to organize data through three areas of influence: people, governance and technology, where each one must be materialized according to the conditions of the territory or local scenario, there is progress made in the consolidation of an infrastructure for the project.

UNODC-SIMCI has worked on the design and consolidation of these areas of influence through the integration of technologies for the standardization of metadata, the design and implementation of a geographic information management system with database and web servers, which provide services for the development of visualization tools and consultation by counterparts and researchers. In addition, staff with expertise in remote sensing, geographic information systems (GIS), territorial analysis, thematic analysis and information technologies define a sustainable panorama in terms of interoperability.

A Master Framework of Areas (figure 31) was implemented based on the framework, defined as



Administrative boundaries (municipalities) and 1 km^2 grid

Boundary mapping according to the center of the grid

Figure 31. Administrative boundary information mapping using grid center coordinates

[174] Retrieved from: https://ggim.un.org/IGIF/part2.cshtml

"A list of surfaces that can be compiled in a single stage or in multiple stages. Areas in single or multi-stage selections are described by geographic or georeferenced boundaries. If satellite images are available, then the areas can be classified according to land cover, allowing the separation of cropland from forests and urban areas. The listing of areas does not depend on any census or administrative data. An area frame provides a means to organize a survey program in the absence of previous agricultural or population census results. The final selection of areas (segments) or points or grids becomes the sampling units."[175].

On the understanding that sampling units are territorial elements and it is not necessary to create an explicit list of units. If the cultivation and yield area are observed directly, it is enough to identify the boundaries of the region of interest to ensure that the sampling frame is complete. However, if the listing units are agricultural coca production units (UPAC), area frames should generally be combined with lists of statistical units of large farms or farms producing rare items.

The master sampling frame provided the basis for the selection of the probability sample of UPAC, with the ability to link both agricultural and socioeconomic characteristics. Satellite imagery and both aerial and ground verification are used for construction, information that is then related to land cover and use dimensions. The area frame included coca cultivation reference variables such as number of plots, coca interpreted within the area, socio-economic status for the current and previous census.

The generation of the 1 km^2 grids is carried out with the SIMCI digital cartography; subsequently, they are classified into the socio-economic statuses defined by cover to simplify the model. Finally, the grids are serially numbered from 1 to N, starting from the northeast corner within the regions under examination.

Grids are defined by a grid that is usually sampled in two phases. First, the territory is divided into blocks larger than the expected size of the sample segments; these are usually called primary sampling unit (PSU) and can be divided by land cover type and sampled. Second, the selected PSUs are divided into smaller UPACs and one or more of them is sampled. If only one PSU (grid) is selected, it can be difficult to estimate sampling errors unless replicated sampling occurs[176].

Areas under cultivation can be measured directly by field observation. Yield can be measured on a small sample of items within the segment (sample plot collection experiment). In this case, there is a suitable two-stage sampling process, where the segment is the PSU (grid).

Thanks to this research model, more than 6,200 surveys have been conducted among agricultural coca producers between 2005 and 2021, with the purpose of characterizing

[175] The area sampling frame generated by UNODC/SIMCI was constructed considering the recommendations of the Food and Agriculture Organization of the United Nations (FAO). Handbook on Master Sampling Frameworks for Agricultural Statistics. Frame Development, Sample Design and Estimation (FAO, 2015), http://www.fao.org/3/ca6398es/ca6398es.pdf.

[176] Carrie Davis. «Area Frame Design for Agricultural Surveys.» USDA National Agricultural Statistics Service, Research Report No. RDD-09-2009.

the processes of coca cultivation and its transformation into a farm. Furthermore, more than 2,300 surveys have been conducted among agricultural producers both with and without coca located in areas where coca cultivation is present in order to understand the incentives for the establishment of this type of cultivation, as well as to characterize the economic structures of the agricultural production units present in the territory.

