



UNODC

United Nations Office on Drugs and Crime



Government of Colombia



Colombia

Coca cultivation survey 2014

July 2015

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Photographs: UNODC / SIMCI unless otherwise specified.
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Abbreviations

ADAM	Municipal Alternative Development Areas
CCITE	No Reports for Drug Trafficking Certificate
CLIC	Consolidation of Areas Free of Illicit Crops
COD	Colombian Observatory on Drugs
COP \$	Colombian Pesos
DANE	National Administrative Department of Statistics
DEA	Drug Enforcement Agency of the United States
DIRAN	Anti - Narcotics Directorate - National Police
DNP	National Planning Department
DPCI	Directorate of the Programme Against Illicit Crops
FGN	Public Prosecutor's Office
GDP	Gross Domestic Product
GME	Mobile Eradication Groups
INCB	International Narcotics Control Board
INCODER	Colombian Institute of Rural Development
IOM	International Organisation for Migrations
MIDAS	More Investment to the Sustainable Alternative Development
MT	Metric Tonnes
OAS	Organisation of American States
PAC	Coca Agricultural Producer
PCI	Programme Against Illicit Crops
PFGB	Forest Warden Families Program
PMCI	Illicit Crops Monitoring Programme
PNCRT	Territorial Consolidation and Reconstruction National Policy
PNCT	National Territorial Consolidation Plan
PRADICAN	Andean Counter – Drug Program
PRELAC	Prevention of the Diversion of Chemical Precursor Substances of Drugs in the Latin America and the Caribbean Countries
SIMCI	Integrated System for Monitoring Illicit Crops
UNODC	United Nations Office on Drugs and Crime
UPA	Agricultural Production Unit in Area Affected by Coca Crops
UPAC	Agricultural Production Unit with Coca
USAID	United States Agency for International Development
USD \$	United States Dollars

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SUMMARY FACT SHEET – COLOMBIA COCA CULTIVATION SURVEY, 2014

	2013	Variation ¹	2014
Net coca cultivation area calculated on 31st December (rounded to the nearest thousand)²	48,000 hectares	44%	69,000 hectares
Pacific region	18,562 hectares	40%	25,976 hectares
Central region	8,815 hectares	29%	11,412 hectares
Meta-Guaviare region	7,623 hectares	40%	10,700 hectares
Putumayo-Caqueta region	11,989 hectares	68%	20,151 hectares
Amazon region	375 hectares	-7%	348 hectares
Orinoco region	782 hectares	-31%	536 hectares
Sierra Nevada region	43 hectares	-79%	9 hectares
Area affected by coca ³	89,215 hectares	23%	109,788 hectares
Average fresh coca leaf yield ⁴	4,100 kg/ha/year (3,600– 4,600) kg/ha/year	14.6%	4,700 kg/ha/year (4,100– 5,300) kg/ha/year
Potential fresh coca leaf production ⁵	208,200 mt (178,900 mt - 237,500 mt)	48.2%	308,500 mt (240,600 mt - 376,400 mt)
Potential cocaine hydrochloride production ⁶	290 mt (249 mt – 330 mt)	52%	442 mt (345 tm – 540 mt)
Weighted average coca leaf price	COL \$2,250	-2.2%	COL \$2,200
Average coca leaf price at production sites	US\$ 1.1 /kg ⁷ \$ 2,000 /Kg	7.5%	US\$ 1.1 /kg \$ 2,150 /Kg
Average coca paste price at production sites	US\$ 1,011 /Kg \$ 1,889,100 /kg	4.1%	US\$ 983 /Kg \$ 1,967,200 /kg
Average cocaine price in major cities	US\$ 2,521/kg \$ 4,710,700/kg	-3.7%	US\$ 2,269/kg \$ 4,538,200/kg
Accumulated aerial spraying	47,053 hectares	18%	55,554 hectares
Reported manual eradication of illicit crops	22,381 hectares	-44%	12,496 hectares
Cocaine seizures	165,569 kg	0.5%	166,355 kg
Heroin seizures	403 kg	-13%	349 kg
Illegal laboratories destroyed ⁸	2,343	12%	2,624

1. Figures are rounded up to the closest whole number

2. Corresponds to the coca – grown area as of December the 31st, 2014-

3. The affected area is the geographical sum of the reports on presence of illicit crops derived from aspersión, manual eradication and the yearly survey. UNODC produces data of the two latter; the aspersión report is prepared by DIRAN.

4. The limits were obtained from the interval, at a 95% reliability rate.

5. Coca leaf production estimates are obtained from the yearly productive area, which is in turn estimated based on the factor of permanency and crop yields. Intervals are built from the variance in ha from the two last surveys.

6. Potential production estimates are determined based on the calculations of intervals at a 95% reliability rate for the yearly coca - cultivated area, and taking the following variables into account; i) coca leaf, cocaine paste and cocaine base yield parameters, ii) the market structure as determined by productivity studies, iii) the purity of the cocaine base (81%), and iv) the coca leaf to cocaine base conversion (factors obtained from the efficiency studies in transformation and data from the Government of the United States on secondary transformation efficiency - cocaine base to cocaine hydrochloride in a 1:1 ratio). This resulted in the minimum and maximum potential production estimates, in the different links of the production chain associated to variance of the areas cultivated with coca, reported in coca surveys.

7. The currency exchange rate used for these conversions was USD \$1 is equal to COP \$1,869 in 2013, and USD \$1 is equal to COP \$2,000 in 2014. This was estimated using the monthly average reported by the Colombian Central Bank (<http://www.banrep.gov.co/ES/trm> - yearly historical series archive).

8. Includes cocaine laboratories and cocaine paste and base production facilities.

	2013	Variation	2014
Total value of coca leaf production and coca derived farm products ⁹	US\$ 292 million	40%	US\$ 408 million
Percentage in GDP	0.2% ¹⁰	-	0.3%
GDP within agricultural sector	2%		3% ¹¹
Number of households involved in coca cultivation ¹²	60,600	6.4%	64,500
Gross average annual income per person of coca leaf production and paste / base ¹³	1,040 US\$	11.5%	1,160 US\$
Poppy cultivation area	298 hectares	30%	387 hectares
Potential opium latex production ¹⁴	10.5 mt	13%	11.9 mt
Potential heroin production	1.3 mt	15%	1.5 mt
Average price of opium latex within the production site	US\$1,112 /kg	-37%	US\$700 /kg
Average price of heroin	US\$ 9,295 /kg	-19%	US\$ 7,528 /kg

9. Amount calculated from the fact or production amounts available in the market (deducting seizures as loss of product) and usual prices. Conversion to US Dollars (USD) has been estimated from a yearly average of the currency exchange rate as reported by the Central Bank.

10. GDP for the year as reported by the Government of Colombia (DANE). Illicit crops report.

11. GDP percentage for the agricultural sector. This amount has been estimated from growth of income of Agricultural Units with Coca (UPACs) between 2014 and 2013.

12. Growth of households has been estimated from an compound constructed indicator, taking into account the behaviour of the affected area (as calculated by UNODC) and the population projection of municipalities whereat the Survey has reported coca (conducted by DANE), as well as the growth trend as reported in each stage of the Productivity Studies.

13. This income does is exclusive of production costs.

14. Corresponds to oven – dried opium.

EXECUTIVE SUMMARY

The Colombian Government has established the need to study the drug production phenomenon. This study should be conducted from a broad perspective that allows to understand the complexities of the territories involved, while finding tools in order to control the drug production problem and promote development and respect for human rights.

This recommendation has led to the search for new strategies, as well as a review to the current ones. In addition, the Colombian Government has initiated a dialogue process seeking to put an end to the armed conflict by signing peace agreements with the guerrilla movement FARC. One of the items in the agenda makes specific reference to the drug problem, particularly sustainable reduction of illicit crops.

It is impossible to grasp the 2014 coca survey out of this complex framework; differentiating between trends and the historical moment is one of the main challenges this report presents to analysts.

Potential production of cocaine rose from 290 mt (249 mt – 330 mt) to 442 mt (345 mt – 540 mt) in 2014, with a significant 52% increase. The figures for coca crops in Colombia also had a significant increase, going from 48,000 ha in 2013 to 69,000 in 2014.

It is important to clarify that this study does not have the sufficient scope as to define relationships of causality; nevertheless, there are two major explanations for this increase. On the one hand, there is a political reason associated with the expectations that countrymen and community organizations have regarding intermediation processes that are ongoing between the Government and coca growers; they feel that they have better chances of establishing a dialogue with the Government if they own coca.

On the other hand, there is a market – related reason, namely an increase in coca leaf prices in strategic regions (i.e. the price of 1 kg of coca leaf in Meta-Guaviare has increased by 42%), while at the same time there is lower risk from aspersions and manual eradication, meaning that there are lower production

costs and better market prices for the primary producer (68% of coca farmers sell coca leaf).

Coca crops grew strongly in two National Natural Parks: La Macarena and Nukak – both parks are located east of the country, in the Meta – Guaviare region. The presence of coca also increased in Afro – Colombian Community Councils and indigenous reservations.

Despite the above-mentioned increase in coca cultivation, the expansion is hardly entering new coca-growing communities. 84% of coca crops identified in 2014 are situated within less than 1 km from the coca crops detected in 2013. This means that the affected communities are still the same. These communities (which have historically been affected by the presence of coca crops) have found new incentives to expand their coca – grown areas.

The departments of the southern part of the country (e.g. Nariño, Cauca, Putumayo and Caquetá), as well as Catatumbo, are the main challenge to face the problem of cocaine production. Not only do these areas concentrate most of the coca crops (73%); there are also very strong conditions of vulnerability which hamper communities' trust in the State. Catatumbo, Union Peneya, the mountainous area of the Department of Cauca and the southern border of Colombia are currently the foci with most density of coca crops. These "foci" are not new; however, coca crops are clearly centralised around them.

Similarly, six departments (Magdalena, Cesar, Santander, Boyacá, Arauca and Guainía) have under 100 ha of coca – grown areas, and no coca crops have been detected in three departments (Guajira, Caldas and Cundinamarca). The number of departments affected by coca crops dropped from 23 to 21, and 35.5% of the territory which was affected by coca crops at some point in time completed three consecutive years with no presence thereof. The abandonment rate increased, which means that there is more coca, but less territory affected.

The increase of potential production of cocaine is not only related to an increase in the coca – grown area. Lesser impact (less aspersions and less manual eradication in comparison to the average from the historical series) and an increase of coca leaf yield per ha have contributed to a stronger increase in production than an increase in area.

There is current evidence of structural changes in the coca market, represented by higher levels of segmentation in productive processes as well as diversification of the risk inherent in the line of business among several stakeholders. This could explain not only differentiated processes in this product, but also specialisation of productive processes. These changes have not caused the prices of cocaine hydrochloride to rise, though; the average price in 2014 was COP \$4,538,200 / Kg (USD \$ 2,269 / kg), which is only as low as 3.7% lower than it was in 2013.

Cocaine hydrochloride prices in accordance with the distance to the coca crop location, i.e. the farther the production site – and the closer to the consumption market, the higher the price. It is worth noting that statistics available on prices do not take into consideration adjustments according to purity. According to information acquired through interviews (PRELAC project) about cocaine wholesale prices in different Latin American countries, made in 2013-2014, 1 kg of cocaine hydrochloride is marketed in Colombia at an average price of USD \$ 2,269 / Kg, whereas the same amount can be marketed in Central American countries at prices ranging from USD \$2,800 to USD \$10,000 (increase between 23% and 341% with regard to the market price in Colombia). Is the intended market is Mexico, 1 kg of cocaine hydrochloride can be marketed at a price ranging from USD \$15,000 and USD \$17,000 (increase between 561% and 649% with regard to the market price in Colombia). If the country of destination is any country of the European Union, prices may range between USD \$ 54,000 and USD 57,000 (increase between 2,280% and 2,412% with regard to the market price in Colombia). Data provided in the World Drug Report 2014 point to even larger markups in Europe and the US.

Despite the incentives associated to prices, there is still no evidence that growth in Colombia is a consequence of an international consumption dynamic; neither prices nor statistics on prevalence of drug use provide proof for this. It is necessary to continue to monitor not only production but also consumption; particularly, an alert must be made in relation to the points of destination of this potentially high production of cocaine in Colombia.

In 2014, UNODC initiated a monitoring process with the aid of satellite imagery of alluvial gold mining activities. This monitoring seeks to contribute to understanding the phenomena of illegality as associated to marginal territories where there are or there have been coca crops. 44% of alluvial gold mining activities coincide with territories which are currently affected by coca crops. 13,600 ha of primary forest have been logged down in the Pacific over the past year in order to carry out mining activities, i.e. twice the area logged down for coca – growing purposes during the 2012 – 2013 period. Given the conditions of territories, many of the mining activities detected are illegal in nature and expose the communities to new forms of vulnerability.

The achievements of alternative development in the past 11 years are remarkably relevant: nearly 180,000 families were covered by the programmes, 8,000 veredas¹⁵ and over 600 organisations have improved their quality of life and face the future within a framework of legality. Continuing to improve the coordination between alternative development and other Government programmes in order to achieve a comprehensive intervention in the territories, is one of the challenges that the Government faces. This also means that alternative development is not only useful to counter coca crops, but also other phenomena of illegality which affect Colombia's most vulnerable territories.

15. In Colombia, a Vereda is a sub-divisional administrative part of a municipality primarily in rural areas.

INTRODUCTION

UNODC works in partnership with the countries which have been most heavily affected by the production of drugs of natural origin, in monitoring extension and evolution of illicit crops through the implementation of the **Illicit Crop Monitoring Programme (ICMP)**. At present, the program has been implemented in Colombia, Peru and the Plurinational State of Bolivia, for coca crops; Afghanistan, Laos and Myanmar for poppy cultivations, and Morocco for Marihuana crops.

The objectives of the Illicit Crop Monitoring Programme aim to set forth methodologies for gathering and analysing information, in order to increase governments' capabilities to monitor illicit crops in their territories, and provide assistance to the international community in monitoring their extension and evolution within the framework of the eradication strategy adopted by the **Member States under the action plan of Session 53 of the United Nations Drugs Commission** in march, 2009.

UNODC has provided support to monitoring activities on coca crops Colombia since 1999, and has issued 16 yearly surveys based on satellite imagery analysis. The two first surveys (1999 and 2000) did not assess the whole country; but from 2001 on the survey was extended in order to cover the whole national territory, thereby assuring a thorough monitoring of the potential expansion of illicit crops.

As of August 2014, UNODC entered into an agreement with the Colombian government in order to continue to expand monitoring and analysis tasks, thus ensuring sustainability of the project until the year 2016. Within this framework, the Colombian government has promoted a comprehensive view of the illicit crop issue, based on the survey on territories as scenarios whereat different characteristics come together to facilitate or hamper sustainability of actions aimed at countering illicit crops. Thus, UNODC and the Colombian Government wish to provide a wide overview of the territory (by means of the SIMCI programme), in order to present public policymakers, assessors thereof, the academic community and civil society with reliable and inter – complementary data to help understand the complex dynamics which underlies drug production.

The monitoring framework includes special areas, such as fragile ecosystems, Natural National Parks, Indigenous Territories, expansion of the agricultural borders, and deforestation processes. In addition, direct support is provided to the following programmes: Alternative Development, National Plan for Territorial Consolidation (PNCT, from its original Spanish language initials - Plan Nacional de Consolidación Territorial) and Forest Warden Families, implemented by the Colombian government.

The project relies on an interagency group tasked with ensuring transfer and adoption of technologies at beneficiary national agencies. SIMCI is a joint project implemented between UNODC and the Colombian Government; the national party is the Ministry of Justice and Law, which is also the president of the National Drugs Council (CNE, from its original Spanish language initials - Consejo Nacional de Estupefacientes).

Since the year 2011, a strategic line of work has been developed with regard to the chemical substances utilised in the production of illegal drugs. This line of work has the support of the PRELAC project, and a focal point of the project is dedicated to it. From the year 2013 on, a team of tech experts was incorporated which has worked in rendering information available through the Colombian Observatory on Drugs (COD), as well as strengthening the project's different information channels – esp. information exchange with researchers worldwide within the framework of the “Weaving Networks” (Tejiendo Redes) researcher network.

DRUG PRODUCTION

COCA CROPS

The numbers in coca crops significantly increased in 2014 with regard to 2013. The results of the survey show that, as of December the 31st, 2014, there were 69,000 ha of coca crops in Colombia; in spite of the strong increase in coca – grown area (+44%), 3 departments (namely Guajira, Caldas and Cundinamarca) had no coca crops in 2014. The number of departments affected by coca crops fell to 21 for the first time ever, and 6 departments had under 100 ha of coca crops.

2013 – 2014 behaviour is indicative of the fact that the amount of coca crops remained stable in 2 departments. There was a reduction of coca crops in 8 departments and an increase in 11. The main increase was observed in Putumayo (+ 5,942 ha), Nariño (+4,108 ha), Cauca (+3,063 ha) and Caqueta (+2,220 ha); these increases strongly outweigh reductions, which only amounted to 419 ha.

Analysis of the historical series of the affected area¹⁶ 110,000 ha in 2014 shows increase (+ 23%) vis – à – vis the report for the surveys; this indicates that a significant portion of the crops identified in the survey corresponds to new crops in areas which had been intervened with aspersion or eradication.

The southern departments of the country (Nariño, Cauca, Putumayo and Caqueta), as well as Catatumbo, constitute the main challenge to face the problem of cocaine production. Not only is most of the concentration of coca crops concentrated there (73%), but there are also highly strong conditions of vulnerability which hamper trust in the State by the communities. Catatumbo, Union Peneya, the mountainous area of the department of Cauca and the southern border of Colombia are currently the two densest foci of coca crops.

Aspersion operations were conducted in the same departments whereat intervention was performed in

2013. Aspersion went from 47,053 ha to 55,554 ha (18% increase); nevertheless aspersion continues to be low with regard to the historical average. About half of the aspersion effort in 2014 was concentrated in Nariño and Putumayo; however, these departments showed the strongest increases in coca – grown areas.

The trend toward reduction which started in the year 2007 was disrupted in 2014. The departments of Nariño and Putumayo had strong increases by 31% and 78% respectively, and 54% of crops are located in 3 departments, Nariño, Putumayo and Caqueta. 82% of all the coca crops in the country can be consolidated by adding Norte de Santander, Cauca and Guaviare in the equation; this means that the concentration trend in areas affected by coca crops is maintained.

Despite this increase, there is no expansion of coca crops to new territories. 84% of the coca crops identified in 2014 are situated within 1 km of the coca crops identified in 2013. This means that there has been an increase in coca – grown areas, yet the communities affected continue to be same.

There is evidence of structural change in the coca market; this can be observed in higher segmentation of productive processes, as well as diversification of the risk inherent in the business amongst several agents; this could explain both differentiated processes in this product and specialisation of productive processes. These changes have not caused prices of cocaine hydrochloride to go up; contrarily, prices dropped by 3.7%, i.e. COP \$4,538,200 / kg (USD \$ 2,269 / Kg).

Cocaine hydrochloride prices increase in accordance with the distance to the coca crop location, i.e. the farther the production site – and the closer to the consumption market, the higher the price. It is noteworthy that statistics available on prices do not take into consideration adjustment according to purity. 1 kg of cocaine hydrochloride is marketed in the country at an average price of USD \$ 2,269 / Kg, whereas the same

16. The affected area is the geographic sum of the reports on presence of illicit crops derived from aspersion, manual eradication and the yearly survey. UNODC issues data in the two latter; the aspersion report is issued by DIRAN.

Department	Dec.- 2007	Dec.- 2008	Dec.- 2009	Dec.- 2010	Dec.- 2011	Dec.- 2012	Dec.- 2013	Dec.- 2014	Change% 2013-2014	% of 2014 total
Nariño	20,259	19,612	17,639	15,951	17,231	10,733	13,177	17,285	31%	25%
Putumayo	14,813	9,658	5,633	4,785	9,951	6,148	7,667	13,609	78%	20%
Norte de Santander	1,946	2,886	2,713	1,889	3,490	4,516	6,345	6,944	9%	10%
Caqueta	6,318	4,303	3,985	2,578	3,327	3,695	4,322	6,542	51%	9%
Cauca	4,168	5,422	6,597	5,908	6,066	4,325	3,326	6,389	92%	9%
Guaviare	9,299	6,629	8,660	5,701	6,839	3,851	4,725	5,658	20%	8%
Meta	10,386	5,525	4,469	3,008	3,040	2,699	2,898	5,042	74%	7%
Antioquia	9,926	6,096	5,096	5,350	3,104	2,725	991	2293	131%	3%
Choco	1,080	2,794	1,789	3,158	2,511	3,429	1,661	1,741	5%	3%
Bolivar	5,632	5,847	5,346	3,324	2,207	1,968	925	1565	69%	2%
Valle del Cauca	453	2,089	997	665	981	482	398	561	41%	1%
Cordoba	1,858	1,710	3,113	3,889	1,088	1,046	439	560	28%	1%
Vichada	7,218	3,174	3,228	2,743	2,264	1,242	713	511	-28%	1%
Amazonas	541	836	312	338	122	98	110	173	57%	0.3%
Vaupes	307	557	395	721	277	254	184	109	-41%	0.2%
Guainia	623	625	606	446	318	301	81	66	-19%	0.1%
Santander	1,325	1,791	1,066	673	595	111	77	26	-66%	0.04%
Arauca	2,116	447	430	247	132	81	69	25	-64%	0.04%
Boyaca	79	197	204	105	93	10	17	14	-18%	0.02%
Cesar	0	5	0	0	0	13	13	10	-23%	0.01%
Magdalena	278	391	169	121	46	37	37	9	-76%	0.01%
Caldas	56	187	186	46	46	16	8	0	-100%	n.a
La Guajira	87	160	182	134	16	10	6	0	-100%	n.a
Cundinamarca	131	12	0	32	18	0	0	0	n.a	n.a
TOTAL	98,899	80,953	73,139	61,812	63,762	47,790	48,189	69,132	44%	100%
Rounded total	99,000	81,000	73,000	62,000	64,000	48,000	48,000	69,000	44%	
Number of affected departments	23	24	22	23	23	23	23	21		

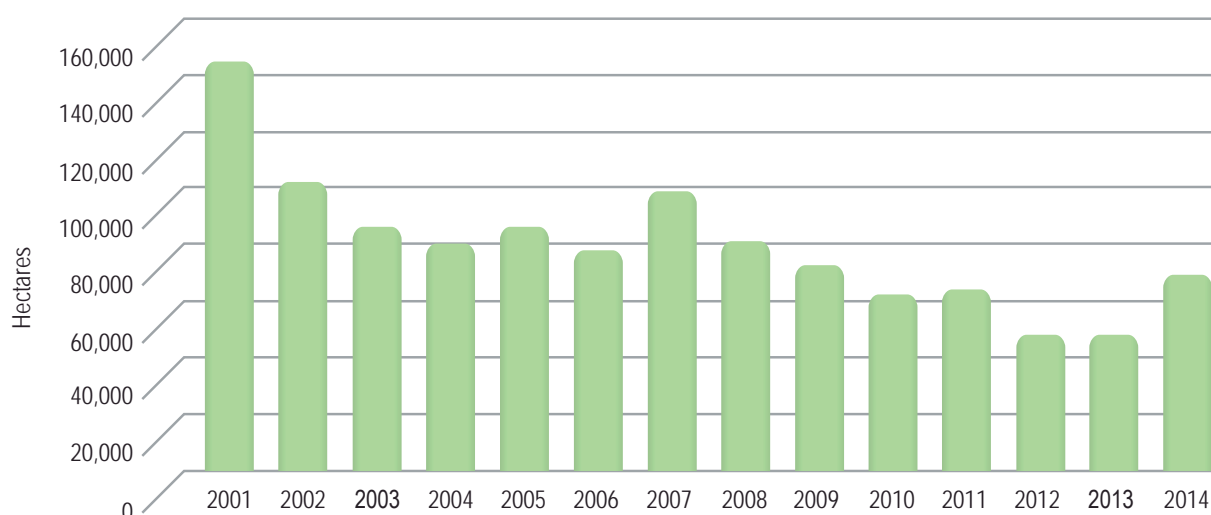
Table 1. Coca fields per department in Colombia, 2007-2014 (hectares)

amount can be marketed in Central American countries at prices ranging from USD \$2,800 to USD \$10,000 (increase between 23% and 341% with regard to the market price in Colombia). Is the intended market is Mexico, 1 kg of cocaine hydrochloride can be marketed at a price ranging from USD \$15,000 and USD \$17,000 (increase between 561% and 649% with regard to the market price in Colombia). If the country of destination is any country of the European Union, prices may range between USD\$ 54,000 and USD 57,000 (increase between 2,280% and 2,412% with regard to the market price in Colombia).