Estimated cocaine production potential

In order to estimate cocaine production, it is necessary to know the following factors:

1. Number of coca leaf-producing hectares.
2. Amount of coca leaves produced per hectare.
3. Amount of alkaloid (cocaine) extracted from leaves.
4. Purity of the cocaine obtained throughout the process.

First factor: Information from the coca cultivation census is available (figure 32). The number of hectares detected has a cut-off date of December 31 and is presented annually. Thus, it is known how much coca there was at the beginning and how much at the end of the year; in other words, the number of hectares with coca planted in the previous year can be interpreted as the amount at the beginning of the following year.

The census data is the amount of coca that was planted at the time of the cut-off date and not the number of hectares from which coca leaf was obtained to produce cocaine. It is clear that some hectares that were present at the beginning of the year may have been eradicated or abandoned during the year and, therefore, are not detected at the end of the period. At the same time, some hectares were planted for the first time during the year, which means that they only appear at the end of the year. In both cases, coca was recorded at one of two stages (at the beginning or at the end of the year) but was only productive at a specific time of the year. This time fraction in which a detected field was planted with coca is determined by a persistence factor.

A spatial analysis methodology is used to estimate the persistence of coca cultivation. An automatic model makes it possible to determine - plot by plot - the dynamics of the cropland area during the year. This is possible by incorporating and systematizing the available information on the variables that directly affect plot stability, such as forced eradication, aerial spraying and vegetation cover, among others. The persistence factor is calculated based on three plot categories: stable, new and abandoned. Each categorized plot may belong - at the same time - to a subcategory generated from the definition of possible impact scenarios.

The productive area during the year is determined as a proportion between the area planted and the time during which it generated yields. In order to estimate it, the area of the plots detected (both at the beginning and at the end of the year) is multiplied by their persistence factor. The productive area Ap is calculated as follows

$$\mathbf{Ap} = \sum_{k=0}^{n} \text{Area} * \text{Persistence factor}$$



Figure 32. Series of coca hectares according to indicator: area detected on December 31, productive area during the year and affected area

Second factor: Two elements need to be considered, the main source of information being the indicators generated within the framework of the coca cultivation yield study:

1. The amount of leaf produced in harvest: harvest tests are carried out directly on randomly and probabilistically selected plots, where a plot is delimited[177] and all the plants within the plot are harvested. Leaves are weighed and botanical samples are obtained.
2. The number of times leaves are harvested in a year: surveys of coca leaf producers are used, defined based on the following question: "Under normal conditions, how often do you harvest it?"

Fresh coca leaf production (CLP) =∑Ap (ha) * Annual leaf yield (kg/ha/year)

[177] For further details on the methodology for harvest test plots, see United Nations International Drug Control Program, Guidelines for measuring opium poppy and coca leaf yields during short field visits (2001).

In 2005, the Government of Colombia and SIMCI developed a probability sampling methodology to characterize and estimate coca leaf production in Colombia, by means of field surveys of direct producers (agricultural coca producers [PAC]) and by carrying out harvest tests on the fields. The research coverage is regional and refers to coca cultivation incidence areas. Table 4 shows the years of research implementation and the number of surveys carried out in the territory corresponding to the four phases of the research.

Table 4. Number of surveys conducted according to phases of the research

Regions	Phase I	Phase II				Phase III				Phase IV				Phase V	
	2005	2007	2008	2009	2010	2011	2012	2013	2014	2015	2017	2018	2019	2020	2021
Meta-Guaviare	309		300					300				300			
Central	165	165				180				165				150	
Putumayo-Caqueta	240		210				240				300				375
Orinoco	150				135			150				150			
Pacific	255			276					270				300		
Catatumbo	135	135				120				135				180	
Sierra Nevada	135	135				45				30				36	
National total	1.389	435	510	276	135	345	240	450	270	330	300	450	300	366	375

Source: Government of Colombia and UNODC, SIMCI. Coca cultivation yield studies. Internal work documents..

Third factor: There are two products resulting from the alkaloid extraction process: cocaine base paste (CBP) and cocaine base (CB). It is worth noting that there are no standards to determine the quality (purity) of the CBP or CB that are produced; in general, these products have different levels of purity, however, this does not necessarily determine their price.

The information to estimate the third factor is obtained from the reports of CBP or CB yields per metric tons of processed leaf, reported by the agricultural coca producers (PAC), as part of the production and yield study, as well as that obtained under controlled conditions in the framework of the processing efficiency exercises (2010-2013), carried out by the Government of Colombia and UNODC/SIMCI.

The alkaloid content of coca leaves (on a dry basis) grown in Colombia is estimated to range between 0.41%-0.57%[178]; however, there are multiple factors that condition the ability of processors to extract the alkaloid from the leaf. Simulation exercises conducted by UNODC under controlled conditions[179] between 2010 and 2013 show that processors were able to extract between

[178] Results obtained by the Drug Enforcement Administration (DEA), an agency of the U.S. Department of Justice.

[179] Exercises carried out in the experimental cultivation of the National Police Training School (CENOP), located in San Luis (TOL). At CENOP, different cultivars of coca leaf are planted and practical exercises are carried out to transform the leaf into cocaine hydrochloride in order to obtain indicators of by-product yields, use of chemical substances, among other variables of interest.

66.25% and 71.3% of the alkaloid contained in the leaves. Meanwhile, the DEA reports an extraction efficiency for Colombia in 2020 of 69.3%. However, there are variations in the capacity to extract alkaloid depending on the expertise of the grower, the quality of the chemicals used in the process and the cultivar planted, since the alkaloid content may vary in each of them depending on the region where they are located.

In order to determine the amount of production that a grower obtains from the processed leaf, the surveys ask about the amount of coca leaf used to produce one kilogram of CBP or CB; the difference in obtaining these two products is determined by the amount of potassium permanganate used, a substance used to oxidize the alkaloidal impurities present in the base paste. Additionally, it is important to identify the possible processing scenarios, depending on the actor that performs the processing. On one side, the PAC can process CBP or CB on the farm, depending on its expertise (in the case that the actor does it itself) or economic capacity (in the case that the actor hires an expert). On the other side, the PACs can sell the leaf - without any transformation - so that other actors can collect it for subsequent processing, be it a neighboring PAC with greater processing capacity or a specialized actor.

After integrating the three previous factors, the cocaine extraction and refining capacity is estimated based on the calculation of the potential production of CBP and CB [180].

Cocaine base production	=	$PB_1 + PB_2 + PB_3$
where,		
Base paste production carried out in the UPAC (PB1)	=	(CLP) x % growers processing base paste x Yield of base paste per mt of coca leaf in UPAC (RPB) x Ratio of paste/base (RCBP /RCB)
Cocaine base production carried out in the UPAC (PB2)	=	(CLP) x growers processing cocaine base x Yield of cocaine base per mt of coca leaf in the UPAC (RB1)
Cocaine base production carried out outside the UPAC (PB_3)	=	(CLP) x % farmers selling coca leaf x Yield of cocaine base per mt of coca leaf external to UPAC *(RB_e)*

Note:

* The paste/base ratio (RCBP /RCB) corresponds to 0.75, estimated from the ratio between the alkaloid percentage of the CBP (estimated at 60%) and the purity of the CB (80 %).

** The purity percentage of CB is estimated at 80% and the yield of CB production inside and outside the UPAC was calculated at 1.45 kg/mt of fresh coca leaf (including the link between mass and purity percentage). These estimates include the analysis of the results of processing exercises under controlled conditions carried out during the Efficiency of coca leaf processing for the extraction of cocaine base and conversion to cocaine hydrochloride (2010-2013) and Characterization of cocaine hydrochloride production complexes research, conducted by UNODC-SIMCI and the Government of Colombia (Bogota, 2016), internal work documents.