It is worth noting that the coca crops detected as per the 2014 survey occupied 0.04% of the total farmable

land in Colombia. The share of indigenous reservations in the coca – grown area returned to 11% (the same share presented in 2013), but increased by 25%. On the other hand, the share of Afro – Colombian Community Councils increased the coca area of 15%, but area crops increased by 17%. This indicates that the rate of increase in indigenous reservations and community councils was lower that it was in the rest of the country.

Coca crops had a strong increase in National Natural Parks (45%), but this growth is concentrated in two parks: La Macarena and Nukak. Both National Natural Parks are situated east of the country, in the Meta – Guaviare core.



Graph 1. Coca cultivation in Colombia, 2001-2014

This survey represents the situation of coca crops as of December the 31st, 2014, similar to the previous issues of surveys conducted since the year 2001.

42% of coca crops are concentrated in the 10 municipalities which have been most heavily affected by presence of coca crops. Tumaco (Nariño) continues to be the most heavily affected municipality; there was a 36% increase in coca crops there. Barbacoas (Nariño), which ranked 5th in the year 2013, left this list and was replaced by Orito (Putumayo), currently ranking 7th.

Orito was one of the first municipalities which benefited from the Forest Warden Programme, and had attained important reductions in coca – grown areas.

The tenth municipality in the list (Valle del Guamuez) in 2013 had 1,093 ha of coca crops; in 2014, the tenth municipality in the list (San Jose del Guaviare) reports 1,522 ha of coca crops.

Department	Municipality	Coca cultivation (hectares)	% census
Nariño	Tumaco	8,963	13
Putumayo	Puerto Asis	4,437	6.4
Norte de Santander	Tibu	2,997	4.3
Cauca	El Tambo	2,522	3.6
Putumayo	Valle del Guamuez	2,050	3
Guaviare	Miraflores	1,922	2.8
Putumayo	Orito	1,639	2.4
Meta	Puerto Rico	1,616	2.3
Guaviare	El Retorno	1,604	2.3
Guaviare	San Jose del Guaviare	1,522	2.2
Total		29,272	42.3

Table 2. The ten municipalities with the greatest cultivated area 2014

KEY CONCEPTS

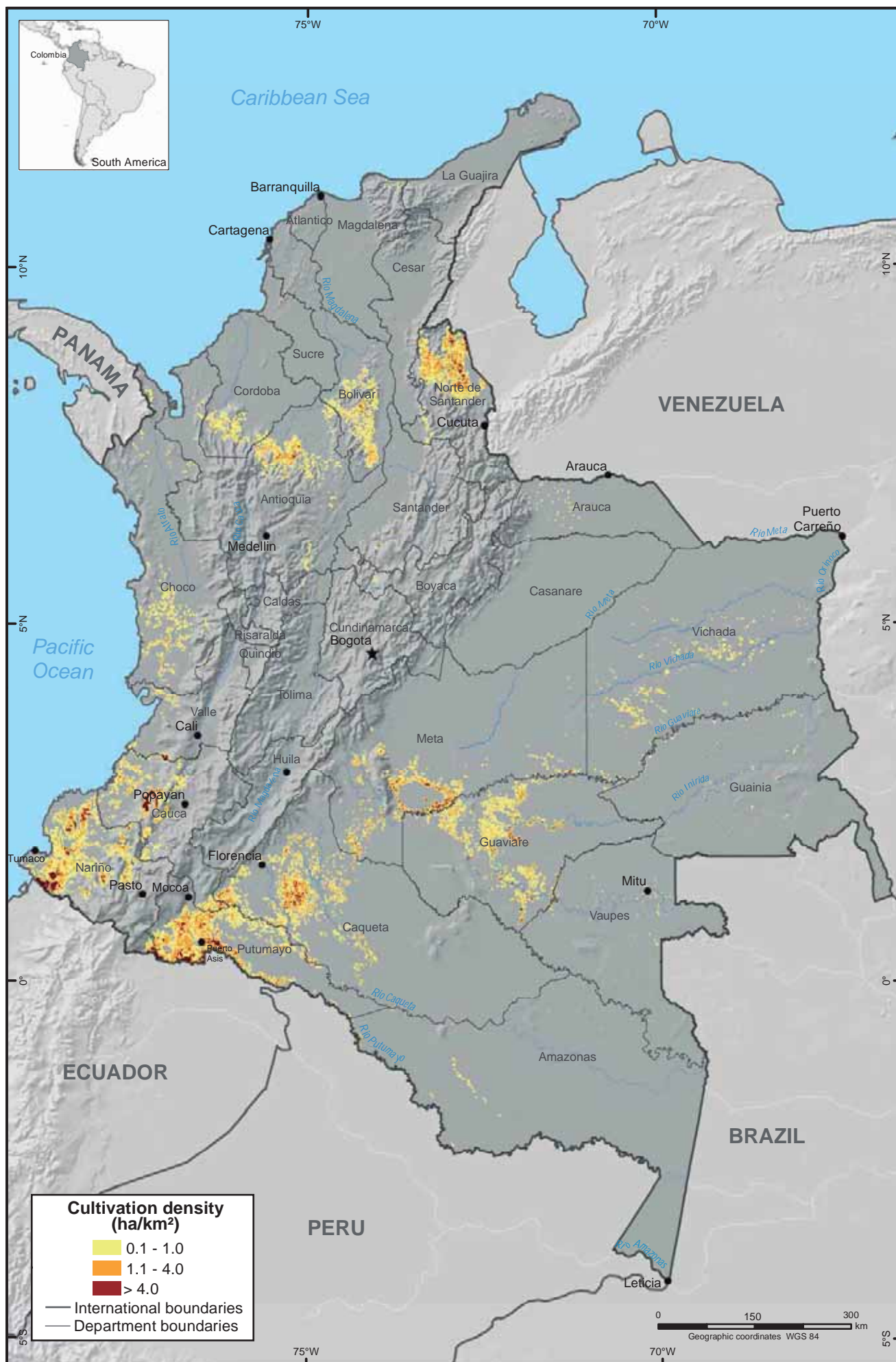
* **Coca cultivation:** ha of coca grown in the country as of December the 31st.

* **Affected area:** Geographical sum of reports about presence of illicit crops derived from aerial spraying, manual eradication and the yearly survey. UNODC produces the data of the two latter; the aspersión report is prepared by DIRAN.

* **Area of influence:** Area derived by performing a 1 km buffer on each of the coca lot centroids.

* **Affected territory:** it means 5 Km² grids which have, at some point in time over the past 10 years, been reported as having coca crops.

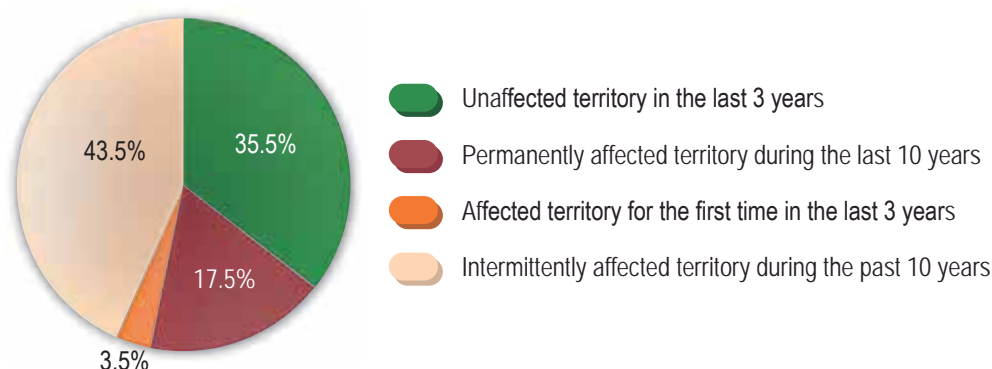
Map 1. Coca cultivation density in Colombia, 2014



Source: Colombian Government - National monitoring system supported by UNODC

The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

DYNAMICS OF PERMANENCE OF ILLICIT CROPS



Graph 2. Regional distribution of permanence, 2005 - 2014*

The dynamics of permanence are based on the analysis of territories affected. Territories affected are 5 km² areas which have been reported as having coca crops at some point in time over the past ten years¹⁷.

After 16 years of monitoring, the spatial establishment and abandonment of coca crops still persists. The model is associated with recurrent processes of land occupation within the peripheral surroundings of the Andean Zone of Colombia, and can be summarized as follows: 1) Ruralisation as an advanced process of anthropic transformations of natural spaces which promotes abandonment of coca crops and incorporation of lands into production processes; ii) the colonisation front, which combines deforestation, grass growth and subsistence crops, alongside illicit crop cultivation; iii) peaks of colonisation, consisting of illicit crop development within vulnerable hydrography, and iv) The

rainforest or dry forests, constituting the source of new areas for establishing the establishment of illicit crops.

During 2014, affected territory by coca crops was 246,125 km², 0.4% less than in the year 2013 (247,200 km²) and 6.5% less than the year 2012 (263,200 km²); this behaviour reinforces the crop concentration trend as evidenced in the latest monitoring reports.

17% of the territory has been permanently affected by coca crops during the last ten years, increasing 0.5 in relation to 2013. This category includes the highest quantities of coca crops detected, i.e. 58% of the total amount nationally. These territories as situated in the departments of Nariño, Cauca, Putumayo, Cauca, Guaviare, Meta, Antioquia (lower Cauca region), Bolivar (south) and Norte de Santander.

Region	Total		Unaffected territory		Territory permanently affected		Intermittently affected territory		Territory affected as from 2012	
	Km ²	%	Km ²	%	Km ²	%	Km ²	%	Km ²	%
Amazon	22,275	9%	14,225	64%	350	2%	7,275	33%	425	2%
Catatumbo	9,950	4%	1,200	12%	1,375	14%	6,775	68%	600	6%
Central	42,775	17%	17,575	41%	5,175	12%	19,075	45%	950	2%
Meta - Guaviare	45,550	19%	17,325	38%	9,825	22%	17,375	38%	1,025	2%
Orinoco	27,125	11%	11,950	44%	1,900	7%	12,425	46%	850	3%
Pacific	51,075	21%	12,000	24%	10,650	21%	24,925	49%	3,500	7%
Putumayo - Caqueta	44,050	18%	11,050	25%	13,700	31%	18,075	41%	1,225	3%
Sierra Nevada	3,325	1%	2,000	60%	50	2%	1,225	37%	50	2%
Total	246,125	100%	87,325	35.5%	43,025	17.5%	107,150	43.5%	8,625	3.5%

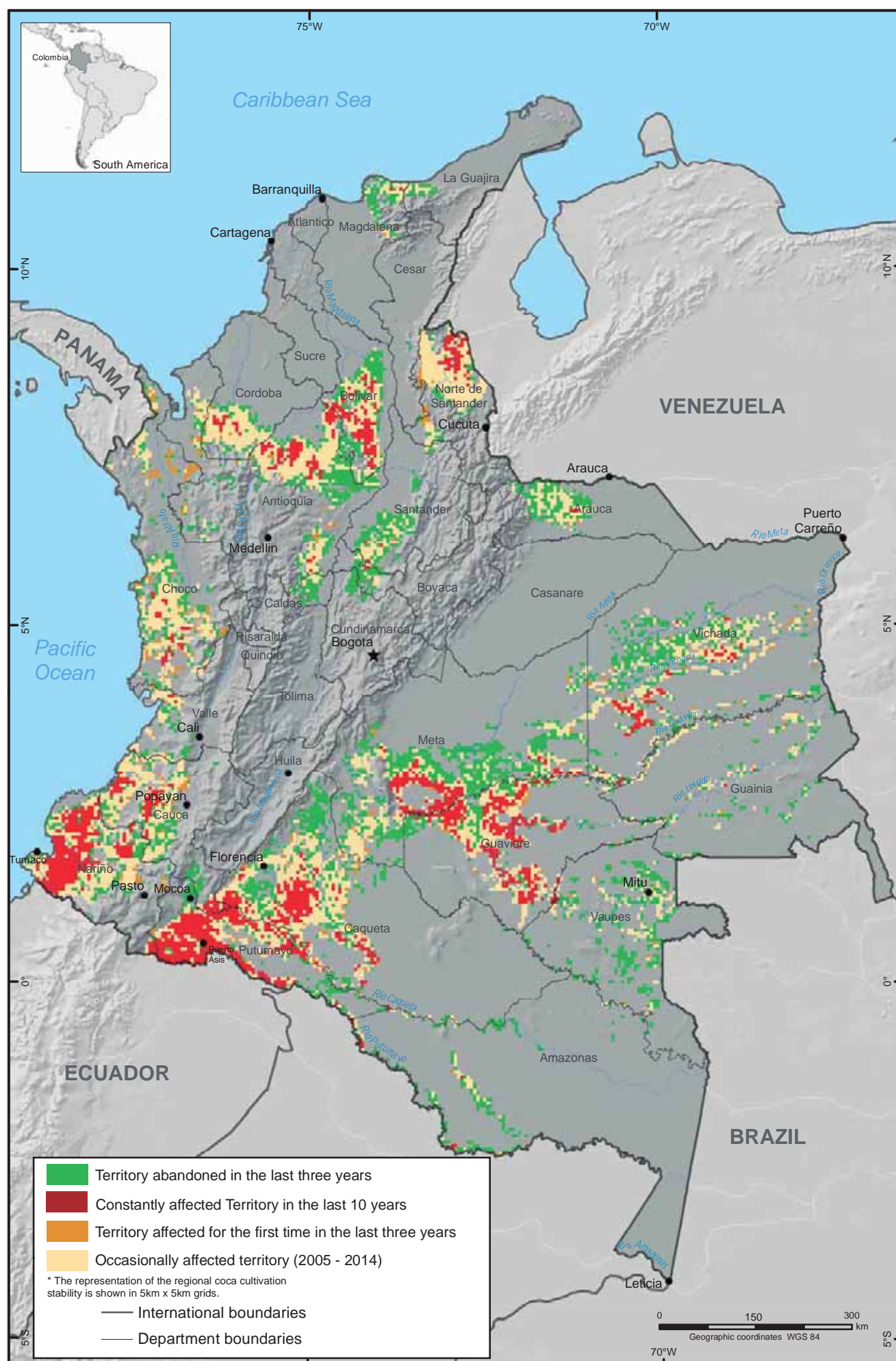
Table 3. Regional distribution of the permanence of coca cultivation (2005-2014)

*Nota

1. The dynamic analysis was based in 2005 for the current study.
2. Territory is considered to be abandoned when no coca crops have been grown during the last three years and it expressed as a percentage of the total area affected in the last 10 years.
3. Territory is considered to be permanently affected when coca crops have been continuously grown since 2004 and it expressed as a percentage of the total area affected in the last 10 years.
4. Territory is considered to be intermittently affected when coca crops have been grown in an interrupted pattern since 2004 and it expressed as a percentage of the total area affected in the last 10 years.
5. Territory is considered to be recently affected when coca crops are grown for the first time during the past three years and it expressed as a percentage of the total area affected in the last 10 years.

17. The dynamic analysis uses the territory affected by coca crops since 2005 as a point of reference. The dynamic analysis does not measure the scale in relation to the coca crop area, but in relation to the amount of territory affected by presence of these crops.

Map 2. Regional coca cultivation stability in Colombia, 2005 - 2014



Source: Colombian Government - National monitoring system supported by UNODC

The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

3.5% of the territory was recently affected (between 2012 and 2014)¹⁸. This category corresponds with the new coca crop areas and expansion zones, mainly situated north of Choco, the peripheral area of the Norte de Santander Core and south of Serrania de la Macarena, between Meta and Caqueta.

43.5% of the territory has been identified as intermittently affected; i.e. areas whereat coca crops appear and disappear throughout the years of the series (2005 to 2014). This phenomenon is present in all regions, more intermittently in the Central, Pacific and Putumayo – Caqueta regions. In relation to 2013, this phenomenon has decreased 4 percentage points. Of the crops detected in 2014, 27% is to be located in these territories.

Lastly, the area which has been abandoned over the past three years increased by 14,5% in relation to the year 2013, covering 35.5% of the total territory. Abandoned territories are to be found south of the Central (chiefly Caldas, Boyaca, Cundinamarca y Santander), and the Meta – Guaviare region (Orinoco, Amazon and the peripheral area).

LATEST DETECTION

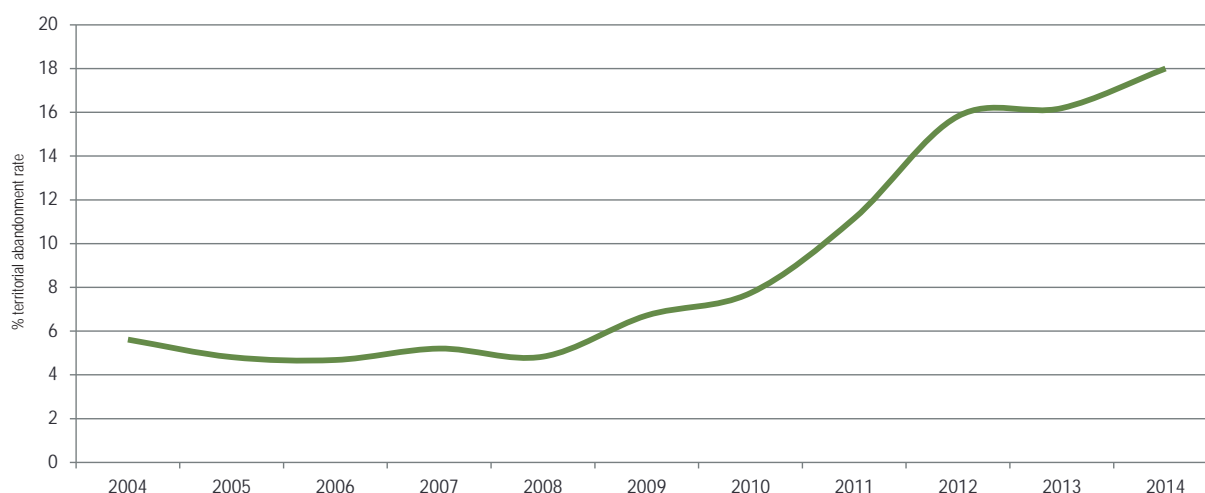
Upon analysing 1 km² grids from the latest detection (understood as the last period in which the grid was affected by coca crops, eradication and spraying), a territorial abandonment rate can be identified with a clear trend to increase since 2008, when a 4.8% rate was identified, and 18% by 2014 – i.e. 2 percentage points more than the year 2013.

Starting in 2008, this increase coincides with a reduction in the coca – grown area which has been observed in the country until the year 2013. By 2014 there is a significant increase in the coca – grown

area, but it can be observed that the concentration of the illicit phenomenon is strong, accounting for 73% of concentration in only 5 departments. This peculiar trait contrasts with abandonment of coca crops in certain regions of the country (10 of the 21 departments affected show a trend to reduction), which allows the abandonment rate to remain stable despite the national trend.

It was estimated in 2013 that a 12,455 km² area could be listed in 2014 as abandoned territory, conditioned to completing three years with no presence of coca crops. However, only 10,303 km² terrain achieved this category. This is indicative of the fact that there is a phenomenon of recidivism in several territories which prevented 2,152 km² from being listed as abandoned territory in 2014.

Recidivism in the presence of coca crops is preponderant in regions with a significantly increasing trend, such as Putumayo, Caqueta, Nariño, Guaviare, and Antioquia, which account for 70% of recidivist territories. Caqueta and Putumayo, with 390 km² and 389 km² of recidivist territories respectively, are the most heavily affected territories.



Graph 3. Rate of abandonment per year 2004 -2014

18. The "territory recently affected" refers to presence of coca crops for the first time within the past three years.

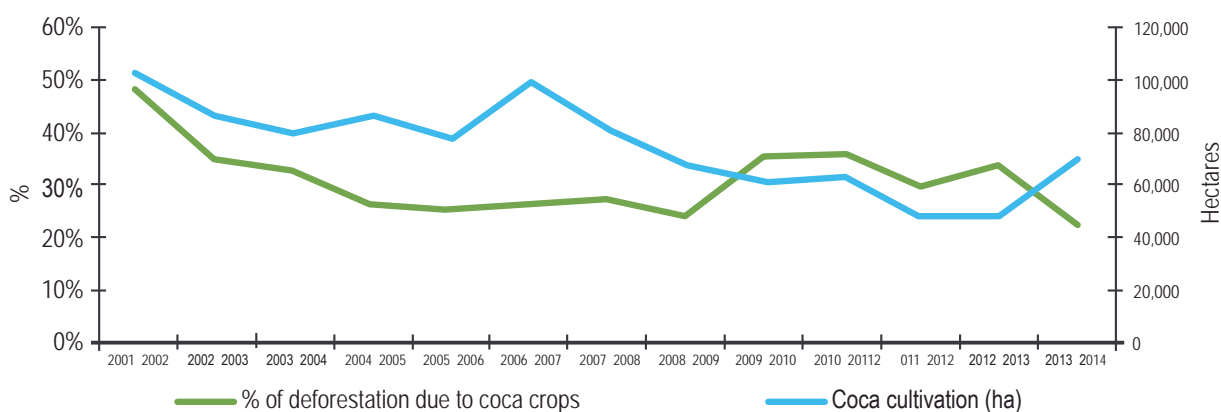
DEFORESTATION DUE TO COCA CROPS

Deforestation associated to direct plantation of coca shows relative stability against the previous year, with 15,405 ha of (primary and secondary) projects. This is 5.7% less than in 2013. Whilst there is no direct relation between the increase in coca – grown area and the area deforested for said purpose, department – specific analysis of the data shows that forest loss is concentrated in the departments which show a significant increase of the coca – grown area.

54% of the total deforested area in this period correspond to primary forests and 46% thereof corresponds to secondary forests and high shrub. This shows that the highest level of impact takes place in pristine forests. This forest loss leads to fragmentation and loss of connectivity amongst strategic ecosystems. 35% of the total primary forest area levelled was concentrated in Nariño; this department had a 31% increase in the coca – grown area in the year 2014. Putumayo ranks

second, and has a 17% forest loss concentration rate, followed by Norte de Santander (12%); the two latter had an increase in their coca – grown area by 78% and 9%, respectively.

Cumulative deforestation associated to direct plantation of coca amounts to 290,992 ha between 2001 - 2014. By 2002, the percentage of deforested area was equivalent to 46% according to the survey. This reflects a 22% reduction in the total area for the year 2014, and is indicative of the fact that, whilst there is a deforestation process associated to coca crops, many of these crops tend to be located in areas which had previously been subjected to intervention.



Graph 4. Rate of deforestation due to coca cultivation, 2001 - 2014

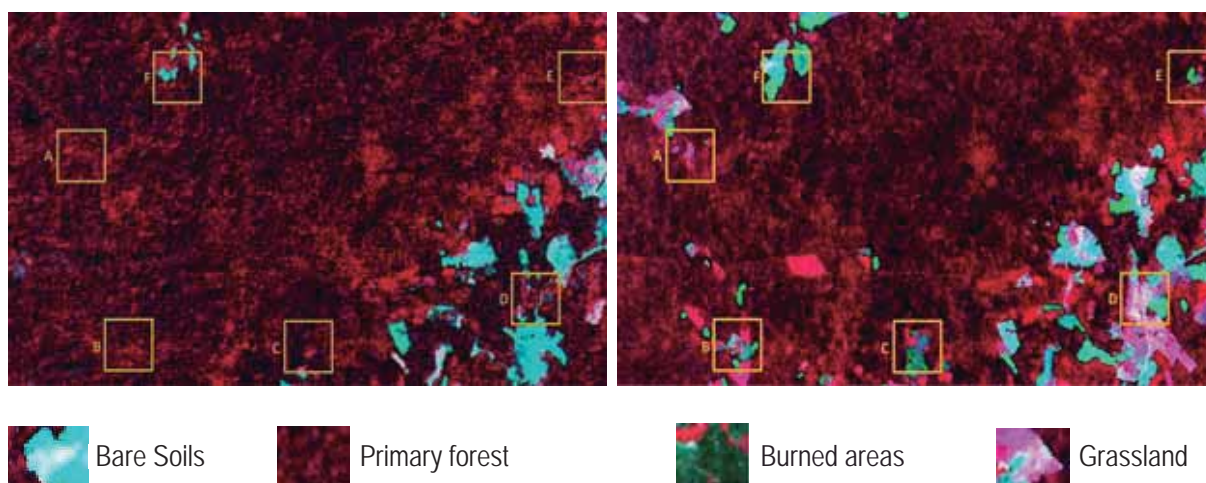
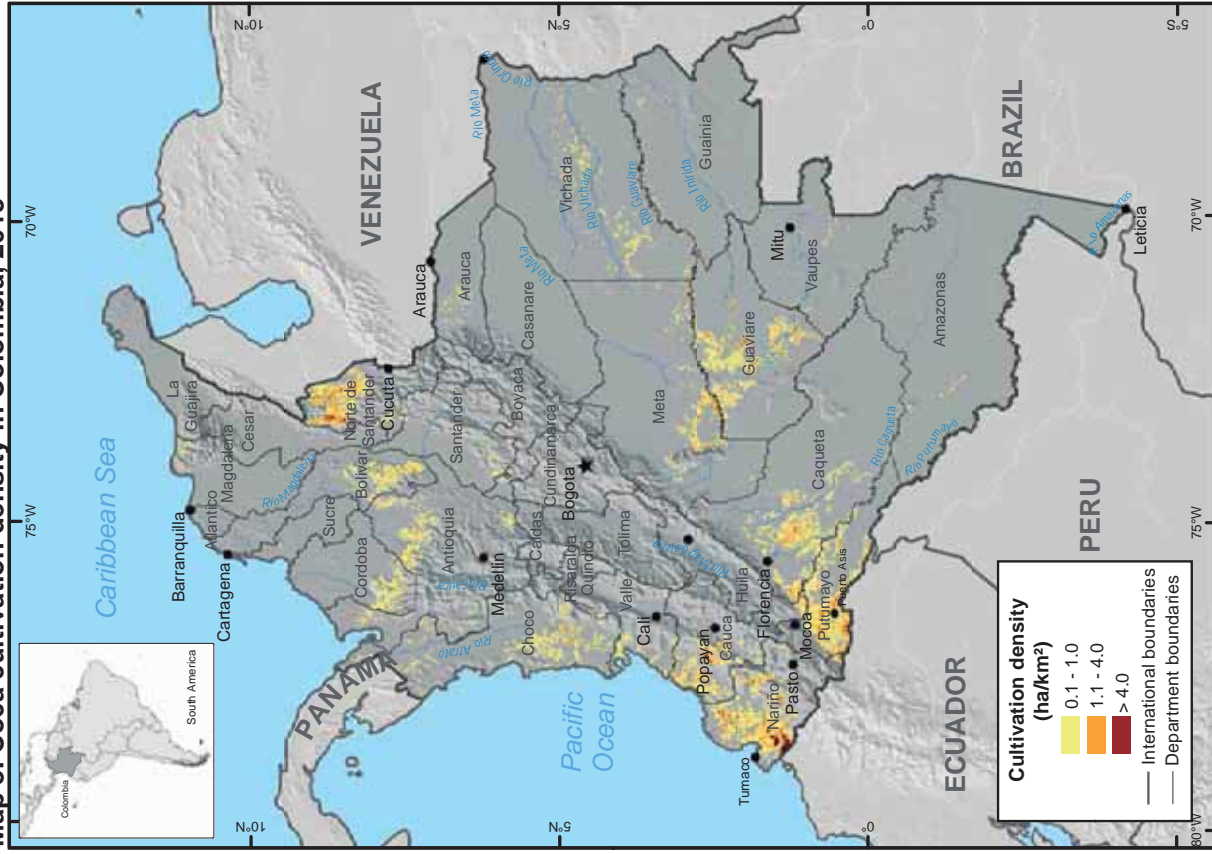


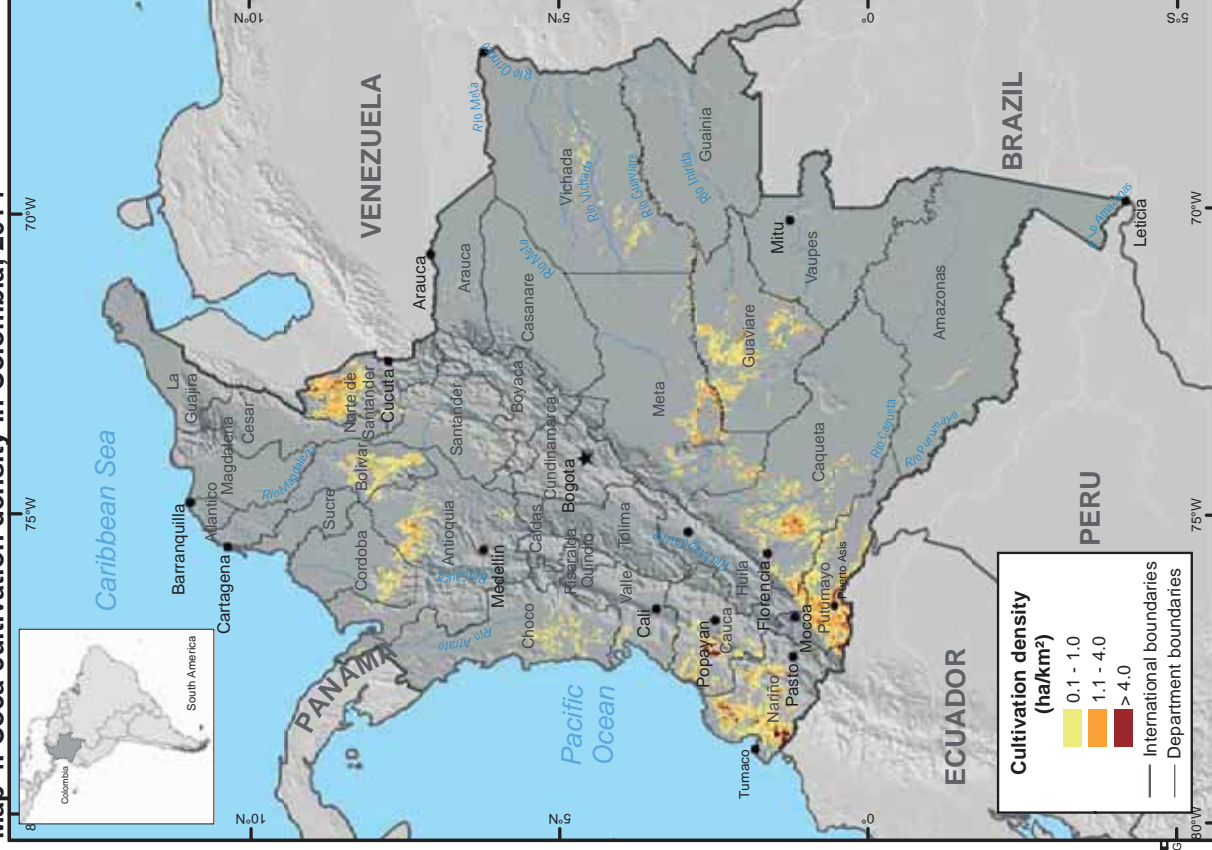
Figure 1. Temporary comparison of satellite images of the municipality of San Jose del Guaviare, Guaviare department. False colour composition. Left: Spot Image, 2008. Right: Landsat 8, 2014

Map 3. Coca cultivation density in Colombia, 2013



Source: Colombian Government - National monitoring system supported by UNODC
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Map 4. Coca cultivation density in Colombia, 2014



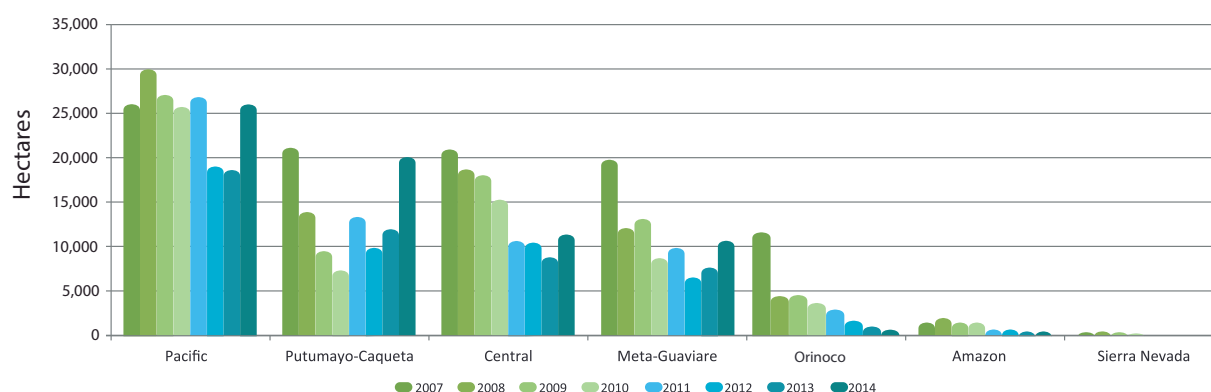
ANALYSIS OF THE REGIONAL HISTORICAL SERIES

Despite the strong increase presented in 2014, three regions had a decrease in terms of coca crop areas, namely Orinoco, Sierra Nevada and the Amazon region. Nevertheless, only 1.2% of the country's coca plantations are located in this area. The area which has been most heavily affected by coca crops continues

to be the Pacific (38% of the area with coca), where crops actually increased by 40%. The area with highest increase was Putumayo – Caqueta, with 8,162 more hectares than in 2013.

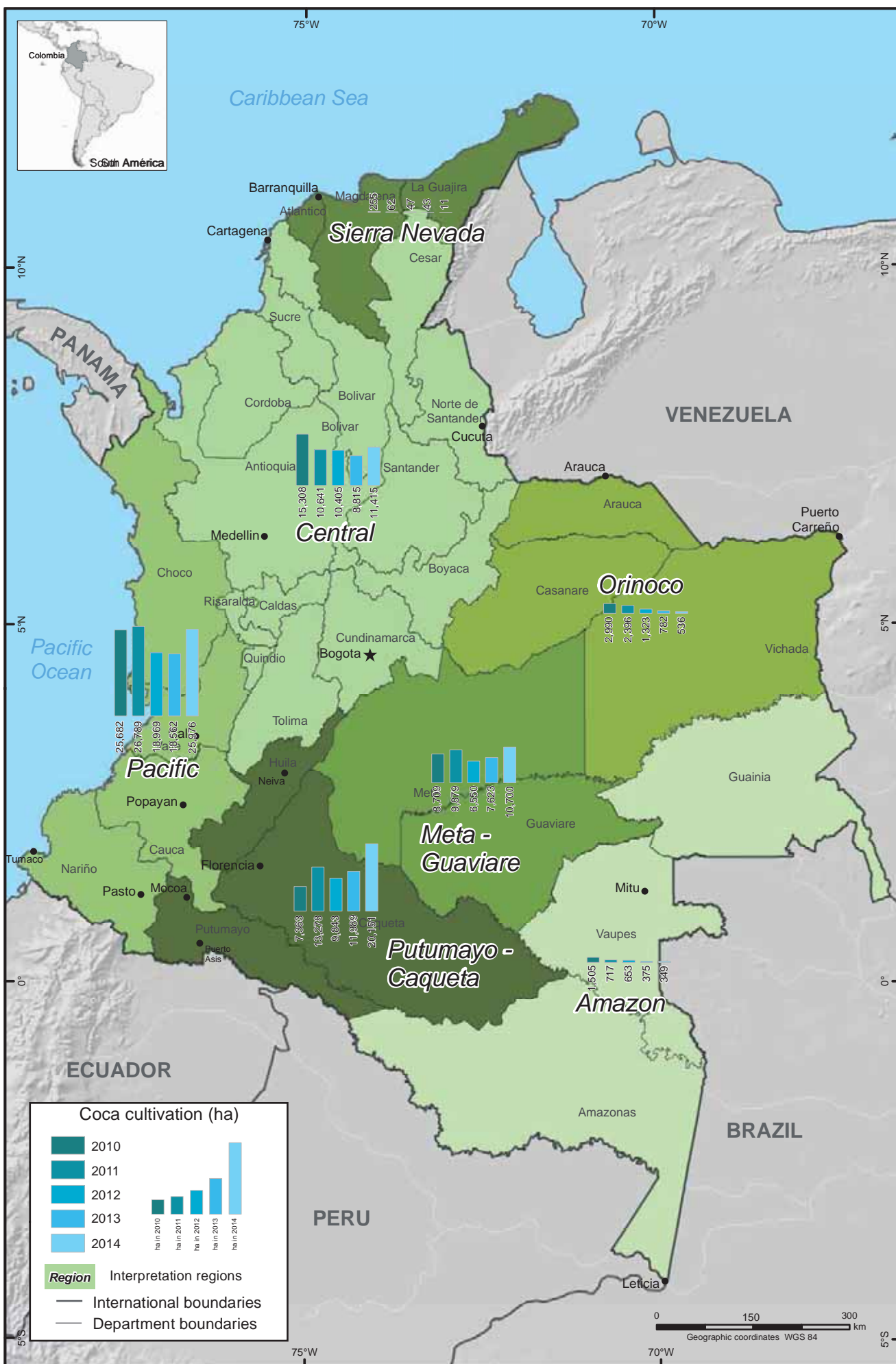
Region	2007	2008	2009	2010	2011	2012	2013	2014	% of the total	Change 2013-2014
Amazon	1,471	2,018	1,313	1,505	717	653	375	348	0.5	-7
Central	20,953	18,731	18,048	15,308	10,641	10,405	8,815	11,412	17	29
Meta-Guaviare	19,685	12,154	13,129	8,709	9,879	6,550	7,623	10,700	15	40
Orinoco	9,334	3,621	3,658	2,990	2,396	1,323	782	536	1	-31
Pacific	25,960	29,917	27,022	25,682	26,789	18,969	18,562	25,976	38	40
Putumayo Caqueta	21,131	13,961	9,618	7,363	13,278	9,843	11,989	20,151	29	68
Sierra Nevada	365	551	351	255	62	47	43	9	0	-79
Rounded total	99,000	81,000	73,000	62,000	64,000	48,000	48,000	69,000	100	44

Table 4. Coca fields in Colombia by region 2007 - 2014 (in hectares)



Graph 5. Coca fields by region 2007 -2014 (hectares)

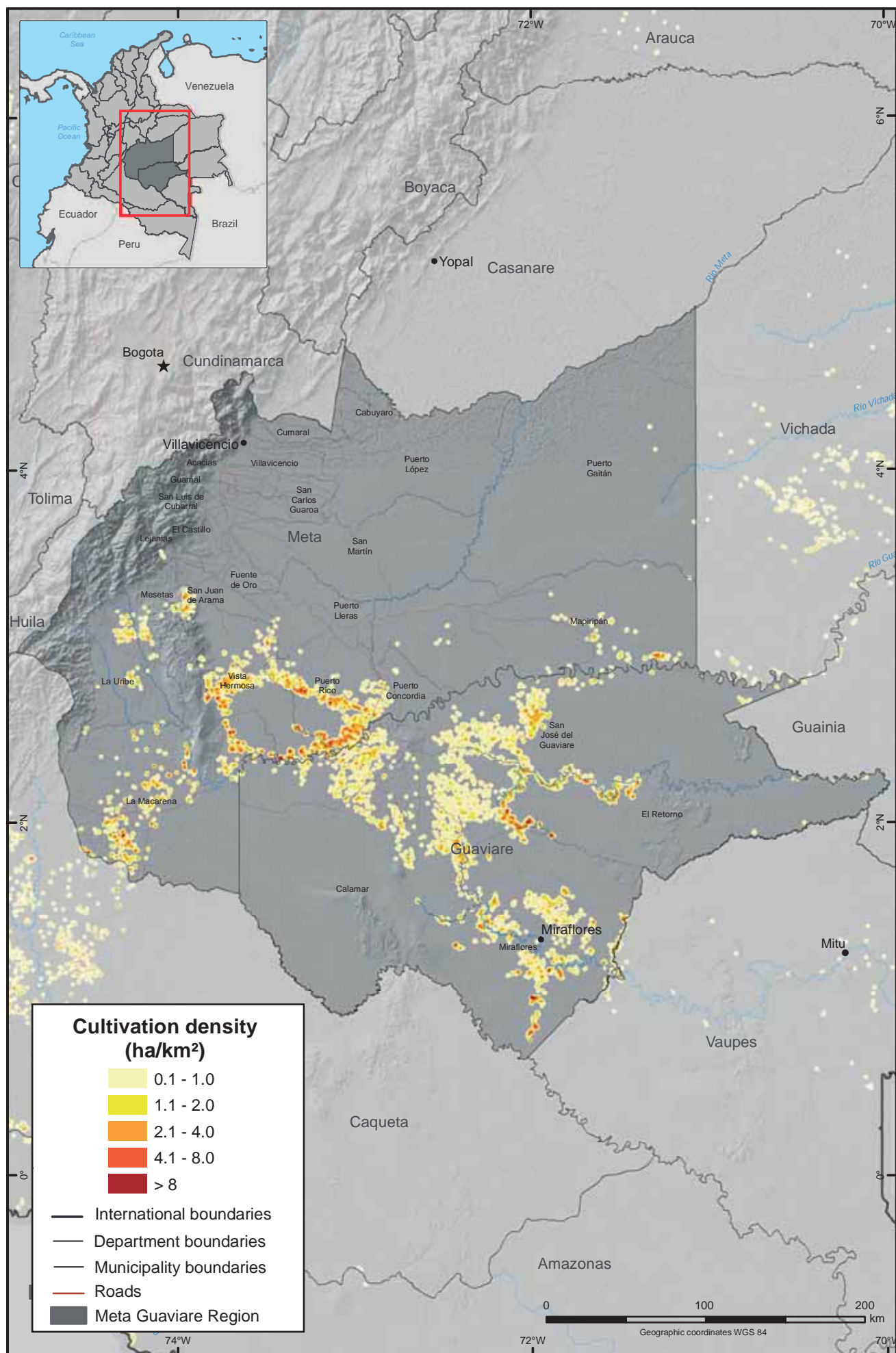
Map 5. Coca cultivation by region in Colombia, 2010 - 2014



Source: Government of Colombia - National monitoring system supported by UNODC

The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

Map 6. Coca cultivation density in the Meta - Guaviare region, 2014



Source: Colombian Government - National monitoring system supported by UNODC

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Meta – Guaviare Region

The Meta – Guaviare region had maintained a continuous trend towards reduction from 2001 to 2012. Despite the foregoing, this was the region with most coca – grown hectares between 2002 and 2006. The lowest point in the series was 2012 with 6,550 ha and crops have increased since then to reach 10,700 ha in 2014.

The coca – grown area increased both in Meta and Guaviare (74% and 20% respectively), and the level of crops in Guaviare (5,658 ha) has been steadily above that of Meta (5,042 ha) since the year 2008.

There were no manual eradication actions in Meta during the year 2014, but 686 ha were eradicated in Guaviare. Aspersions in 2014 were more than they were in 2013, both in Meta and in Guaviare, reaching 10,306 aspersed areas. Nevertheless, it is worth mentioning that 36% of the coca crops were located in zones declared Parks.

The territories affected by coca crops are rather stable, and the increase is more associated with an extension

in the dimensions of the lots that an expansion of the phenomenon. Particularly, it is worth highlighting a densification of the coca – grown areas west of La Macarena Park, in Meta and the southern part of Miraflores, in Guaviare. The increase in Meta is strongly linked to an increase in the size of the lots, which went from 1 ha to 1.4 ha in average size.

It is worth highlighting a strong increase in coca crops in surrounding areas, and even inside Serrania de la Macarena National Park. This area had one of the most remarkable decreases in coca crops nationwide; the department of Meta went from 18,740 ha in 2004 to 3,008 ha in 2010 and this decrease goes hand in hand with the implementation (specifically in the La Macarena area) of the National Consolidation Plan (Plan Nacional de Consolidacion), which aims at strengthening the presence of the State, recovering security amongst the population and promoting investment of the private and international sectors in illicit agriculture. However, the coca – grown area has been stable since the year 2010. In 2014, this is one of the areas which have the highest increase in the whole core.

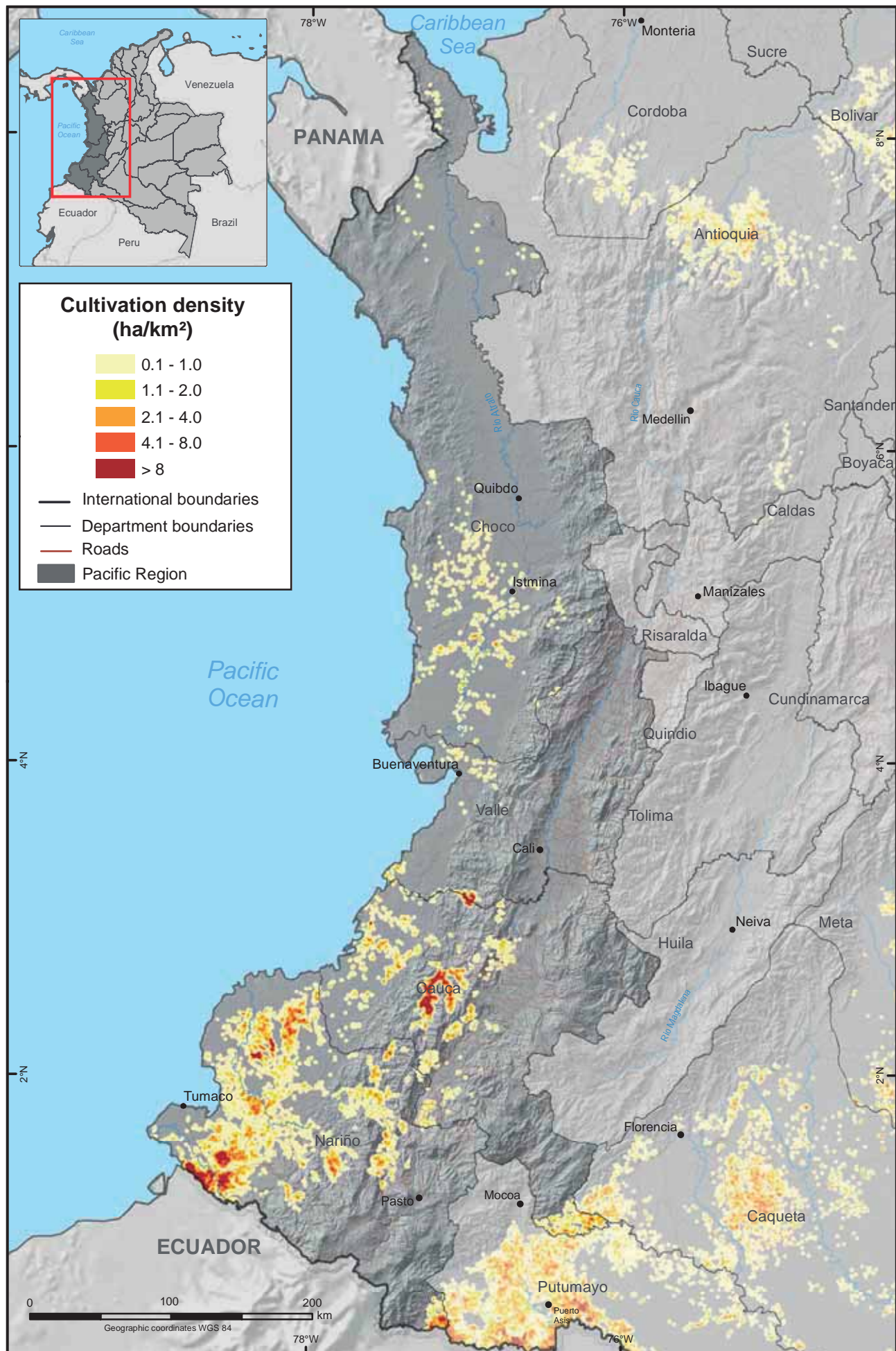
Department	2007	2008	2009	2010	2011	2012	2013	2014
Guaviare	9,299	6,629	8,660	5,701	6,839	3,851	4,725	5,658
Meta	10,386	5,525	4,469	3,008	3,040	2,699	2,898	5,042
Total	19,685	12,154	13,129	8,709	9,879	6,550	7,623	10,700
Annual trend	-4%	-38%	8%	-34%	13%	-34%	16%	40%

Table 5. Coca fields in Meta - Guaviare, 2007 – 2014 (in hectares)



Coca fields in National Natural Park Serrania de la Macarena in Meta - Guaviare

Map 7. Coca cultivation density in the Pacific region, 2014



Source: Colombian Government - National monitoring system supported by UNODC

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Pacific Region

This region is located in the western part of the country, from the border with Ecuador and running along the Pacific Coast up to the border with Panama. This area has varying altitudes, ranging from the highest lands in Colombia down to the Pacific coast. Constant presence of clouds hampers the measurement of land covers – including coca crops. Nevertheless, this situation was particularly favourable during the year 2014, as a consequence it was possible to access some zones for the first time ever, mainly in the Cauca department where it was possible to reach 85% of coverage. This explains the high level of coca crops in Cauca; not necessarily should this mean an increase which was concentrated in the last year.