[180] For further information, see United Nations Office on Drugs and Crime (UNODC) Integrated Illicit Crop Monitoring System (SIMCI), Monitoring of Territories Affected by Illicit Crops 2018 (Bogota: UNODC-SIMCI, 2019), 67, https://www.unodc.org/documents/colombia/2019/Agosto/Informe_de_Monitoreo_de_Territorios_Afectador_por_Cultivos_Ilicitos_en_Colombia_2018_.pdf.

Fourth factor: It is important to mention that surveys do not include information on the purity of cocaine extraction products; growers do not know the purity of their products and, in general, this is not directly related to the price of their products. However, purity is essential to determine potential cocaine production; this value makes it possible to know the amount of cocaine present in each of the derived by-products, and thus to obtain other indicators of interest such as the illicit demand for chemical substances.

Based on the characterization studies on the transformation processes from coca leaf to cocaine hydrochloride in Colombia, it was established that CBP has an average purity of approximately 60%, while CB has an average purity of 80%. As a way of integrating the production of cocaine paste and base, a conversion factor is calculated between CBP and CB, in order to express CBP quantities in terms of CB. This is since experimental exercises confirm that CBP purity is lower than CB purity and that, in mass, between 700 g to 800 g of CB is obtained per 1 kg of CBP.

Paste/base ratio (RCBP/RCB) = % CBP purity (60%) / % CB purity (80%)

It is equivalent to a ratio of 0.75, which means that 1 kg of CBP at 60% purity is equivalent to 750 g of CB at 80% purity.

To estimate potential cocaine production, it is supposed that 1 kg of base produces 1 kg of cocaine hydrochloride (1:1 ratio) and the following formula is used:

$$\textbf{Potencial CHC production} = \frac{\text{Amount of pure cocaine (kg)}}{\text{\% of CHC purity}}$$

The 100% pure cocaine figure is calculated for statistical and comparability purposes, but in practice it is found that seized cocaine has different levels of purity. According to the DEA, hydrochloride-type cocaine from Colombia seized in ports has a purity of 81 %; on the other hand, studies carried out by UNODC and the Colombian Government indicate a purity of 85.1%. The studies carried out to estimate the purity of cocaine began in 2010 and 2015 with the document *Characterization of the transformation process of the leaf into cocaine hydrochloride in Colombia,* and in 2021 with the *Research on the alkaloid content and purity of seized samples,* carried out by the Government of Colombia and UNODC/SIMCI, internal work documents.

The United Nations Office on Drugs and Crime (UNODC) uses qualitative and quantitative control tools to validate the information used in production estimates; these include focus group interviews, simulated exercises, expert discussion, among others. CENOP possesses the infrastructure that has enabled experimental exercises endorsed by the national authority (resolution 532/2017

issued by the National Narcotics Council [CNE])[181], from coca cultivation to obtaining various products (cocaine paste/base and cocaine hydrochloride) and where from these research scenarios it is possible to obtain indicators that allow a qualitative as well as quantitative description of the demand for chemical substances, extraction, refining or conversion yields and purity of the products obtained.

- Having knowledge of the quantities of leaves, CBP and CB produced by coca growers is not only useful for estimating potential cocaine production, but also to:
- Contribute to the understanding of illicit drug markets, by identifying possible incentives established in the territory.
- Determine the quantities of inputs, chemical substances and services required to obtain them.
- Estimate the economic dependence of households that directly or indirectly participate in these illicit economic activities.
- Improve the understanding of the social, economic and demographic conditions of the territories affected by coca cultivation.
- Contribute to the development of estimates of the illicit financial flows (IFF) that drive coca and its transformation from and into Colombia, based on the establishment of the amounts of cocaine potentially obtained according to the hectares planted. Its potential use lies in the coordination with other indicators to assess the transactions generated, considering coca prices and by-products, as well as the use of licit and illicit inputs and services necessary for production in its different stages[182], with the purpose of dimensioning the types of IFF generated, as well as to have an approximation of the added value of these activities.