Department	2007	2008	2009	2010	2011	2012	2013	2014
Nariño	20,259	19,612	17,639	15,951	17,231	10,733	13,177	17,285
Cauca	4,168	5,422	6,597	5,908	6,066	4,325	3,326	6,389
Choco	1,080	2,794	1,789	3,158	2,511	3,429	1,661	1,741
Valle del Cauca	453	2,089	997	665	981	482	398	561
Total	25,960	29,917	27,022	25,682	26,789	18,969	18,562	25,976
Annual trend	38%	15%	-10%	-5%	4%	-29%	-2%	40%

Table 6. Coca fields in the Pacific region, 2007-2014 (in hectares)

A significant trait of this region is the presence of special territorial units; 37% of the territory has been declared Community Councils for Afro – Colombian communities, and 13% corresponds to areas declared Indigenous Reserves. In addition, there are 16 National Natural Parks. It is worth mentioning that 70% of coca crops in the region are located in these special units.

There are three main coca crop cores in the Pacific Region: The first one is the southern part of the Department of Nariño, near the border with Ecuador; the second core is the northwest part of the Department of Nariño, at El Charco and La Tola, and the third one is the mountainous region of Cauca, at El Plateado township, municipality of El Tambo.

Coca crops in Nariño gained relevance in 2002, as there was a reduction by 40,000 ha in the departments of Putumayo and Caqueta and an increase in Nariño to 7,600 ha. From the year 2003, Nariño has ranked top three amongst the departments with most coca – grown areas, and ranked first from the year 2006 to 2014. Crops in 2014 (17,285 ha) have returned to historical levels between 15,000 and 20,000 ha since 2002; this trend was only interrupted in 2012, with a reduction to 10,733 ha. Aspersión operations in 2014 nearly doubled in number those conducted in 2013; however, they are still far below historical levels. Manual eradication was reported in the amount of ca. 1,900 ha in this department in 2014.

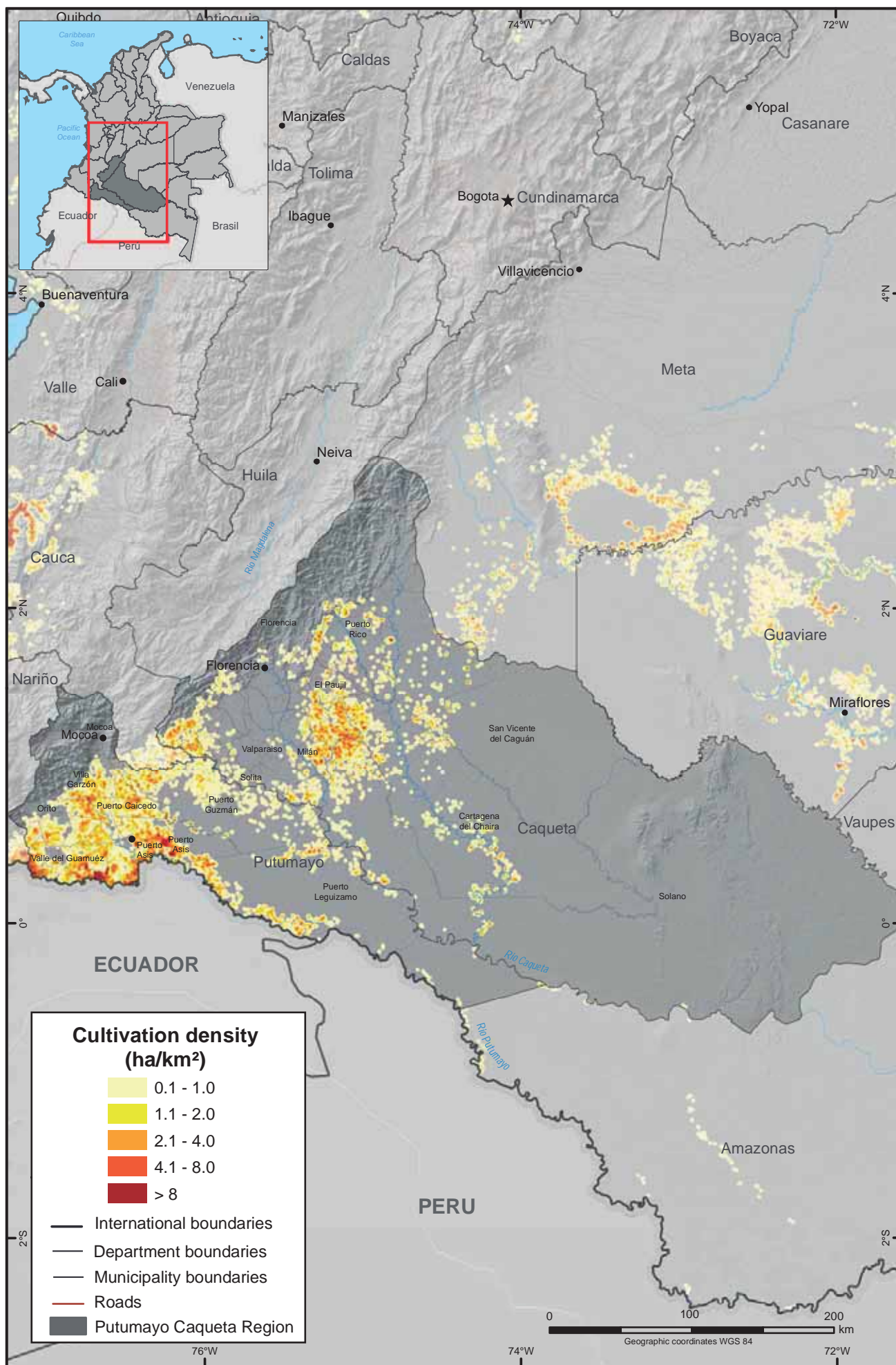
The department of Cauca has a number of common characteristics with neighbouring Nariño, such as an extensive maritime coastline, high sierras and rural economy. Coca crops had maintained relatively low levels until 2006, when the coca – grown areas tripled their size and reached 6,597 ha by 2009. In 2014, coca – grown areas return to the highest levels in the historical series, reaching 6,389 ha, and the dimension of the lots increased by 52%. Additionally, the department of Cauca has had significant expansion of alluvial gold mining in territories affected by coca crops, particularly Timbiqui, Guapi and Lopez de Micay.

The department of Choco has an overall increasing trend since 2004, although there have been alternating increases and reductions since 2008. 1,741 ha of coca crops have been reported in 2014, which is chiefly the same level reported in 2013. However, expansion of mining activities in the department generates alerts as to the true conditions for diminishing vulnerabilities and ultimately leading to an improvement of local conditions.

The department of Valle del Cauca had always had an area below 300 ha with coca crops; however, a dramatic increase was observed in 2008 (2,089 ha). The coca – grown area increased in 2014 and peaked at 561 ha, i.e. a quarter of the 2008 record.

The Pacific region is one of the main challenges in the fight against illicit crops; 38% of all the country's coca crops, 34% of the expansion and the lowest abandonment rate nationwide are concentrated in this region. Furthermore, cultural diversity is being threatened by phenomena of illegality in this region; 59% of the coca crops located in reservations correspond to the Pacific region's reservations, and the region's Afro – Colombian Community Councils hold 15% of the country's coca.

Map 8. Coca cultivation density in the Putumayo Caqueta region, 2014



Source: Colombian Government - National monitoring system supported by UNODC

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Putumayo – Caqueta Region

The Putumayo – Caqueta Region is located southeast of Colombia. 42% of the 145,000 ha coca – grown areas in the country in 2001 were located in this region. Crops decreased to 10,800 ha in 2004 and have since ranged from 7,000 to 20,000 ha without a clearly consolidated trend. In 2014 (as in the case of the years 2002 and 2007), crops return to the upper limit of this range, thus completing the second consecutive year of increase (22% and 68% respectively; 29% of the country's coca is located in this region – 4 percentage points above last year. Both Putumayo and Caqueta had a strong increase in coca – grown areas.

Coca crops reached 66,000 ha (40% of the country's total coca – grown areas) in the department of Putumayo, bordering Ecuador and Peru in the year 2000. After 4 years of consecutive and relevant reductions, this

Coca crops in the department of Caqueta reached their lowest historical record in 2010, with 2,578 ha (4.5% of the country's total coca – grown areas), after a slight yet steady reduction which started in 2001 upon reaching 14,516 ha (10% of the country's total coca – grown areas). Nevertheless, a trend towards growth started in 2010 which is maintained in 2014, with an increase of 52% with regard to the year 2013. In 2014, coca crops are still concentrated in the piedmont area south of the department, as well as in the Union Peneya sector (this is a township of La Montañita municipality). Lots have become bigger, and there has been an expansion of the phenomenon, chiefly in the piedmont of the west mountain range, in the western part of the department – municipality of San Jose del Fragua. Aspersions were conducted at the same levels of the year 2013, and manual eradication was doubled.

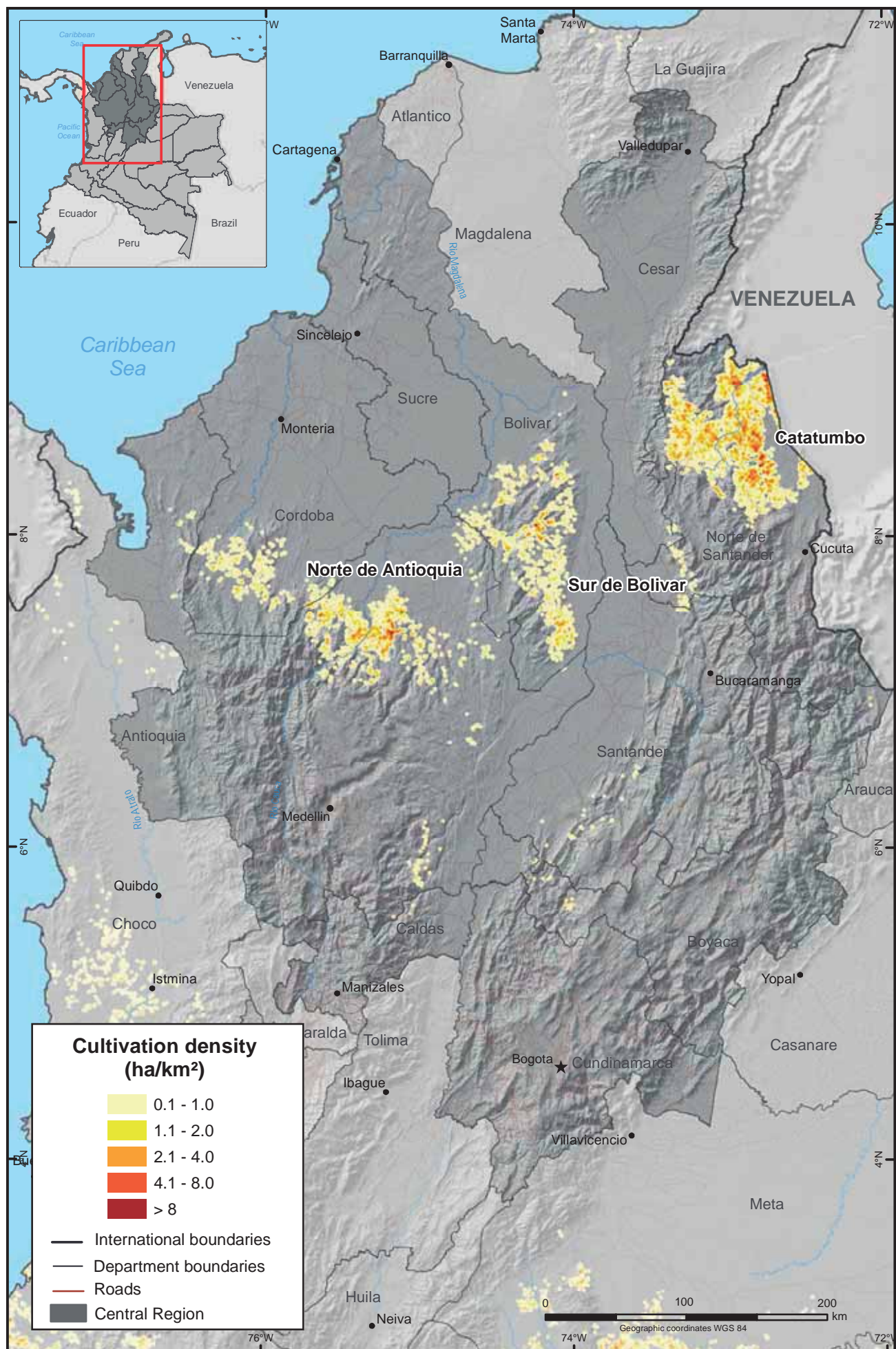
Department	2007	2008	2009	2010	2011	2012	2013	2014
Putumayo	14,813	9,658	5,633	4,785	9,951	6,148	7,667	13,609
Caqueta	6,318	4,303	3,985	2,578	3,327	3,695	4,322	6,542
Total	21,131	13,961	9,618	7,363	13,278	9,843	11,989	20,151
Annual trend	23%	-34%	-30%	-23%	80%	-26%	22%	68%

Table 7. Coca fields in the Putumayo-Caqueta region, 2007-2014 (in hectares)

number dropped to 4,386 ha (5% of the country's total coca – grown areas) in 2004, but this trend changed between 2005 and 2007 with consecutive increases by 105% in 2005, 37% in 2006 and 21% in 2007. From this year, there have been increases and reductions without a clearly consolidated trend. 13,609 ha of coca were detected in 2014 – 77% more than the year 2013. The increase in Putumayo was strongly concentrated in the southern part of the department, particularly the municipalities of Puerto Asis, Valle del Guamez and San Miguel.

Aspersions activities have neared 10,000 ha since 2008; 11,052 ha were aspersed (26% more than 2013). Manual eradication was much lower (82 ha) as compared to the 650 ha manually eradicated area in 2013. The dynamics of coca crops in Putumayo is strongly characterised by its concentration south of the department, as well as densification in the Putumayo piedmont area. It is also noteworthy that there was a significant increase in the extension of the lots in these regions; however, this increase is offset by the persistence of small lots in the rest of the department and an expansion towards the east, along the Putumayo River.

Map 9. Coca cultivation density in the Central region, 2014



Source: Colombian Government - National monitoring system supported by UNODC
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Central Region

The trend towards reduction which was observed in 2008 was disrupted in 2014 with a 29% increase in the region vis – à – vis the year 2013; this increase is strongly driven by increases in Antioquia (+131%) and Bolivar (+69%). Norte de Santander had a slight increase (+9%).

Cundinamarca is free of coca crops for the third year in a row, and Caldas entered this category for the first time ever. Boyaca and Santander have stayed at the under – 100 ha level.

It is worth mentioning that there has been a strong increase in alluvial gold mining activities, including both legal and illegal activities.

not remarkable it is necessary to highlight the fact that areas where coca had been abandoned were affected once more in 2014.

Coca crops in the department of Bolivar are concentrated in the area known as Sur de Bolivar, accounting for 3% to 8% of the country's total in the 2001 – 2006 period. Coca crops peaked at 5,847 ha in 2008, and a trend to reduction started thence. In 2014, coca crops went from 991 ha to 1,565 in 2014. The 2014 increase is associated with an increase by 28% in lot size, but mainly due to the appearance of strong cores in San Pablo, Cantagallo and Santa Rosa del Sur. It is important to highlight the reappearance of coca lots north of Serrania de San Lucas, in municipalities such as Tisquisio, Montecristo and Morales since this area had been consolidating as free of coca cultivations.

Department	2007	2008	2009	2010	2011	2012	2013	2014
Norte de Santander	1,946	2,886	3,037	1,889	3,490	4,516	6,345	6,944
Antioquia	9,926	6,096	5,096	5,350	3,104	2,725	991	2,293
Bolivar	5,632	5,847	5,346	3,324	2,207	1,968	925	1,565
Cordoba	1,858	1,710	3,113	3,889	1,088	1,046	439	560
Santander	1,325	1,791	1,066	673	595	111	77	26
Caldas	56	187	186	46	46	16	8	0
Cesar	-	-	-	-	-	13	13	10
Boyaca	79	197	204	105	93	10	17	14
Cundinamarca	131	12	0	32	18	0	0	0
Total	20,953	18,731	18,048	15,308	10,641	10,405	8,815	11,412
Annual trend	73%	-11%	-4%	-15%	-30%	-2%	-15%	29%

Table 8. Coca fields in the Central region, 2007-2014 (in hectares)

16% of the country's coca crops are located in the Central Region. This region comprises 9 departments, 2 of which have no report of coca crops in the year 2014 – Cundinamarca and Caldas. In the case of Cundinamarca, this department is free of coca crops for the third year in a row.

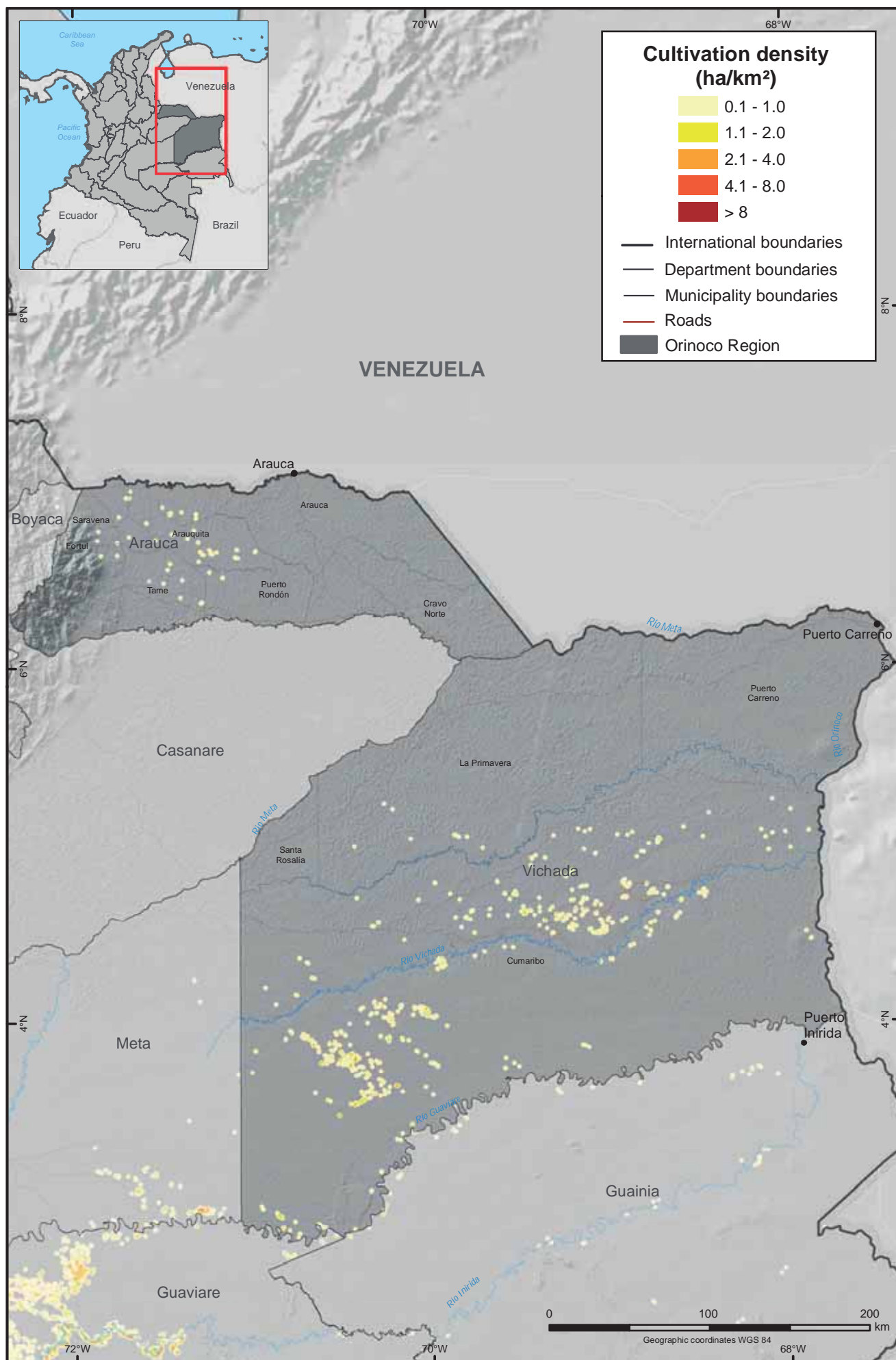
Until 2013, Antioquia, Bolivar, Cordoba Santander and Boyaca had a steady trend towards reduction, and Norte de Santander had a steady trend towards increase. The overall tendency was disrupted in 2014, and all departments (except Santander and Boyaca) had a decrease.

Reduction in Antioquia had started in 2007, but crops doubled in 2014 vis – à – vis 2013 reaching 2,293 ha. Coca crops in Antioquia are strongly concentrated in Anori, Caceres and Valdivia, on the central mountain range in the Cauca river valley. The size of lots increased by 38%, which may partially explain the department's growth in crops. On the other hand, while expansion is

The departments of Santander, Boyaca, Caldas and Cundinamarca form the subregion¹⁹ of Magdalena Medio, which has particular characteristics. The trend to reduction in these departments started in 2008 with 2,187 ha of coca crops; by 2014, Caldas and Cundinamarca no longer had any coca crops and there are trends to reduction both in Santander (-66%) and Boyaca (-18%). There are both national and international initiatives in this core in order to face and remedy local communities' vulnerability with regard to threats related to illegal activities.

19. UNODC proposed a delimitation of sub regions, in order to improve comprehension of the phenomenon, based on the geographic continuity of illicit crops.

Map 10. Coca cultivation density in the Orinoco region, 2014



Source: Colombian Government - National monitoring system supported by UNODC

The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

Orinoco region

The Orinoco region is located east of the country, in the border with Venezuela. Generally speaking, these are areas of plains and highlands, covered with natural grasslands and gallery forests. Coca crops have been associated with gallery forests in Vichada and highlands in Arauca. The region shows a trend towards decrease of coca crops since 2007, going from 9,334 ha 2007 to 536 ha in 2014.

Despite the fact that there has been a decrease in the area, the territories affected by coca crops have generally been the same over the past 5 years.

Coca crops in the department of Vichada peaked at a maximum of 9,200 ha in 2001 and decreased to 5,523 in 2006; went back up to 7,218 in 2007 and started a trend towards reduction again from the year 2007 which has been maintained to this date, again to reach the lowest point in the whole historical series – 511 ha. Coca crops in Vichada are mainly located in Cumaribo –

municipalities of Chupabe and Puerto Principe. Manual eradication operations were conducted in 2014 in almost 10 ha and no aspersion operations were carried out (similar to the year 2013).

As for the department of Arauca, ca 1,000 hectares of coca were detected for the first time in the year 2000. The peak in the historical series came in 2001 (2,749 ha) and the lowest rate was in the year 2014 (25 ha). Similar to the neighbouring Vichada region, a trend toward reduction started since 2012 which allowed the department of Arauca to enter the group of departments with under 100 ha of coca crops. A record was reached in aspersion in 2013 (12,000 ha), but no aspersions have been performed since 2009.

This region features the El Tuparro National Park, which continues to be affected by the presence of coca crops, but has had a reduction by 50% vis – à – vis data from the year 2013, reaching 3 ha in the year 2014.

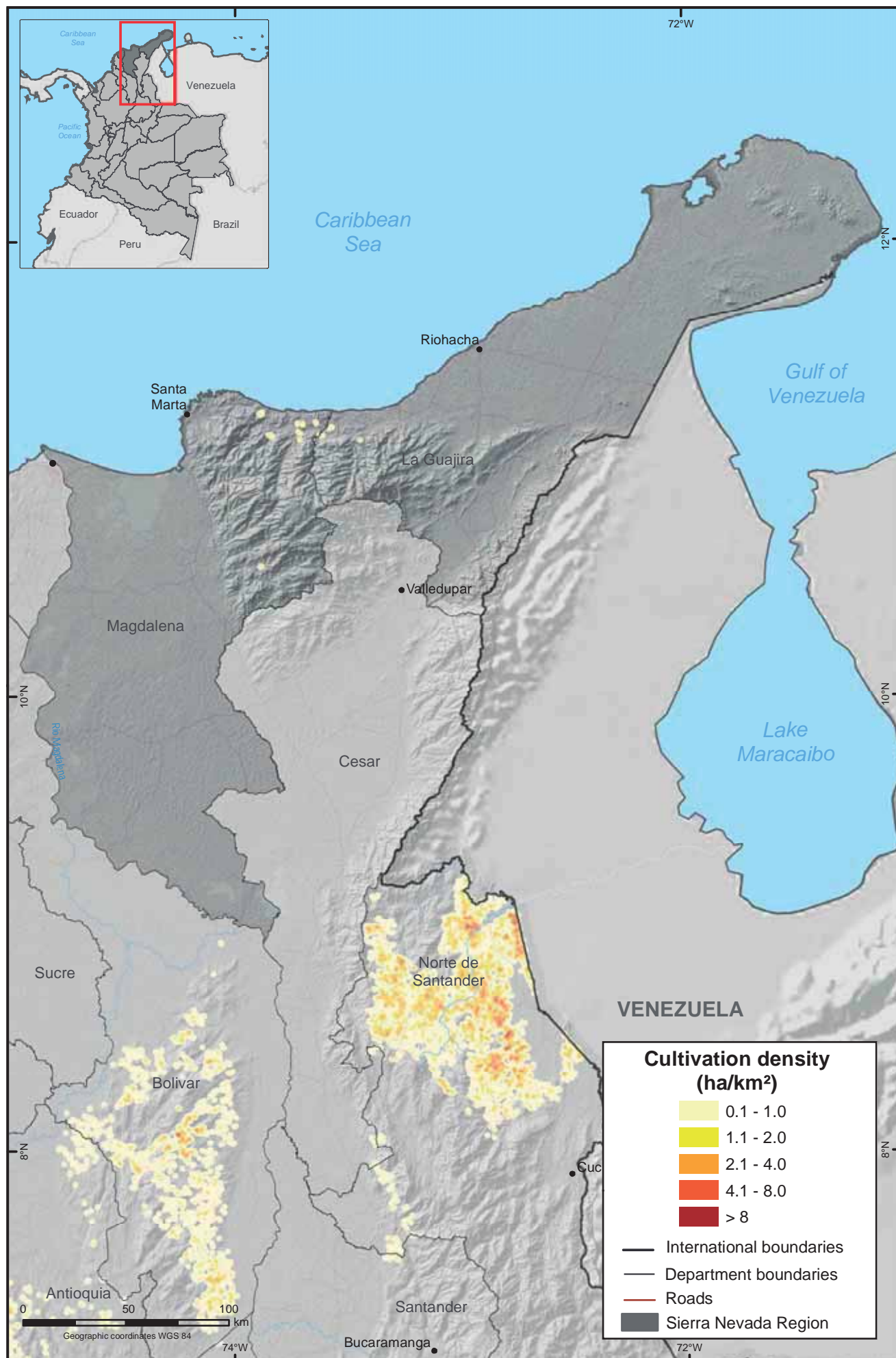
Department	2007	2008	2009	2010	2011	2012	2013	2014
Vichada	7,218	3,174	3,228	2,743	2,264	1,242	713	511
Arauca	2,116	447	430	247	132	81	69	25
Total	9,334	3,621	3,658	2,990	2,396	1,323	782	536
Annual trend	37%	-61%	1%	-18%	-20%	-45%	-41%	-31%

Table 9. Coca fields in the Orinoco region, 2007 - 2014 (in hectares)



Coca fields in Cumaribo Vichada

Map 11. Coca cultivation density in the Sierra Nevada region, 2014



Source: Colombian Government - National monitoring system supported by UNODC

The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

Sierra Nevada Region

The Sierra Nevada region has a low density of coca crops in relation to the rest of the country. Coca crops remained between 500 and 1,300 hectares until 2004, and a trend to reduction started in 2004 until reaching 365 hectares in 2007. After a slight increase in 2008, the core remains below 100 ha for the fourth consecutive year. Dynamics in the territory, the progress of alternative development and the effort made by local communities make the Sierra Nevada Core a strong candidate to be declared an illicit-crop free territory. No coca crops were detected in La Guajira in 2014.

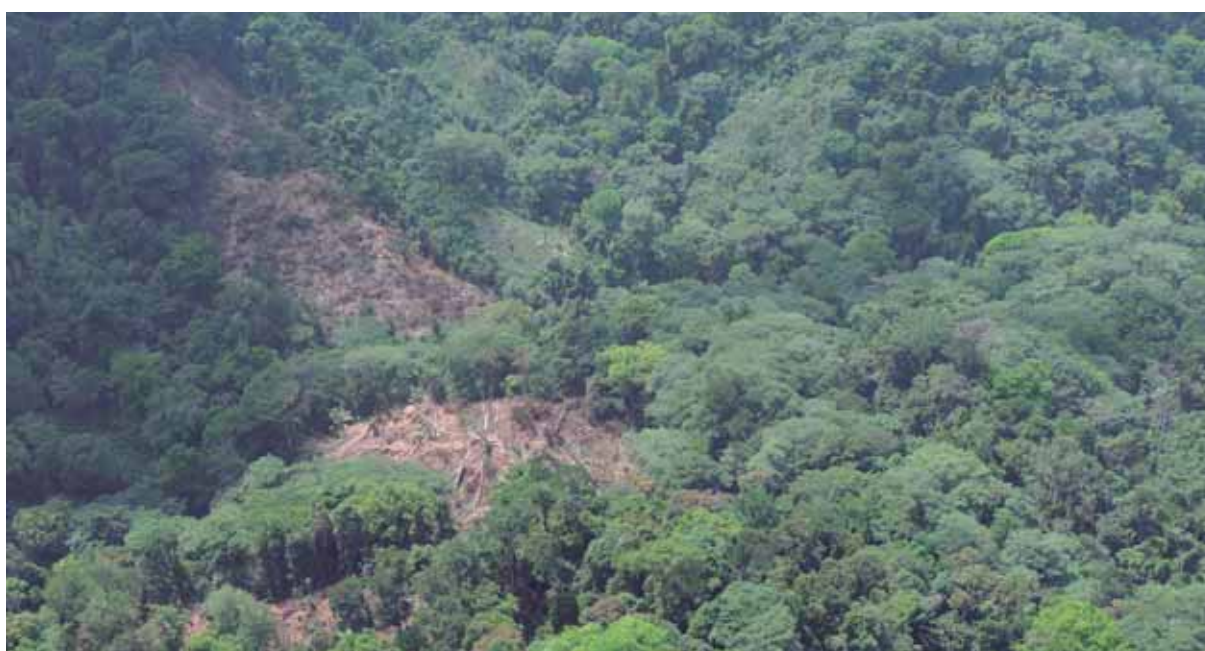
Coca crops have remained at the margins of the lowlands, between the high mountains of Sierra Nevada and the Caribbean coast. No aspersión activities have been conducted in this region since 2005, and manual eradication was reported in 2014 for 9 ha in Magdalena and 9 ha in La Guajira.

During the past few years, the region has benefited from relevant contributions in terms of alternative development, conservation and recuperation of environmentally strategic ecosystems, as well as support in strengthening indigenous cultural traditions. The region is an important tourism centre, with the Tayrona and Sierra Nevada National Natural Parks – together one of the most salient ecological reserves in Latin America, renowned for its biodiversity and the presence of several indigenous groups with ancestral cultures.

The indigenous peoples in this reserve use coca leaf as an ancestral practice; however, the methodology implemented does not allow to differentiate coca crops intended for traditional use from those intended for drug production.

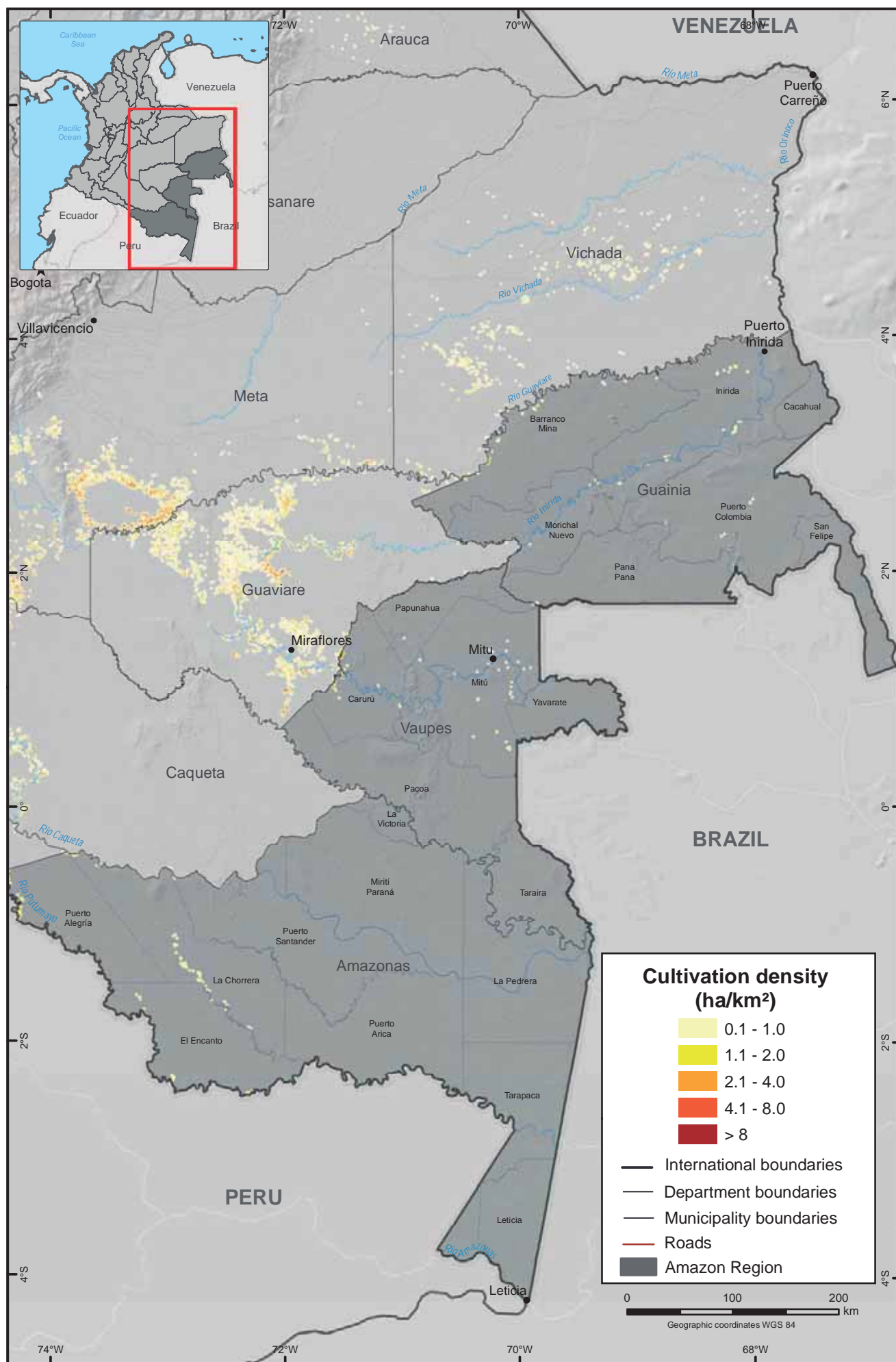
Department	2007	2008	2009	2010	2011	2012	2013	2014
La Guajira	87	160	182	134	16	10	6	0
Magdalena	278	391	169	121	46	37	37	9
Total	365	551	351	255	62	47	43	9
Annual trend	-16%	51%	-36%	-27%	-76%	-24%	-9%	79%

Table 10. Coca fields in Sierra Nevada, 2007-2014 (in hectares)



Coca fields and tree felling in Sierra Nevada

Map 12. Coca cultivation density in the Amazon region, 2014



Source: Colombian Government - National monitoring system supported by UNODC

The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

Amazon Region

The Amazon region is characterised by low density in population and accessibility issues. For this reason, human settlements are correlated to waterways, and fluvial transport is the principal means of communication within the region. Conditions of isolation and accessibility hamper possibilities for legal markets and institutional presence in these territories, thereby favouring illegal activities. Nevertheless, coca crops in the Amazon region have been decreasing since 2001. Guainia has had under 100 ha of coca crops for two consecutive years.

The departments of Vaupes, Amazonas and Guainia (as is the case of Putumayo and Caqueta) belong to the Amazon basin. Albeit they share various geographical features with Putumayo and Caqueta, these three

departments have not been important centres for coca crops. A 7% reduction was reported in 2014, concentrated in Guainia and Vaupes. Coca crops increased by 62%, mainly due to the reactivation of the "La Chorrera" core.

The highest point in the historical series of coca crops was reached in 2001 with 3,768 ha, which were chiefly concentrated in Vaupes. During 2014, 50% of the area is in the Amazon, 19% in Guainia, and 31% in Vaupes. Coca crops increased in the Amazon for the second consecutive year, but underwent a reduction in Vaupes and Guainia. No aspersión activities have been carried out in this region since the year 2005; however, manual eradication operations were conducted in 135 ha in Vaupes.

Department	2007	2008	2009	2010	2011	2012	2013	2014
Guainia	623	625	606	446	318	301	81	66
Vaupes	307	557	395	721	277	254	184	109
Amazonas	541	836	312	338	122	98	110	173
Total	1,471	2,018	1,313	1,505	717	653	375	348
Annual trend	-23%	37%	-35%	15%	-52%	-9%	-43%	-7%

Table 11. Coca fields in the Amazon region, 2007 - 2014 (in hectares)



Coca field in Amazon

Coca Crops in National Natural Parks

The presence of coca crops at National Natural Parks has been monitored by SIMCI since the 2001 survey. Data are submitted to the competent authorities aiming to identify actions and projects for the preservation of the territory's social and environmental characteristics.

The boundaries of National Natural Parks are outlined by agencies officially tasked with their preservation and maintenance. These boundaries were corrected based on satellite imagery provided by SIMCI; by the year 2010, they were adjusted once more by UAESPNN and IGAC. The table below shows data based on the most recent boundaries.

Coca crops were found in 16 out of 59 National Natural Parks – one less than in the year 2013 due to the fact that no coca crops were detected in Serrania de los Yariques. The coca – grown area at National Natural

Parks (5,477 ha) accounts for 0.037% of the total area covered by National Natural Parks, and 8% of the total coca crop area in 2014.

The coca – grown area in Parks increased by 45%. This increase is concentrated in 5 parks: Nukak, Sierra de la Macarena, Paya, Tinigua and Farallones de Cali, concentrating 84% of the total area with coca in National Natural Parks.

It is worth mentioning that two of these parks – Tinigua and Farallones de Cali – have had an increase over the last year amounting to 694% and 502% respectively.

Region	Natural National Park	2011	2012	2013	2014
Amazon	Puinawai	42	45	3	6
	Yaigoje Apaporis	6	9	0	0
Central	Catatumbo Bari	191	155	298	229
	Paramillo	446	408	284	367
	Serrania de los Yariques	10	3	2	0
Meta - Guaviare	Nukak	786	634	882	1.145
	Sierra de la Macarena	971	1.466	1.649	2.449
	Tinigua	0	5	31	246
Orinoco	El Tuparro	18	11	6	3
Pacific	Los Farallones de Cali	79	38	41	247
	Los Katios	4	3	2	2
	Munchique	128	204	117	212
	Sanquianga	5	7	18	26
	Utria	1	2	0	0
Putumayo - Caqueta	Alto Fragua Indi Wasi	6	14	9	32
	La Paya	500	362	420	503
	Plantas Medicinales Orito Ingi - Ande	2	5	4	1
	Serrania de los Churumbelos	1	3	7	7
Sierra Nevada	Sierra Nevada de Santa Marta	11	4	18	2
Total		3,207	3,378	3,791	5,477

Table 12. Coca cultivation in hectares in National Natural Parks 2011 – 2014

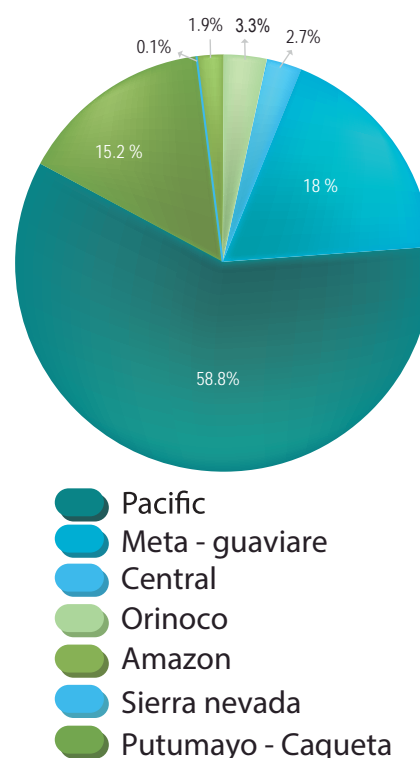
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Sources: Colombian Government; National coca cultivation monitoring system supported by UNODC; for national parks UAESPNN
The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United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

Coca Crops in Indigenous Reserves

A 25% increase (consisting of the increase from 6,255 in 2013 to 7,799 ha in 2014) can be observed upon cross – referencing the boundaries of indigenous reserves²⁰ with coca polygons. The indigenous reservations with the highest increase are located in the Putumayo – Caqueta region (increase 4 percentage points) and the Pacific region (increase 1 percentage points) with regard to the previous year. Reservations located in the following regions: Amazon, Orinoco, Central, Meta – Guaviare and Sierra Nevada reduced their percent share in coca crops during the year 2014. In total, coca in indigenous territories accounts for 11% of the total at the national level.

In attachment 4 shows the coca – grown area in 2013 and 2014, per each indigenous reservation.



Graph 6. Percentile participation of coca cultivation in indigenous reservations by region, 2014



Coca fields in Indigenous Reserves in Nariño

20. Geographic delimitation of indigenous territories in Colombia is reported by IGAC, and the most recent issue dates from the year 2009.

Coca crops in Afro – Colombian Community Councils

Coca crops in Afro – Colombian Community Councils²¹ had an increase from 2001 to 2011, and a decrease in the years 2012 and 2013. In 2014, there is a new increase (by 17%) in coca crops. As for the share of coca crops in Community Councils, approximately 15% of the country's coca crops are located in these territories.

In the year 2014, small lots which could potentially be coca crops have been detected in remote areas, beyond the agricultural areas established in the departments of Guainia and Amazon. In – situ verification has not been possible in these areas given the excessive overheads costs in terms of time and funds involved in verifying coca crops in small and isolated lots. Consequently, the estimations of coca crops in these areas are presented only as indicative values, and they do not count toward the final result.



Graph 7. Percentile participation of coca cultivation in Afro – Colombian Community Councils with respect to the national total

The share decreased in spite of the increase between 2013 and 2014; this implies that the growth rate is lesser inside that out of community councils.

21 LANDSAT images were analysed in order to identify potential illicit crop areas. A total of 121 ha was estimated in these nontraditional areas.

Potential areas with new coca crops

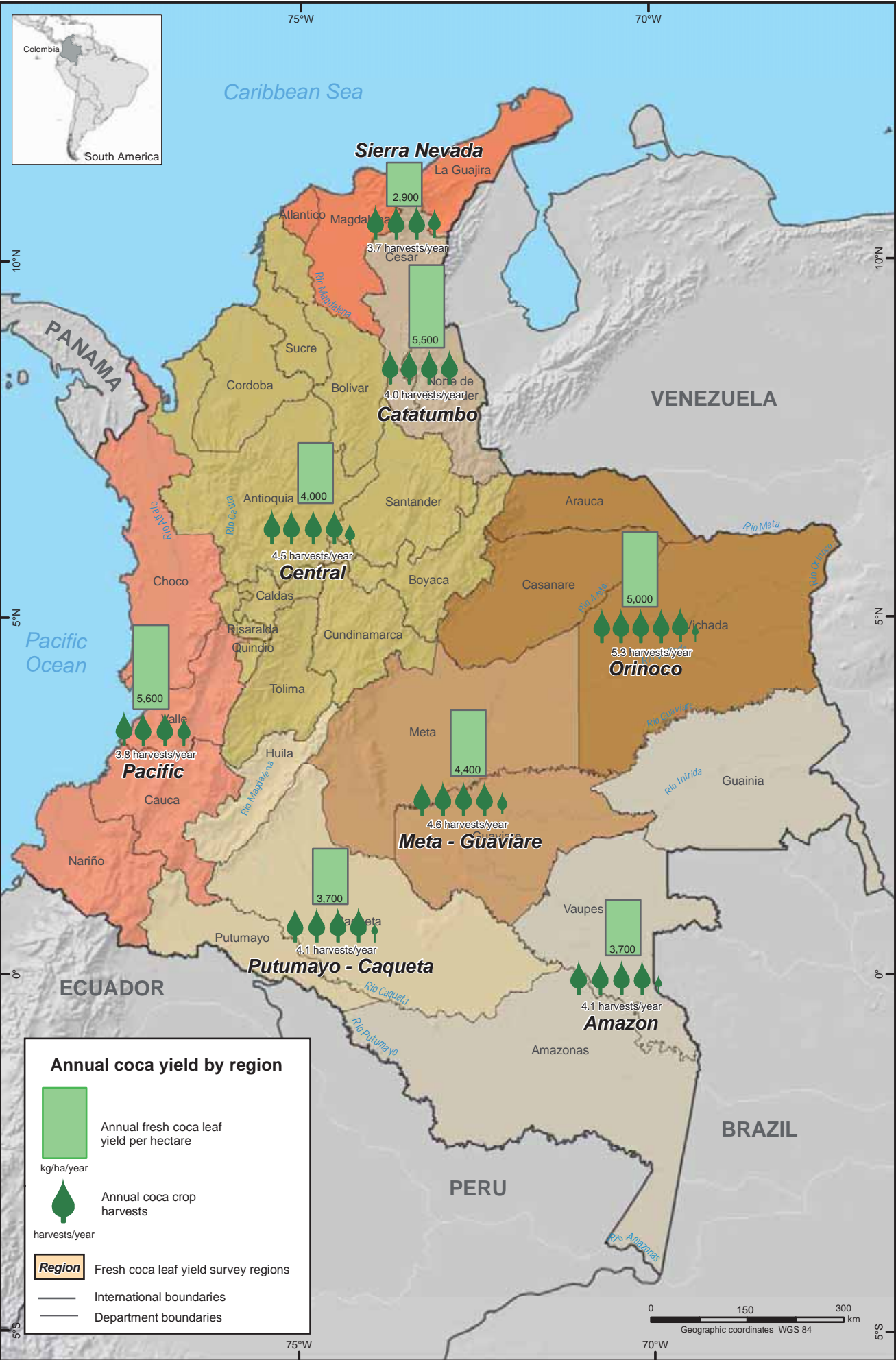
The monitoring process on coca crops conducted by SIMCI covered and interpreted 100% of the national territory, not only including the survey's areas of influence, but also areas which had not been identified as coca crop areas thus far, thereby implementing an early alert system in order to detect and prevent the expansion of coca crops into new areas.

Department	Area (hectares)
Amazonas	61
Guainia	60
Total	121

Table 13. Possible coca cultivation in new areas, 2014

21. The geographical demarcation of the Afro - Colombian community councils in Colombia is reported by IGAC.

Map 14. Coca yield by region in Colombia, 2014



Source: Colombian Government - National monitoring system supported by UNODC
The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

PRODUCTION OF COCA LEAF AND COCAINE PASTE AND BASE

The following factors must be considered to estimate the potential amount of yearly cocaine production in Colombia: i) establishing the coca production area, as measured in hectares; ii) capacity of the area of production, as measured in tonnes of fresh coca leaves per hectare; iii) capacity of extraction of the alkaloid and converting it into base paste or cocaine base, carried out by farmers or other agents, as measured in kilograms of cocaine paste or base produced per tonne of leaves, and iv) crystallisation used in order to obtain cocaine hydrochloride, as measured in kg of cocaine per kg of cocaine paste or cocaine base.