The aforementioned information is a technical input for the government's decision-making regarding illicit drug trafficking activities.

Since 2004, illicit drug price monitoring in Colombia has been developed by interinstitutional technical teams from the National Government and UNODC/SIMCI.

Different types of illicit drugs have been identified in Colombia, which can be classified according to the source of their active substance: coca by-products, cannabis by-products, poppy by-products, synthetic drugs, new psychoactive substances and controlled medicines. For each one, a list of the main products marketed as the object of monitoring has been drawn up. In addition to price, other variables of interest have been included to give a better direction to the analysis, such as: location and geographic area where the sampling was carried out, type of product, place of commercialization and type of market, in order to characterize the production, trafficking and consumption markets. The methodology contemplates the following stages: planning; collection; consolidation, review, validation and criticism; analysis and dissemination, as shown in figure 33.

[181] Resolution that allows the production of cocaine in said facilities of the National Police, for research and academic purposes.
[182] Amounts and prices of inputs and services such as use of agrochemicals, inputs and chemicals, personnel working in production processes, among others.

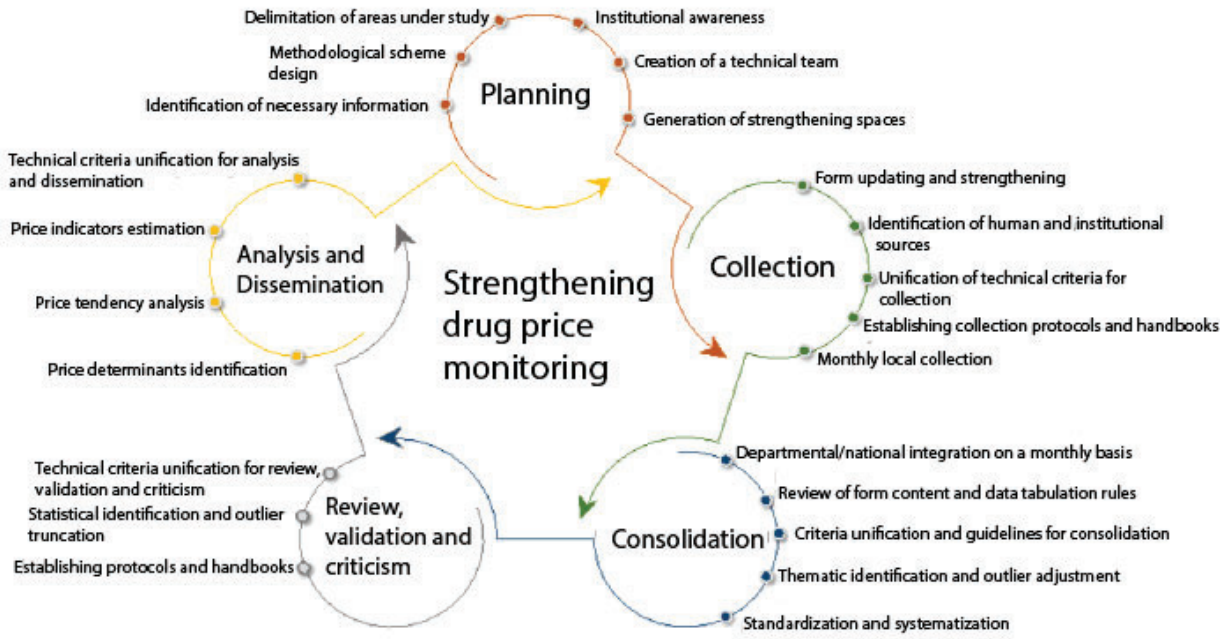


Figure 33. Methodological strengthening scheme for drug price monitoring in Colombia

Source: Exercises carried out by UNODC-SIMCI and the Government of Colombia, 2021.



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