PRODUCTIVITY STUDIES UPDATE

Given the complexity of dynamics relating to illicit crops in Colombia, there are difficulties to gather information related to coca production, due to issues in access, high mobility of resources and variability in lots.

Productivity studies have been carried out jointly by UNODC and the Colombian Government, in order to obtain information about the main characteristics of productive systems in Agricultural Production Units with Coca (UPAC²²), as well as other key factors to estimate the capacity to produce coca leaf and efficiency of extraction processes during the primary production phase.

During 2005, the productivity studies baseline was established after gathering primary information. This process was carried out by grouping eight regions with the territories affected by coca crops in the country.

The methodology utilised in the productivity studies is probabilistic in nature, and it enables the extrapolation of information to the population through the application of a multi – stage approach²⁴, based on area frameworks. This is configured into a strategic tool for the administration of harvest testing and direct surveys with Agricultural Producers with Coca. It is worth mentioning that, since the universe of coca leaf growers is unknown, the geographical component can be used as a reference point from the location of the coca crop within a previously determined area. This location is obtained from prior yearly surveys conducted by SIMCI, and it constitutes the population universe called the Framework of Areas²⁵.

Field operations were conducted in 2014 in order to gather information in the Pacific region, which was studied in the years 2005 (Stage I) and 2009 (Stage II). The regional update of Stage III was thus completed, i.e. there is information from the regions with influence of coca crops in three moments, in the following regions: Central, Catatumbo, Sierra Nevada, Putumayo – Caqueta, Meta – Guaviare, Orinoco and Pacific.

2014 Production Studies: Pacific Region

The Pacific region update for the year 2014 had a sample of 270 direct interviews conducted with agricultural producers, 90 sampling primary units (1 km² grids), i.e. 3 surveys in each primary unit. Similarly, 90 coca crop lots were selected and 90 tests were conducted on harvests. The trend identified in the area is maintained in terms of yield for coca leaf, cocaine paste and cocaine base. This has a direct incidence in the fresh coca leaf production potential.

Region	Pacific	Sierra Nevada	Central	Catatumbo	Putumayo-Caqueta	Amazon	Meta-Guaviare	Orinoco
Year of study	2014	2011	2011	2011	2012	2012 ⁽¹⁾	2013	2013

Table 14. Year of productivity studies execution, used as a point of reference during the 2014 report

¹ The productivity studies are not completed within the Amazon region, production estimates are carried out considering results obtained from the Putumayo-Caqueta region.

Since then, and due to high costs and security conditions at zones of influence, only one or two regions are updated every year. Within the framework of the agreements entered into between UNODC and the Colombian Government, there is regional information nationwide which is updated every 4 years, and three national stages have been consolidated to date²³.

22. As regards agricultural practices, choice of varieties and crop density, among other variables.

23. In 2005, the information gathered in the baseline corresponds to Stage I of the productivity study, whilst the regional update conducted between the years 2007 – 2010 makes reference to Stage II. The regional update round as per Stage III is hereby completed, with the update for the Pacific Region,

which has been published in this report.

24. Makes reference to sampling designs associated to several stages of selection for units of interest. This type of sampling allows to focalise interest units, thereby minimising costs and improving field operations.

25. The framework allows to identify and locate the items within the universe; the tool used is random selection of the items which comprise the sample through geographic reference to units associated with the area, under the connotation that they are unique, unrepeatable and identifiable. Further information about the methodology applied can be found in the following document: 'Agricultural characteristics of coca crops in Colombia – 2005' at the following web address: <http://www.biesimci.org/Documentos/Documentos.html>

Region	Area of influence	Coca crops area (2014)
	Hectares	Hectares
Pacific	1,382,933	25,976

Table 15. 2014 Study areas, Pacific region

5,600 kg/ha per year in 2009²⁶, thus remaining with a constant average harvest production capacity in the year (3.8 as recorded in 2009).

Among the multiple influencing factors there are varieties grown, crop age, adoption of agricultural practices such as using agrochemicals, and impact on the crops due to different factors (aspiration, manual eradication, climate, plagues and disease).

Taxonomical and Geographical Analysis of Coca Varieties Grown in Colombia – published by UNODC, Universidad Distrital Francisco Jose de Caldas and the Colombian Government, the characteristics of Tingo Maria correspond to *Eryroxylum coca*. However, it has been found that 50% thereof corresponds to *Eryroxylum coca Var. coca*, whilst 35% corresponds to *Eryroxylum coca Var ipadu*²⁸. In

Variable	Measurement unit	Pacific		
		2005	2009	2014
Area monitored on 31 Dec	Hectares	17,633	27,022	25,976
Harvests	Harvests per year	2.5	3.8	3.8
Annual yield of the coca leaf	(kg/ha/year)	2,600	3,800	5,600

Table 16. Changes in fresh coca leaf production in Pacific region, 2005, 2009 and 2014

74% of UPACs in the Pacific region grow coca under the single – crop modality, and only one variety. 24% of UPACs grow other varieties of coca; only 1% thereof grows coca alongside other crops. Crop density went from 8,900 plants/ha to 10,200 plants/ha in 2014²⁷.

As for variety grown, the predominant variety continues to be Tingo Maria – one of the most widely recognised names in coca crops. Agricultural Producers with Coca reported yields equivalent to an average of 4.3 mt/ha per year. In accordance to the study

addition, other varieties have been reported such as Caucana, Pajarito, Bolivianas, Pinguana, Nacedera, Pingua, Chiparra and Guayaba.

According to the information detected in 2014, while the majority of crop lots (91,3%) continue to be more than 2 years old, there is an increase in the appearance of crop lots under 2 years of age as compared to the findings of the year 2005, as these lots went from 8.9% in 2005 to 1.6% in 2009, and finally established themselves at 8.7% in 2014. In addition, it is noteworthy that 47% of

Age	Pacific					
	2005		2009		2014	
	% fields	Yield mt/ha/year	% fields	Yield mt/ha/year	% fields	Yield mt/ha/year
Less than two years old	8.9%	0.2 - 1.2	1.6%	0.1	8.7%	0.9
2 to 4 years old	29.1%	1.5 - 1.8	28.3%	5.2 - 5.3	44.3%	5.0 - 5.9
More than 4 years	62%	1.5 - 1.9	70.1%	2.7 - 2.9	47.0%	5.5 - 6.1

Table 17. Age of coca crops within Pacific region, 2005, 2009, 2014

26. The abovementioned fresh coca leaf yields correspond to the values observed on the field by conducting harvest testing. It is worth mentioning that it has been found that a specific value of yield of coca leaf / ha per year is obtained by way of the interviews conducted with UPACs – agricultural producers with coca – which was reported at 4.8 mt / ha per year by the growers surveyed for this year.

27. Densities found in the field oscillate between 9,700 plants / ha and 10,600 plants / ha.

28. Tingo Maria is a name which was present during the ten – year follow-up. To date, of the 80 samples collected they corresponded to 19 different morphotypes, which makes this cultivariedad a plastic entity, which can easily change under different environmental conditions of the country.

Variable	Pacific		
	2005	2009	2014
% fields with loss or decrease	94.5%	65%	22.2%
% fields without loss	5.5%	35%	77.8%

Table 18. Coca crops with decreased or lost yield, based on interviews with coca farmers, Pacific region

the lots in 2014 is at an optimal productivity level, yielding produces nearing 5.5 mt/ha per year – 6.1 mt/ha per year.

Most agricultural workers in the Pacific region (77.8%) report not having had any total loss, or a decrease in their lots. From the total crop lots observed in the study, only 8% was aspersed. This evidences an important change, since 94.5% growers reported losses or decreases in 2005, and the most important causes were associated to aerial spraying (58%), plagues and disease (28%) and the climate (4%).

22.2% of coca crop lots in 2014 had losses or a decrease, and the most impact came from aerial spraying (56%) and the climate (30%). In this regard, growers reported Zoqueo (pruning) (40%) and re – growing (33%); only 26% of the crop lots reported no intervention whatsoever.

Coca growers reported the use of different agricultural products for purposes of fertilisation, plague and weed control and increasing productivity. Nonetheless – as in the case of other regions of the country – the Pacific region had a reduction in the amount of agricultural products as compared to the year 2005.

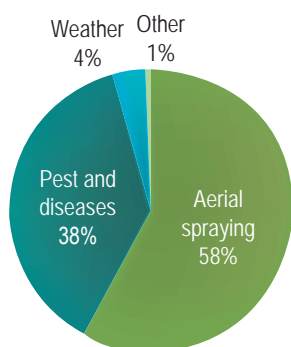
Region	Based measurement (2005)	Actual measurement ¹
Amazon ²	3.9	4.1
Catatumbo	4.5	4
Sur de Bolivar	3.3	4.5
Meta-Guaviare	6.6	4.6
Orinoco	5.4	5.3
Pacific	2.5	3.8
Putumayo-Caqueta	3.9	4.1
Sierra Nevada	3.4	3.7
Average yield of coca leaf	4.5	4.1

Table 19. Yearly coca harvests regional average, 2005-2014

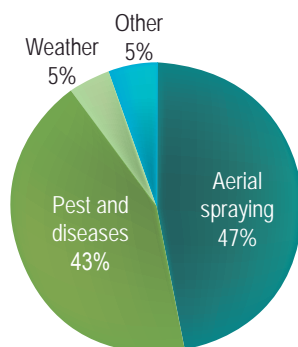
Note:

1. The years of reference in the productivity study update are to be found in Table 14.

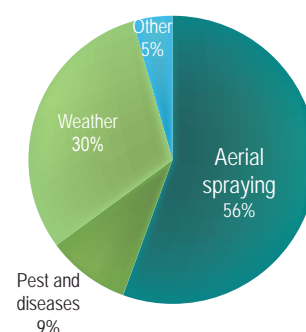
2. Productivity studies do not survey information in the Amazon region, therefore production estimates are carried out taking into account the results of the Putumayo – Caqueta region.



Causes of reduction or loss crops in Pacific, 2005



Causes of reduction or loss crops in Pacific, 2009



Causes of reduction or loss crops in Pacific, 2014

Graph 8. Causes of reduction or loss crops in Pacific

In regards to productive cycles, coca crops can be harvested several times throughout the year. Frequency of crops may depend on several factors such as the climate, agrological and agronomical issues (quality of the soil, change of use / quantity of herbicides, pesticides and fertilizers), aerial spraying, manual eradication and varieties grown, inter alia. On some occasions, frequency of harvests is determined by the coca market, instead of maturity of the crop.

Distinction between coca paste and cocaine base is not easy to establish. This is due to the fact that the terms are interchangeably utilised used by producers. In this case, reference is made to cocaine base when producers report the use of potassium permanganate when processing coca leaves.

Cocaine paste is the first product obtained in the process of extraction from coca leaves, by means of the use of sulphuric acid and fuels. This becomes cocaine

Region ¹	Annual yield of fresh coca leaf	Lower boundary of the 95% reliability interval (kg/ha/year)	Upper boundary of the 95% reliability interval (kg/ha/year)
	kg/ha/year		
Amazon ²	3,700	3,400	4,000
Catatumbo	5,500	4,900	6,100
Central	4,000	3,400	4,600
Meta-Guaviare	4,400	4,200	4,700
Orinoco	5,000	4,600	5,400
Pacific	5,600	5,300	5,900
Putumayo-Caqueta	3,700	3,400	4,000
Sierra Nevada	2,900	2,600	3,100
Average yield of coca leaf	4,700	4,100	5,300

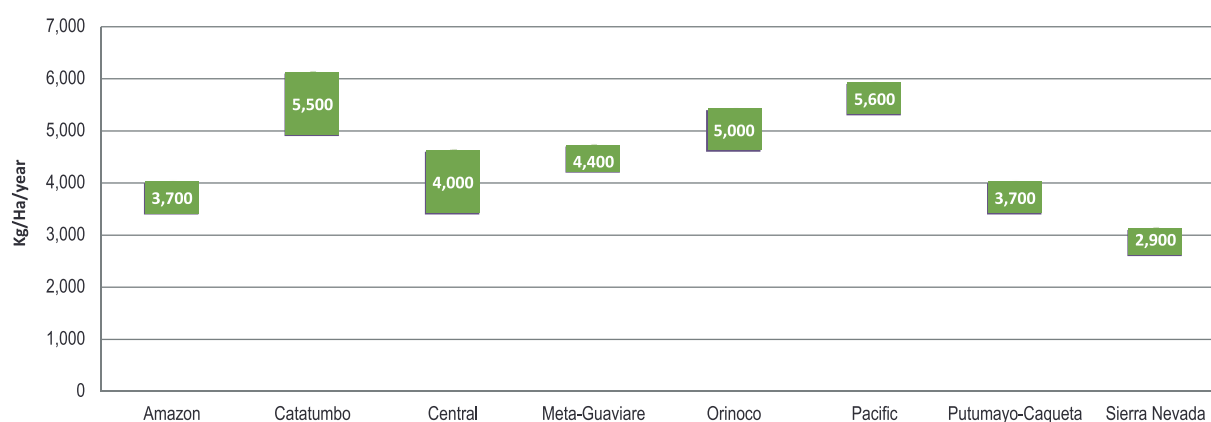
Table 20. Average annual yield per region in Colombia

Note:

1. The years of reference in the productivity study update are to be found in Table 14.
2. Productivity studies do not survey information in the Amazon region, therefore production estimates are carried out taking into account the results of the Putumayo – Caqueta region.

In the Pacific region, the average number of days between harvests in the year 2005 was the lowest in the country: 2.5 harvests per year (or every 146 days). This number changed to 3.8 harvests a year (or every 96 days) in the year 2009, in accordance with the findings in this regard. This value was maintained in 2014.

sulphate, which has a high content of organic remains, pigments, tannins and other chemical substances. Cocaine base is obtained by dissolving the cocaine sulphate in an acid, and adding an oxidizing agent such as potassium permanganate (the most commonly used acid), and adding a base. The mixture is then precipitated and filtered.



Graph 9. Yearly regional average yield of coca crops per ha²⁹

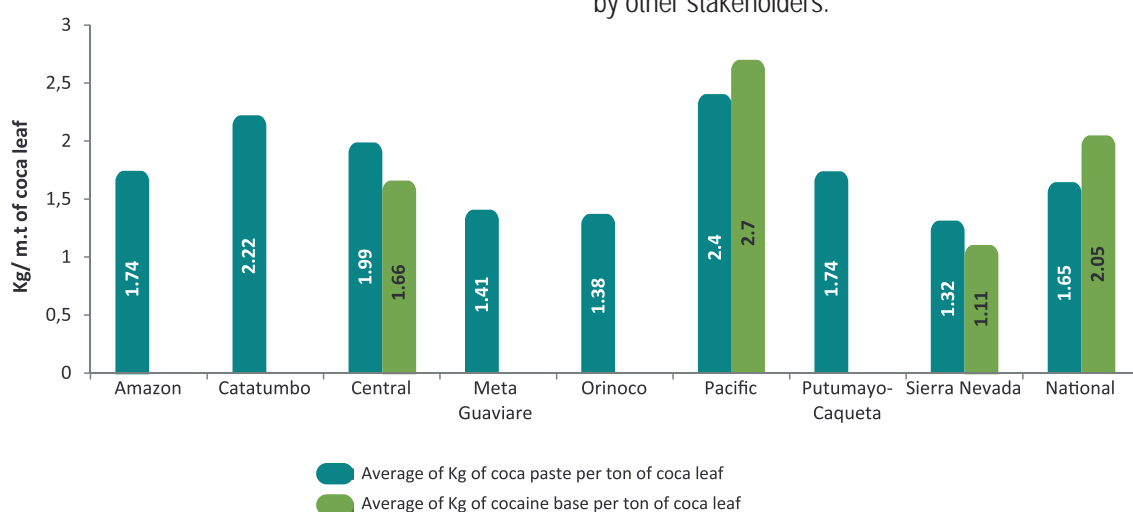
29. The limits have been obtained from the interval, at a reliability value of 95%.

Variable	Pacific		
	2005	2009	2014
Kg basic coca paste/m.t of coca leaf	1.55	1.7	2.4
Kg cocaine base/m.t of coca leaf	1.46	1.6	2.7

Table 21. Regional average, in kilograms of coca paste and cocaine base obtained per metric tonne of coca leaves, 2005, 2009 and 2014, Pacific region

According to the Pacific region update, 8% of UPACs which reported the use of on – site alkaloid extraction processes show specialisation in the process of extracting the alkaloid and converting it to cocaine paste, with average yields of 2.4 kg / mt of coca leaves, and 2.7 kg /mt of coca leaves for cocaine base, as compared to the levels observed in 2005 and 2009. These are the highest levels detected in coca – growing areas, in the 10 – year series of productivity studies.

In previous years, the extraction process from coca leaf to cocaine paste or base used to be carried out by the same grower. However, 92% of UPACs last year reported sales of coca leaves for an intermediary to perform the transformation process in some part of the region. It is worth noting that transformation from cocaine base to cocaine hydrochloride is not carried out by the grower; this process requires special infrastructure which is centralised, and even monopolised – in some areas – by other stakeholders.



Graph 10. Coca paste and cocaine base regional average obtained per metric tonne of coca leaves

Note:

1. The years of reference in the productivity study update are to be found in Table 14.
2. Productivity studies do not survey information in the Amazon region, therefore production estimates are carried out taking into account the results of the Putumayo – Cauqueta region.

In 2014, it was found that in Pacific region on site production processes are carried out until obtaining cocaine paste, mainly in UPACs with a capacity between 5 ha and 10 ha (47.4%), 10 ha to 50 ha (42.9%) and 1 ha to 3 ha (9.7%). In the case of transforming coca leaves into cocaine base, this is a process which tends to take place in UPACs with a capacity which ranges between 5 ha and 50 ha. Coca leaf sales tend to take place in all sizes of UPACs; however, it is worth mentioning that these sales take place mostly in sizes varying 0.5 ha – 1.0 ha; 3.0 ha – 5.0 ha, and over 50 ha. The latter correspond to 0.1% of the UPACs observed.

Within the national scenario, division of labour among coca growers is as follows: 68% thereof sell coca leaves directly with no process whatsoever; 29% of agricultural workers process coca leave until obtaining cocaine paste, and the remaining 3% process coca leaves in order to obtain cocaine base.

Region	% coca growers that sell coca leaf	% coca growers that process coca paste	% coca growers that process cocaine base
Amazon	64%	36%	0%
Catatumbo	82%	18%	0%
Central	59%	8%	33%
Meta-Guaviare	14%	86%	0%
Orinoco	5%	95%	0%
Pacific	92%	5%	3%
Putumayo-Caqueta	64%	36%	0%
Sierra Nevada	91%	4%	5%
All regions	68%	29%	3%

Table 22. Division of work during the fresh coca leaf sale and production processes

Note:

1. The years of reference in the productivity study update are to be found in Table 14.

2. Productivity studies do not survey information in the Amazon region, therefore production estimates are carried out taking into account the results of the Putumayo – Caqueta region.

POTENTIAL PRODUCTION OF COCA LEAF, COCAINE PASTE, COCAINE BASE AND COCAINE HYDROCHLORIDE

Productivity studies provide information in relation to fresh coca leaf yields and the characteristics of the process to transform coca leaves into cocaine paste or cocaine base. These studies have been conducted at UPACs in each of the regions with incidence from coca crops. Based on updated indicators, potential production of coca leaf, cocaine paste, cocaine base and

cocaine hydrochloride can be estimated by applying the methodological adjustments published in the previous edition of this report: factor of permanence and cocaine base conversion factor.

Fresh coca leaf production has been estimated to go from 208,218 mt in 2013 to 308,554 mt in 2014³⁰. This is a 48.2% increase which is influenced by an increase in the factor of permanency, which translates in 29.4% and the current levels of yield in fresh coca leaves per ha in 14.6%.

Region	2013			2014		
	Estimated productive area	Annual yield of coca leaf Kg/ha/year*	Production of coca leaf	Estimated productive area	Annual yield of coca leaf Kg/ha/year*	Production of coca leaf
	Hectares		mt	Hectares		mt
Amazon	617	3,700	2,300	372	3,700	1,400
Catatumbo	5,604	5,500	30,800	7,658	5,500	42,100
Central	4,543	4,000	18,200	4,615	4,000	18,500
Meta-Guaviare	8,072	4,400	35,500	11,272	4,400	49,600
Orinoco	1,278	5,000	6,400	860	5,000	4,300
Pacific	16,818	3,800	63,900	21,758	5,600	121,800
Putumayo-Caqueta	13,783	3,700	51,000	19,122	3,700	70,700
Sierra Nevada	45	2,900	100	32	2,900	100
Total	50,760	4,100	208,200	65,689	4,700	308,500

Table 23. Productive area, coca yields and coca leaf production per region, 2013-2014

Note:

¹ The years referenced during the productivity study can be found in Table 14.

² The productivity studies have not analysed information from the Amazon region as production estimates are carried out with the inclusion of results from the Putumayo-Caqueta region.

³ Annual cultivation area production estimates are estimated based on the permanence factor and crop yield

⁴ Coca leaf production is rounded up to the nearest hundred.

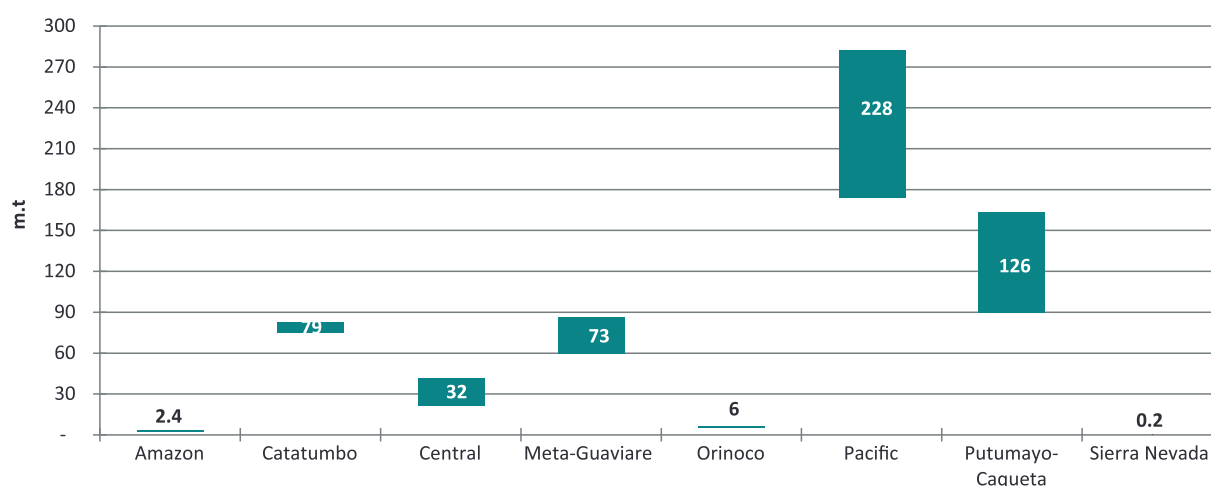
30. Potential fresh coca leaf production, as estimated from variance in coca – grown hectares the past two surveys, oscillates between 179,300 mt - 237,000 mt in 2013, and 240,600 mt – 376,400 mt in 2014.

Information provided in productivity studies reaffirms the trend towards selling coca leaves; 68% of growers sell their produce to a person outside their UPAC. It is estimated that, of the 308,544 mt of coca leaves harvested in 2014, nearly 210,991 mt of coca leaves were sold by the farmer and collected by an individual outside the UPAC, in order to manufacture around 380 mt of cocaine base³¹. This scenario has an influence in the local dynamics of the following regions: Pacific, Putumayo – Caqueta y Catatumbo, as well as the Central and Meta – Guaviare regions.

32% of growers process coca leaves on site; 29% thereof process it until converting it into cocaine paste. 87,730 mt of fresh coca leaves are calculated to have been converted into 145 mt of cocaine paste in 2014. This is equivalent to 144 mt of cocaine base. In addition, it is estimated that 3% of growers process coca leaves directly into cocaine base and obtain ca. 20 mt, requiring around 9,823 of fresh coca leaves. Consequently, it is calculated that potential production of cocaine base went from 358 mt in 2013 to 546 mt in 2014³².

Based on the results obtained in the productivity studies, production estimates for cocaine paste and base, and the conversion rates utilised (average purity of cocaine base = 81% and conversion rate from cocaine base to cocaine hydrochloride 1:1), production of cocaine base in 2014 is equivalent to 442 mt of pure cocaine hydrochloride³³. While there is no pure cocaine hydrochloride market in practice, the results obtained constitute a benchmark in order to establish comparisons with production levels of other countries.

Taking into account the different parameters obtained in processes of growing, extracting and refining the aforementioned alkaloid, a potential production relation is estimated at 8.3 kg of cocaine base per ha grown, and 6.7 kg of cocaine hydrochloride per hectare grown³⁴.



Graph 11. Estimated cocaine base potential production, 2014.

Note:

¹ The productivity studies have not analysed information from the Amazon region as production estimates are carried out including results from the Putumayo-Caqueta region.

² Cocaine production estimates are carried out within the annual production area, estimated based on the permanence factor, distribution of work and the sales and transformation process of coca leaves, crop yields and extraction processes within each of the regions within the study, under controlled conditions. The purity percentage is not calculated within the estimates.

³ Potential production estimates are determined based on interval calculations of 95% of the annual coca crop area. Based on these intervals and establishment of parameters, the production potential in relation to the highest and lowest limits of confidence intervals can be calculated using coca yields, coca paste and cocaine base and the market structure based on productivity studies and the coca conversion rate during the transformation process. The aforementioned is a result of the minimum and maximum production potential estimates within different links of the chain associated with the variety of coca hectares within the coca censuses.

31. The values above are based on an assumption of 1.8 kg of cocaine per mt of fresh coca leaves, given the scenario of an increase in coca leaf sales by the producer, and being gathered by other stakeholders, under the assumption of efficiency in extraction processes which exceed the values reported in the agricultural sector with coca, as a result of scale production and improved use of supplies. This conversion factor has been estimated based on the results obtained from 33 processes of cocaine base, under controlled conditions, within the framework of the Efficiency Study for the transformation of cocaine hydrochloride, conducted by UNODC and the Government of Colombia, which would only be updated upon inputting new information. It is worth mentioning that a sub-record could take place, to the extent that it has been found that large-scale production processes may optimise the use of solvents, thereby influencing directly the use of lesser amounts of chemical substances and higher control of potential losses.

32. Potential cocaine base production, as estimated from variance in coca-grown hectares in the past two surveys, oscillates between 308 mt – 408 mt in 2013, and 426 mt – 666 mt in 2014.

33. The data obtained from production and yield studies in primary transformation (from coca leaf to cocaine base), as well as data obtained by the Government of the United States on efficiency in secondary transformation (1 : 1 from cocaine base to cocaine hydrochloride) and purity cocaine base (81%) have been used for purposes of estimating cocaine production. Cocaine hydrochloride potential production, as estimated from variance in coca-grown ha in the past two surveys, oscillates between 249 mt – 330 mt in 2013, and 345 mt – 540 mt in 2014.

34. These estimates correspond to the national scenario wherein all crops are extracted and converted into cocaine base, and refined into cocaine hydrochloride.

Map 15. Annual fresh coca leaf production by region in Colombia, 2014



Source: Colombian Government - National monitoring system supported by UNODC

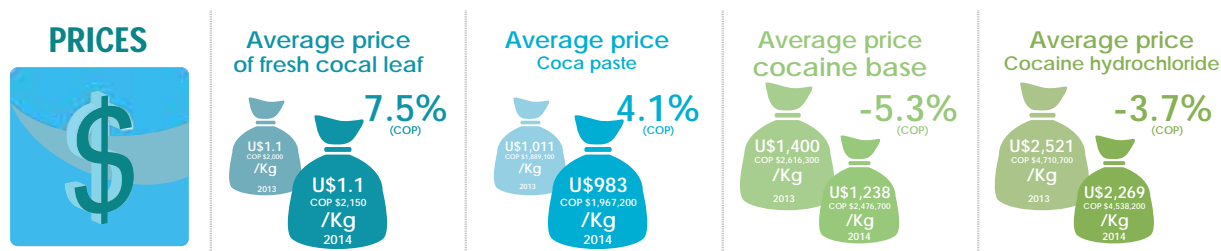
The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

PRICES AND MARKET

In any market, the price³⁵ is the mechanism by which the exchange takes place. The drugs and chemical inputs market for manufacturing is no exception; it exists not only because there is someone offering it but there is also someone willing to buy it and the price comes to set as the mediation mechanism in the negotiations between the parties. In this sense, the monitoring of prices contributes to a better understanding of the market dynamics of drugs and chemicals used for its production. From this arises the need to have information that systematically allows establishing changes in economic incentives generated by this activity.

presented downtrend (of 32% and 11% respectively), while in the Pacific remained constant; they concentrate 82.1% of the coca leaf potential. However, the increase in the price of this product in Meta - Guaviare registered of the previous year (41.7%) generates concern to the extent that could increase both trading volume and the number of growers selling leaf on farm.

The trend towards the sale of coca leaf causes changes in the dynamics regarding where and who produces; they directly affect the income received by the Coca Agricultural Producers - PAC.



In Colombia, prices of products derived from the production and transformation of illicit crops do not always reflect a behaviour related to the laws of supply and demand. However, factors such as public security, the supply of fresh coca leaf, weather, difficulties in access to transportation and possible changes in the production processes (homogenisation of intermediate products), have affected to a greater or lesser extent in the decrease/increase in trading flows and thereby on the behaviour of prices in the regions.

Against the increase of 48.2% in 2014 in the potential production of fresh coca leaf, the prices in 2014 increased 7.5% compared to the same period of the previous year, reaching \$ 2,150/kg (US \$ 1.1/kg), and its marketing, without any level of transformation (63% of the growers sell the leaf) increasingly common by the growers. While the price of coca leaf has increased in the last year and there was an increase in the appearance of new fields, the price levels of this product recorded between the last two years are presented below those recorded in 2011; it is noteworthy that the growth trend in this product has been lower than the one presented in the prices of licit agricultural products.

If the price of this product is weighted based on production levels, a decrease of 2.2% is estimated going from \$ 2,250/kg in 2013 to \$ 2,200/kg in 2014 because the Central and Putumayo - Caqueta regions

In areas such as Catatumbo and Pacific, extraction processes are not performed on farm (in the UPAC), which involves changes in the market chain with two possible scenarios: i) a market for the collection of coca leaf, being a space of intermediation between the agriculture link and the first level of extraction; and ii) the direct collection of people who control the processing sites of coca leaves, which are not directly linked to the UPAC. It is noteworthy that, geographically, the alkaloid extraction sites continue to associate to areas with crop influence, to the extent that, being an illicit product which can be seized anywhere in the country, the mobility of the leaf is limited.

In the market of the alkaloid extraction derivatives, 32% of the Coca Agricultural Producers - PAC processing the leaf on farm, of which the most of them produces cocaine paste. This means that oxidation processes (refining of the Cocaine Paste converting it into cocaine base) tend to move from the Agricultural Production Unit with Coca - UPAC to other specialised sites and even to the collection site prior to the entry of the input in the cocaine hydrochloride laboratory, according to the information captured in the updated of the study of the Characterisation of the transformation of the fresh coca leaf to cocaine hydrochloride conducted by SIMCI and PRELAC³⁶ projects.

35. Since 2005, UNODC / SIMCI has an information system on drug and derivatives prices that feeds on the collection and systematisation of records obtained from the different marketing stages and in major cities. By 2014, the price data in Colombia has been collected in growing areas and in places of marketing influence, following the work of people linked to programs of the UNODC and the Anti - Narcotics Directorate - National Police (DIRAN).

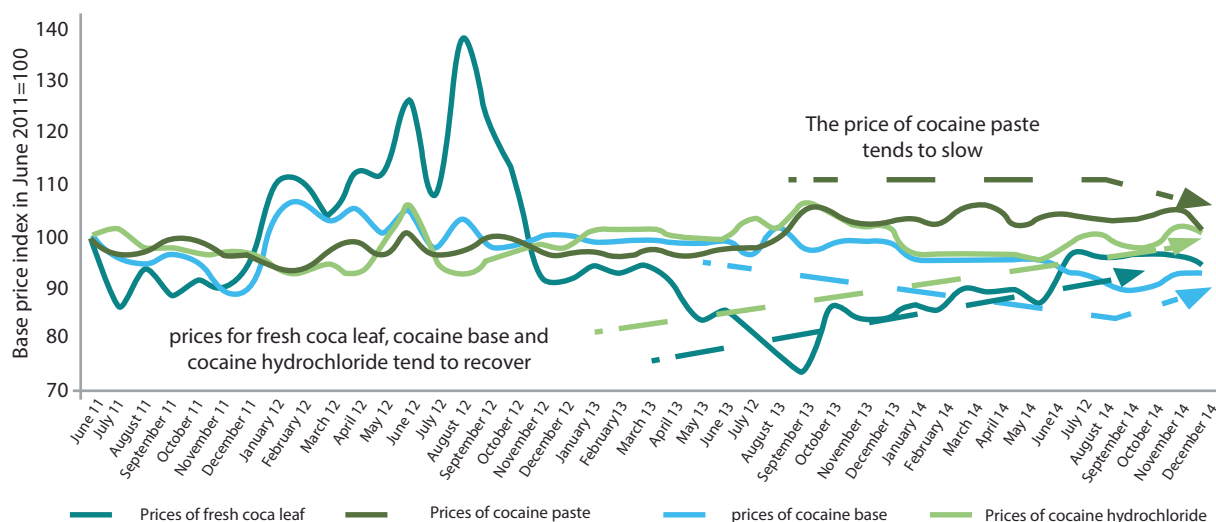
36. Under the study of the Characterisation of the Transformation of the Coca leaf into Cocaine Hydrochloride in Colombia conducted by SIMCI and PRELAC projects in 2014 of the United Nations Office on Drugs and Crime, they met processors of cocaine.

The trend towards non - production on farm of cocaine base is encouraged from the market through different mechanisms. In some areas, armed groups outside the law and organisations engaged in the production of drugs impose rules governing the market; this is how persist scenarios in which prices and decisions of when, how and where to grow and process coca, are imposed by these actors.

In 2014 the price of cocaine paste showed an increase of 4.1% over the previous year; in the of the previous year, the price of cocaine base presents a reduction of 5.3% standing at \$ 2,476,700/kg (US \$ 1,238/kg). Although in nominal terms the prices of cocaine base have a spread

homogenisation; these sites tend to be associated with laboratories producing cocaine hydrochloride being the first transformation process carried out. In this respect, the study detected some dynamics of buying and selling cocaine base from cocaine hydrochloride laboratories under the designation of cocaine base “reoxidised” (“reoxidada”) cocaine base.

According to Graph 12, one could infer that coca leaves, cocaine base and cocaine hydrochloride prices tend to recover in the short term to levels similar to those recorded in 2011, while the upward trend in the price of cocaine paste could slow. In addition to the above, the change in strategy of the armed groups outside the law



Graph 12. Fixed base price index June 2011. Behavior of the prices of the cocaine-based derivatives in Colombia from 2006 to 2014.

Source: National Police - DIRAN

Calculations: UNODC-SIMCI.

Note:

1 To facilitate comparative analysis of the growth of the above variables, fixed base indices of 2003 were estimated. A fixed base index goes beyond comparing two moments in time and it seeks to analyze the variations in relation to a fixed period of reference.

of over 20% compared to those of cocaine baste paste, the trend in the medium term (4 years) may indicate that the growth in prices of cocaine baste paste has presented a behaviour more favorable than the prices of cocaine base.

It should be noted that prices of cocaine base registered in different regions ranging from \$ 1,400,000/kg to \$ 3,500,000/kg, a difference that could be explained not only by the lower production of cocaine base on farm, but by the marketing of this product among drug trafficking structures. According to the study of the Characterisation of the Transformation of the Coca leaf into Cocaine Hydrochloride in Colombia conducted by SIMCI and PRELAC projects in 2014, it was found that the product tends to be without the oxidation process, although it is marketed under the name of cocaine base. In practice the raw material entering the “reoxidiser” (“reoxidadero”)³⁷ for the purpose of its

of giving growers freedom to expand coca cultivation in some areas of the country³⁸, could generate incentives that determine the increase of growers selling the leaf, as well as the increase of new fields, which would contribute to increase the supply in the short term.

At the local level, selling most of the coca leaf production by the grower would involve the development of production structures exclusively dedicated to collecting and processing leaf into cocaine base, a situation that could lead to: i) new strategic alliances with drug trafficking organisations and armed groups outside the law in the territory, consolidating market scenarios with many sellers and a few or a single buyer of coca leaf, as well as a few or a single producer or vendor of cocaine base and hydrochloride³⁹; ii) before collecting

standardise the quality of the input that enters the production chain crystallisation of cocaine, after application of potassium permanganate.

38. Information provided by the authorities in meetings with UNODC. This situation has been reported in Norte de Santander, Meta - Guaviare, Putumayo and Cauca

39. It is noted that, there have been scenarios where the drug dealer in the local organisation or armed group outside the law buy from the grower the coca leaf production; these groups include the entire production chain, i.e. they themselves are in charge of the manufacture of cocaine base and

37. Site for the collection of basic cocaine paste and cocaine base where they perform processes

the leaf large scale returns could be obtained from the alkaloid extraction processes where the use of chemicals (especially solvents) would be optimised, less losses and yields more homogeneous cocaine base production, iii) if previous approaches materialise, we might expect an increase in the yields of the final product - cocaine base and hydrochloride.

Previous approaches strengthen the hypothesis about structural changes in the coca market represented in the greater segmentation of production processes and diversification of risk inherent in the business among several agents, which could explain not only the tiered pricing but also the specialisation in production processes. These changes have not increased the prices of cocaine hydrochloride which in 2014 recorded a drop of 3.7% standing at \$4,538,200/kg (US \$2,269/kg).

It is noteworthy that the price of cocaine hydrochloride increases according to the distance, that is, the farther away the production site and the closer to consumer markets, the price tends to increase. It is important to note that the available statistics on prices do not consider adjustments related to purity.

According to interviews with processors of cocaine base to cocaine hydrochloride, conducted in producer countries in Latin America, Colombia, Bolivia and Peru, in the framework of the PRELAC project⁴⁰, the selling prices of cocaine hydrochloride agreed from Colombia to be placed on different ports for its entry into consumer markets were identified. So things, a kilogram of cocaine hydrochloride in the country is sold on average for US \$2,269; that very same kilo can be sold in Central America between US \$2,800 and US \$10,000 (increase between 23% and 341% over the selling price in Colombia). If the target market is Mexico or a port in the U.S., the kilo of cocaine hydrochloride can be sold between US \$15,000 and US \$17,000 (increase between 561% and 649% over the selling price in Colombia) while putting it a port in Spain (European Union), the price can range between US \$54,000 and US \$57,000 (increase between 2,280% to 2,412% over the selling price in Colombia). It should be noted that these prices correspond to cocaine hydrochloride in transit, so its price in consumer markets tends to increase to the extent that is a likely product to be adulterated ("cut") and dosed.

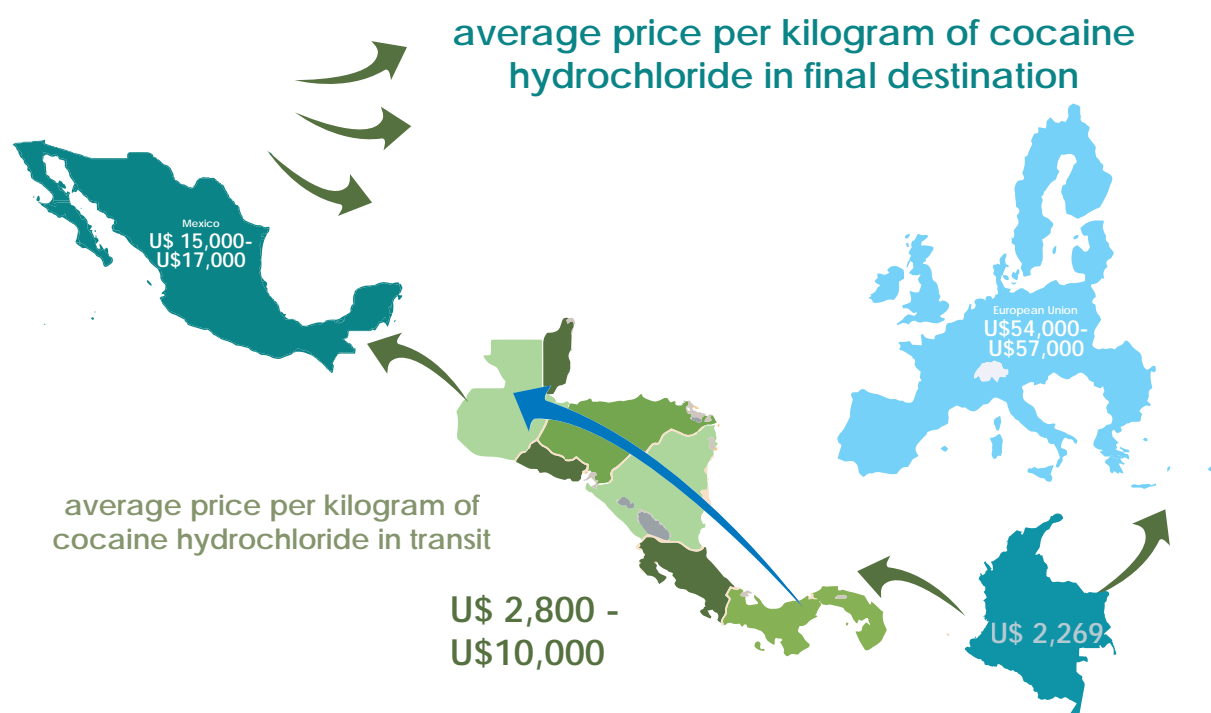
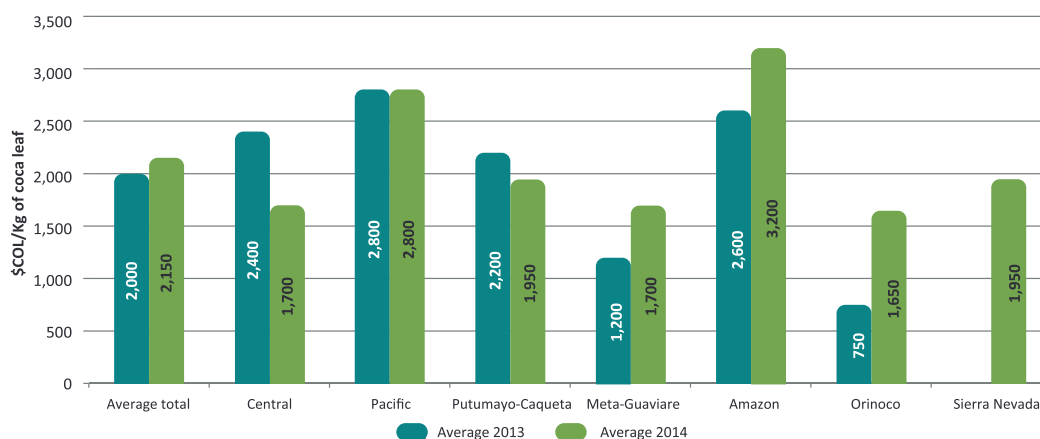


Figure 2. Wholesale price variation per kilogram of cocaine in different selling countries

the transformation into cocaine hydrochloride, according to information obtained in the course of the study conducted by UNODC SIMCI and PRELAC projects. This situation has been identified in Pacific centers and obeys particular situations presented in this territory.

40. The information was obtained under the study of the Characterisation of the Transformation of the Coca leaf into Cocaine Hydrochloride in Colombia conducted in 2013 - 2014 by the PRELAC and SIMCI projects of the United Nations Office on Drugs and Crime, where they interviewed processors of cocaine hydrochloride in the three producer countries (Colombia, Peru and Bolivia).



Graph 13. Average fresh coca leaf prices according to regions, 2013-2014

Source: UNODC, National police of Colombia, DIRAN, Calculation: UNODC - SIMCI

Note:

1 Prices listed in the report correspond to the arithmetic average of the monthly data reported by the sources.

2 Values were rounded to the nearest multiple of 50.

3 The values reported in the Central region includes the behavior of prices of coca leaf recorded in the Norte de Santander department.

PRICES OF FRESH COCA LEAF

It is estimated that in 2014 about 211,000 tonnes of coca leaf (68% of national production) were sold by the grower to other agents (brokers or processors), a trend that is differentiated in the regions. The results of the productivity studies reported that growers mainly marketed fresh coca leaf in the regions of Sierra Nevada (91%)⁴¹, Catatumbo (82%), Pacific (92%), Putumayo - Caqueta (64%) and Central (59%) and to a lesser extent in the regions of Meta - Guaviare (14%) and Orinoco (5%) .

As explained above, in 2014, the reported average price of fresh coca leaf was \$ 2,150/kg (US \$ 1.1/kg) presenting an increase of 7.5% compared with the same period of the previous year. At the regional level, prices registered a positive growth in Orinoco (120%), Meta - Guaviare (41.7%) and Amazon (23.1%), while in the Central region and Putumayo - Caqueta showed a fall of 29.2% and 11.4% respectively. Prices of coca leaf in the Pacific region remained constant.

The higher prices of coca leaf were recorded in the region of Putumayo - Caqueta (123% compared to the national average); in Caqueta the marketing of coca leaf ranges from \$ 1,400/kg and \$4,800/kg, in Huila a level

of \$ 4,800/kg was recorded. At local level, the higher selling prices for coca leaf occurred in Caqueta with values close to \$4,800/kg associated with the marketing of a variety under the designations of "Bitter" ("Amarga") or "Caturra", a situation that has been detected in the municipality of El Doncello⁴².

In Caqueta department, Solita, San Jose del Fragua, Valparaiso, Belen de los Andaquies, Curillo and Cartagena del Chaira municipalities report that the fall in the prices of fresh coca leaf is due to the perception of decline in marketing due among others, the following factors: i) lack of guarantees to the extent that pressure from government controls limit the free movement of intermediaries and ii) bad weather affecting the coca crops and roads which limits the entry of buyers to the areas. In the case of Florencia, despite being a capital city, marketing has this trend because the offer has not been stable due to the pressure of the State controls, according to the information provided in the field.



Cocaine paste



Reoxidized basic



Cocaine base

41. It is a productive center with the trend to decline the coca crops which the last survey of coca crops in 2013 only produced 0.1% of the national coca leaf production.

42. It is noteworthy that in the case of the municipality of El Doncello, an incentive arises from the market to promote the coca variety of Pringa Maria Amarga or Caturra, which is gaining momentum due to its high concentration of alkaloid, according to information reported by growers; their price levels hover around \$ 50,000 per bushel of coca leaf, equivalent to \$ 4,000 / kg. However, problems with the supply of this seed are arising to the extent that there is a high demand for planting.

PRICES OF COCAINE PASTE AND COCAINE BASE

In the records obtained in different regions, prices of cocaine base are higher than the prices of basic paste (26%) possibly explained by the difference in production costs between these processes; in the case of cocaine base, the producer requires using additional chemical inputs as potassium permanganate, an essential chemical used to clean impurities which currently is made by hand, and other chemicals such as sulfuric acid, sodium metabisulfite and ammonia.

PRICES OF COCAINE PASTE

According to the latest trends detected in studies of productivity in the regions of Meta - Guaviare and Orinoco, 86% and 95% of the growers process the leaf to obtain cocaine paste. It has also been identified an extraction on farm to manufacture this product in the Putumayo - Caqueta (36%), Pacific (5%), Catatumbo (18%) regions and to a lesser extent, Central (8%) and Sierra Nevada (4%).

In 2014, the average price of a kilogram of cocaine paste was recorded in \$1,967,200/kg (US \$983/kg) with an increase of 4.1% compared with the same period of the previous year. During this period, all regions showed upward trends in price levels; Orinoco, Pacific and Central were characterised by record significant growth of 5.2%, 3.8% and 1.5% respectively while the Meta-Guaviare, Caqueta and Putumayo-Amazon regions recorded a fall of 1.6% 1.4% and 0.6% correspondingly.

In 2014, prices of cocaine paste ranged from \$1,000,000/kg and \$2,400,000/kg. At local level, it was identified that in the Pacific region the product is sold below the national average, particularly in Cauca, this product is being marketed at a price ranging between

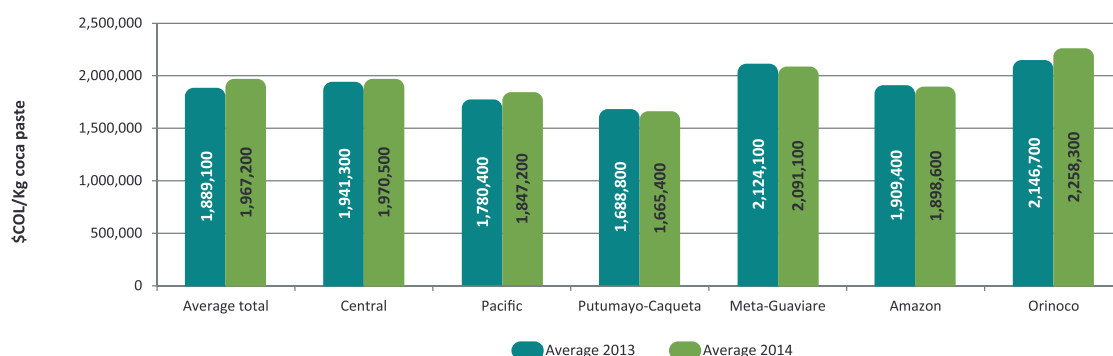
\$1,000,000/kg and 1,200,000/kg, while in Orinoco in the department of Casanare were prices between \$ 2,000,000/kg and \$2,400,000/kg. Orinoco and Central identified the higher prices of cocaine paste in the country (28% higher than the national average), sold in Bogota, Boyaca, Casanare and Vichada.

PRICES OF COCAINE BASE

Productivity studies indicate that the oxidation process necessary to manufacture cocaine base is not performing on farm; only 2% of Agricultural Production Unit with Coca carry out the oxidation with potassium permanganate, this percentage corresponds to the regions of Central (33%), Sierra Nevada (5%) and Pacific (3%). However, this process might be being carried out by specialist people outside the Agricultural Production Unit with Coca – UPAC, who collect two types of products: i) the fresh coca leaf to extract the alkaloid, or ii) the cocaine paste to continue the process of clearing impurities and oxidation.

In the latter scenario and as preliminarily identified in the update of the study of the Characterisation of the transformation of the fresh coca leaf to cocaine hydrochloride conducted by UNODC, SIMCI and PRELAC projects in 2014, the laboratories of cocaine hydrochloride may be assuming the latter function where they perform the process of homogenisation of the quality of the cocaine paste and cocaine base through the oxidation process; the generated production can be made to the input suppliers in weight (kg) of “reoxidised” base (according to its trade name) or sales can be generated of this product among laboratories.

In 2014, the average price of cocaine base was recorded at \$2,476,700 (US \$1,238/kg); presenting a decrease of 5.3% compared with the same period of the previous year. In the regions of Pacific, Putumayo - Caqueta,



Graph 14. Average coca paste prices according to region, 2013-2014

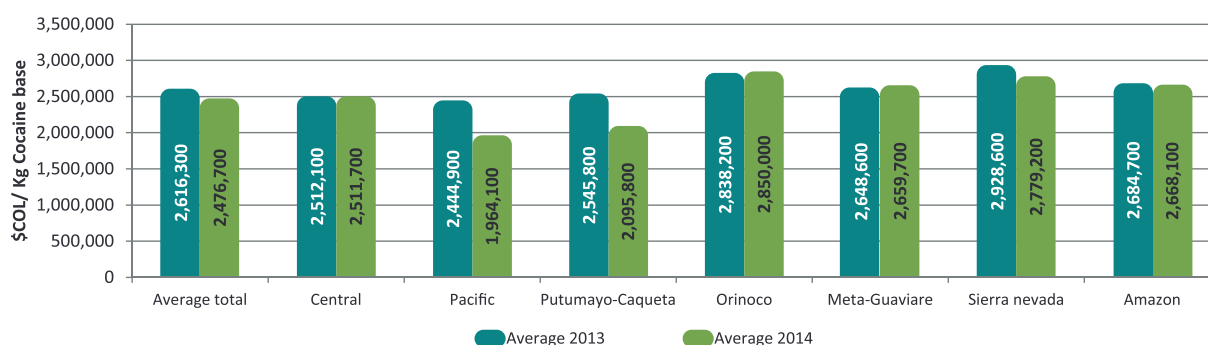
Source: UNODC, National police of Colombia, DIRAN, Calculation: UNODC - SIMCI

Note:

1 Prices listed in the report correspond to the arithmetic average of the monthly data reported by the sources.

2 Values were rounded to the nearest multiple of 50.

3 The values reported in the Central region includes the behavior of prices of coca leaf recorded in Orinoco region



Graph 15. Average prices of cocaine base according to region, 2013 - 2014

Source: UNODC, National police of Colombia, DIRAN, Calculation: UNODC - SIMCI

Note:

1 Prices listed in the report correspond to the arithmetic average of the monthly data reported by the sources.

2 Values were rounded to the nearest multiple of 50.

Sierra Nevada and Amazon price declines by 19.7%, 17.7%, 5.1% and 0.6% respectively were identified, while in Meta - Guaviare a slight growth of 0.4% was presented.

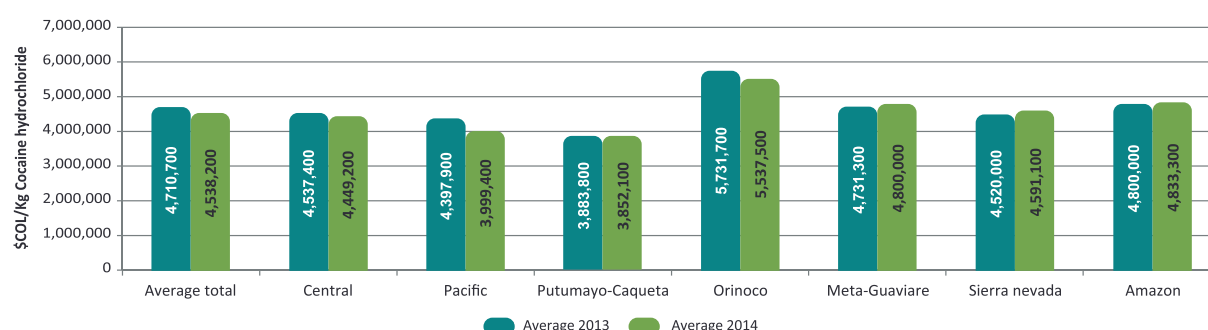
The sale of cocaine base was identified above the national average in the regions of Orinoco (15%), Sierra Nevada (12%), Amazon (8%) and Meta - Guaviare (7%); on the other hand, in the regions of Pacific and Putumayo - Caqueta it is sold at lower levels in 21% and 15% of the national average.

The prices of cocaine base in 2014 ranged from \$1,400,000/kg and \$3,500,000; at local level, the lowest prices occurred in Pacific, in the municipality of Tumaco (Nariño) and in the Central region, in the municipalities of Apartado, Chigorodo, Mutata and Turbo (Antioquia), while the highest levels were recorded in Bogota and Puerto Boyaca (Boyaca).

PRICES OF THE COCAINE HYDROCHLORIDE

In 2014, the average price of cocaine hydrochloride stood at \$4,538,200/kg (US \$2,269/kg) with a drop of 3.7% compared with the same period of the previous year. At regional level, Pacific, Orinoco, Central contributed to this trend, showing a decrease in the price of 9.1%, 3.4%, 1.9% and 0.8% against the same period of 2013. In the case of Meta - Guaviare and Sierra Nevada regions prices of cocaine hydrochloride increased by 1.5% and 1.6% respectively.

According to information provided by the sources, the fall in the Pacific region, specifically in the department of Nariño, might be influenced in reducing product quality to the extent that there has been a recruitment of "chemical" experts by international cartels which have determined the entry of new processors with less experience.



Graph 16. Average cocaine hydrochloride price according to region, 2013-2014

Source: UNODC, National police of Colombia, DIRAN, Calculation: UNODC - SIMCI

Note:

1 Prices listed in the report correspond to the arithmetic average of the monthly data reported by the sources.

2 Values were rounded to the nearest multiple of 50.

It is noteworthy that prices correspond to the records obtained in the main cities of the country and are increased in the chain to the extent that the traffic chain moves to other nodal points. According to records obtained in 2014, the price of cocaine hydrochloride can range from \$3,100,000/kg and \$6,000,000/kg (excluding the records of San Andres). At local level, the lowest prices are reported in the municipalities of Buenaventura (Valle del Cauca) and Neiva (Huila), while the highest prices are reported in the region of Orinoco, municipalities of Yopal (Casanare) and Puerto Carreño (Vichada).

According to the U.S. Government, the purity analysis of cocaine hydrochloride for export produced in Colombia went from 76.27% in 2013 to 77.12%⁴³ in 2014, which is

an increase of 1.11%. While in 2005, a purity of 84.40% was estimated in the cocaine hydrochloride for export in 2010, stood at its lowest point in 73.14%; from 2011 the trend has marked a growth with levels between 75% - 77% purity⁴⁴.

Regional markets associated with coca derived products⁴⁵

While at national level, prices reported relative stability, at regional level, disparities related to market response to specific territorial contexts are evident. It is noteworthy that the drugs market understanding involves a comprehensive analysis between supply and demand. Some of the main trends evidenced are as follows:

Amazon Region	<p>In recent years, the fall in the supply of fresh coca leaf (from 7,423mt in 2009 to 1,377mt in 2014), has configured other dynamics within the territory. Extraction of alkaloids has declined abruptly at the local level; this influences the reduction of potential cocaine production capacity; however, this does not imply that the territory tends to be free from the drug problem.</p> <p>Given its location at a transnational border, the dynamics of traffic tend to influence the local environment; prices of first extraction – level products have increased in the medium term, with an accumulated growth of 50% in cocaine paste and 13.3% cocaine base, vis – à – vis the 2006 records. Along the same lines of thought, prices of cocaine hydrochloride increased by 6.4% between 2006 and 2014.</p> <p>According to information provided by officials and local authorities, the former Leticia – Tefe – Manaos – Macapa – Port of Suriname – Africa corridor is active. The product that transits in the zone comes from the river corridors of Putumayo and Caqueta, or from the Lower Amazon and Putumayo cores in Peru.</p> <p><small>a Collected under the characterization study of the geographic, economic and institutional factors which affect the development of illegal activities related to drug production and trafficking in the Amazon rain forest, conducted by UNODC and the Government of Colombia.</small></p>
Catatumbo region ^b	<p>The increases in the supply of fresh coca leaf (from 3,584 mt in 2006 to 42,122 mt in 2014), as well as the on – site sale tradition at farms (71% of growers sold fresh coca leaves in 2006 and 82% thereof did in 2011, according to productivity studies) influenced the price level; according to records in the Drug Price System, prices of this product remained stable between 2011 and 2013, while the last year recorded a fall of 50% from \$2,750/kg in 2013 to \$1,350/kg in 2014.</p> <p>The ability to potentially produce cocaine base in the territory has increased from around 6mt in 2006 to 79mt 2014; however, prices have declined by 4.7% between 2011 and 2014. Contrary to these trends, the price of cocaine has remained constant within the same period.</p> <p><small>b The Drug Price System has records of fresh coca leaf products (2011 – 2014), cocaine paste (2011 – 2013), cocaine base (2011 – 2014) and cocaine hydrochloride (2011 – 2014).</small></p>
Central Region (excluding Norte de Santander)	<p>In nominal terms, fresh coca leaf prices have fluctuated in time, until becoming consolidated in the last year with a 10.8% increase over 2013. In spite of the fact that there has been a reduction in the capacity of producing coca leaf in the territory, prices do not always respond to this dynamic. Production of fresh coca leaf fresh went from 91,606 mt in 2006 to 18,459 mt in 2014, while price growth has tended to stability by ca. 1.4%, if prices are translated to constant terms in 2006.</p> <p>According to productivity studies conducted in 2011, 59% of growers sell coca leaves at their farm while 33% process coca leaves on site to into cocaine base. By 2014, prices of cocaine base dropped by 10% taking the levels recorded in 2006 as reference.</p> <p><small>c. Prices of coca leaf in the Central region have oscillated as follows: \$2,800 /kg (2006), 2,200 (2007), 1,700 (2008), 2,600 (2009), 2,750 (2010), 2,550 (2011), 3,200 (2012), 1,850 (2013), and 2,050 (2014).</small></p>

43. Source: Department of State of the U.S.A., based on 2014 seizures of cocaine made in that country.

44. The statistics on the level of purity of cocaine hydrochloride, data supplied by the U.S. government, are: 2005 (84.40%), 2006 (84.60%), 2007 (83.05%), 2008 (79.16%), 2009 (75.18%), 2010 (73.47%), 2011 (75.14%), 2012 (77.49%), 2013 (76.27%) and 2014 (77.12)

45. For the conduction of historical production analysis they took into account the 2006 - 2008 series of traditional methodology and the 2009 - 2014 series of methodology adjusted after inclusion of the permanence factor and the factor of conversion of coca leaf to cocaine base

Meta – Guaviare region	<p>In recent years, prices of coca leaf and cocaine base have tended to increase in this region. While the price of coca leaf showed a 31.4% decrease in 2013 as compared to 2012, prices recovered in 2014 with an increase of 41.7%.</p> <p>It is clear that the sale of coca leaf at farms in this region is a minority – only 14% of the Agricultural Production Units sell it. It is estimated that 86% of fresh coca leaf production is processed on site by Agricultural Producers with into cocaine paste; prices have tended to stability at levels near those recorded in 2006.</p> <p>The potential production capacity of fresh coca leaf was estimated at 49,597 mt in 2014, and could generate around 73 mt of cocaine base. While there is a 0.4% growth in prices, the trend has been upward. The price of cocaine hydrochloride has tended towards stability at the prices recorded in the year 2006.</p>
Orinoco region	<p>In the Orinoco region, 5% of the growers sell coca leaves at their farm; upon comparing price levels of the year 2014 to those registered in 2006, a decrease can be observed from \$ 2,300/kg in 2006 to \$ 1,650/kg in 2014. 95% of farmers extract the alkaloid to produce cocaine base; trends in prices indicate that this percentage has tended to increase over the past three years, thereby generating incentives for manufacturing. Cocaine base prices have remained relatively stable.</p> <p>Upon analysing the cumulative price growth since the year 2006, the trend in the price of cocaine has been increasing, in spite of the in the last year (2014) a decrease of 3.4% was recorded.</p>
Pacific Region	<p>Prices for coca leaf have not responded to the increase in supply. Stability in the price of coca leaf from the years 2014/2013 is not in keeping with the increase in production from 63,909 mt in 2013 – 121,847 mt in 2014. It is noteworthy that 92% of growers sell coca leaves at their farm, so this market becomes relevant at the local level.</p> <p>5% of growers extract the alkaloid to obtain cocaine paste, at prices which have remained stable as compared to the year 2006, but with a 3.8% increase as compared to 2013. Prices of cocaine base have lost competitiveness with regard to the levels presented in 2006, which could be associated with a disincentive to market the product. This would relate to the fact that laboratories in this area tend to collect cocaine paste, and perform the oxidation process at their own facilities, even if it has already been completed by farmers, in order to ensure homogeneity of the raw materials.</p> <p>The price of cocaine hydrochloride has tended to decline with regard to the records in 2006; there has been a 9.1% decrease in the last year as compared to the figure recorded in 2013.</p> <p><small>c According to information obtained in the characterization study of the transformation from coca leaf into cocaine hydrochloride in Colombia, conducted by SIMCI and PRELAC projects of the United Nations Office on Drugs and Crime in 2014, cocaine hydrochloride manufacturers were interviewed.</small></p>
Putumayo-Caqueta	<p>Compared to the 39% increase in coca production in the region in the past year (from 50,997 mt in 2013 to 70,750 mt in 2014), prices dropped by 11.4%, with 64% of the production sold at farms by growers. It is noteworthy that differentiated prices have been identified at the local level, depending on the coca leaf varieties grown. This is allegedly associated with the ease to extract the alkaloid, as reported by coca growers in the area.</p> <p>36% of growers process the leaf for cocaine paste; the selling price of this product has tended to remain stable in recent years as compared to the records from the year 2006. This could translate into a market incentive for the farmer to sell fresh coca leaves and desist from on site transformation.</p> <p>The price of cocaine hydrochloride in the region has tended to increase by about 46.3% as compared to the records from the year 2006, whereas the price of cocaine base has decreased by about 13.4% as compared to 2006.</p> <p><small>e It is noteworthy that for processors of cocaine paste and cocaine base</small></p>

YEARLY INCOME PER COCA – GROWN HECTARES IN 2014

The Agricultural Production Unit with Coca - UPAC could receive income from the sale of products derived from the following processes: i) growing through the sale of coca leaf; ii) extracting the alkaloid through the sale of basic paste, or iii) extracting the alkaloid, using potassium permanganate to obtain cocaine base for subsequent sale.

The income received by Coca Agricultural Producers - PAC have tended to decline against the figure recorded in 2006 due to changes in the division of labor within the UPACs; while in 2006, 65% of growers performed alkaloid extraction processes on farm, currently 68% of the PAC sold the leaf on farm. It is estimated that the potential income received by growers rose from US \$904 million in 2006 to US \$407 million in 2014, mainly due to the decrease in the produced quantities and by markets regulated by armed groups outside the law and drug trafficking organisation, who impose the trading conditions.

In the absence of compensation between the prices of inputs and the products produced in the UPAC, i.e. increases in input prices are higher than the growth in prices of the products marketed by the grower; it was required that PACs adjust their costs. In Addition, the relationship between the production area during the year and the area affected with coca crops has tended to remain stable (on average 48%), i.e. the PAC on average has not received 52% of income of the total cultivated area, between 2006 - 2014.

The foregoing you could infer a possible increased in the loss risk which means that growers are more exposed to losses by cultivation and marketing of the leaf because they have not received a percentage of the added value of the processes that were previously performed in the UPAC and that generated them compensation for possible loss of marketing to interdiction efforts (seizures, manual eradication and aspersion) carried out by the authorities.

In economic terms, coca crops has tended to be an activity replaceable by legal crops to the extent that the cost / benefit⁴⁷ ratio, varies between 50% and 62% of

Product	Annual yield per hectare ¹	Annual price average		Annual income per hectare	
	kg/hectares	'000\$/kg	US\$/kg	'000\$/kg ²	US\$/hectares
Coca leaf	4,700	2.2	1.1	11,005	5,501
Coca paste	7.8	1,967	983	14,820	7,409
Cocaine base	9.4	2,477	1,238	21,081	10,538

Table 24. Potential annual income for Agricultural producers and Coca-PAC per hectare, during the cultivation and alkaloid extraction process, 2014

Note:

¹ The annual yield (kg/hectares) of coca paste and cocaine base corresponds to the production level obtained by the Agricultural Unit and Coca-UPAC producers.

² Was estimated from the potential production that enters the market, that is to say of discounted seizures each of the products in proportion to their participation.

It should be emphasised that a reduction in investment made by the grower is estimated to the extent in which incurred costs tend to relate mainly to the maintenance of crops. The information gathered under Productivity Studies, as well as the Economic Structure of the Agricultural Production Units in areas affected by coca crops identified that the growers have changed their agricultural practices towards a decrease in the use of agrochemicals; it is estimated that the maintenance costs per ha increased from COP \$2,100,000/ha in 2006 to COP \$800,000/ha in 2014⁴⁶.

total production⁴⁸ while in a licit crop this relationship may vary between 68% and 89%⁴⁹. It is noteworthy that the average of the fields size is 0.66 ha; in the case of small fields (from 0.1 ha to 0.5 ha) the PAC family is responsible for performing the maintenance and harvest tasks⁵⁰ while the fields of over 1 ha can claim labor ("pickers" – "raspachines"), implying that there are families with incomes both inside and outside the UPAC. It is estimated that in 2014 around 64,500

46. The Productivity Studies, as well as the Economic Structure of the Agricultural Production Units in areas affected by coca crops permitted to generate benchmarks regarding the quantities of chemicals used by the PAC and the prices paid. Costs from the evolution of the Producer Price Index reported by DANE were estimated.

47. The cost-benefit ratio is estimated based on the ratio of the added value generated by economic activity and total production. It must be remembered that the added value refers to inputs and services incorporated in the production process which is not taken into account the employees' compensation, taxes and subsidies and the operating surplus or mixed income.

48. It was estimated taking into account the ratio of net income and potential production to be placed on the market.

49. It was calculated based on the ratio of the added value of economic activities in coffee growing and cultivation of other agricultural products; information obtained from the Matrices on the use of products, conducted by DANE – Synthesis Directorate and National Accounts.

50. In this case, in the economic activity carried out by the Agricultural Production Unit with Coca - UPAC, added value is equal to mixed income to the extent that does not generate payments to workers (employees' compensation).

households, with an average of 5 people per household, received income from these activities. Each member of the household could receive around US \$1,160 a year.

In 2014, 68% of the growers traded in the market around 210,991 mt of coca leaf, valued at COP \$494,047 million pesos (US \$247 million); it is estimated that they perceived COP \$11,005/ha (US \$ 5,501/ha) approximately in a year.

In addition, 29% of PACs obtained income from the sale of 146 mt of cocaine paste, worth COP \$276,638 (US \$138 million) while 3% of the growers generated COP \$44,936 million pesos (US \$22 million) from the sale of 20 mt of cocaine base.

To calculate the total value of the production on farm, you used the total production of coca leaf and the production estimates of cocaine paste and base made directly by the (grower) primary producer, in the same way,

available coca leaf and cocaine base paste obtained on farm selling prices. Based on the above, net income from primary production (on farm) was estimated at US \$261 million (minus production costs).

From a macroeconomic point of view, the DANE estimates at 2013 (p) the added value of the production and processing of illicit crops represents 0.2% of national PIB, where the economic activity of illicit crops represents 2% of the agricultural sector⁵¹. Previous estimates correspond to the results of the Enclave research: illicit crops, agricultural and industrial phases, Base 2005⁵², which aims to identify the economic flows resulting from the production and processing of illicit crops on the Colombian economy.

Producto	Production 2014	Prices	Gross income		Net income	
	kg	US\$/kg	'000 US\$	'000.000 COP \$	'000 US\$	'000.000 COP \$
Coca leaf	210,990,930	1.1	246,969	494,047	204,689	409,467
Coca paste	146,270	983	138,289	276,638	47,501	95,023
Cocaine base	20,122	1,238	22,463	44,936	9,083	18,171
Farm production value			407,721	815,621	261,273	522,661

Table 25. potential annual net income of farmers with Coca-PAC from the process of cultivation and extraction of alkaloids in 2014

51. According to DANE, Colombia's PIB at current prices in 2013 (pr) was estimated at around \$710,257 billion pesos (US \$380 billion), while the PIB of the agricultural, forestry, hunting and fisheries sector is estimated at \$38,978 Billions of pesos (US \$21 billion).

52. According to the Enclave document: Illicit crops, agricultural and industrial phases, base 2005, 2000 - 2010 pr series, the Enclave is a "virtual" space belonging to the economic territory, artificially created to record separately from the national economy, the activities related to the production and transformation of illicit crops (except for the trade). The enclave of illicit crops has two phases: one agricultural, where the coca crops are carried out coca until the cocaine base processing in the UPAC, while the industrial phase refers to establishments engaged in the processing of cocaine hydrochloride and heroin. For further details: <http://www.dane.gov.co/index.php/cuentas-economicas/investigaciones-especiales>

Map 16. Poppy crops estimate, 2014



Source: Government of Colombia - National monitoring system supported by UNODC, National Police - Anti Narcotics Detection Group
 The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

POPPY CROPS

The Anti - Narcotics Directorate of the National Police of Colombia, has implemented a methodology for the identification, geographic referencing and quantification of poppy crop, based on the combination and analysis of information obtained from records of detection and eradication and information from other institutions; which are validated by airborne sensors and aerial reconnaissance with the use of DMRT (Digital Mapping Toolkit Reconnaissance) precision equipment; information which is processed through special software that allows geographic referencing and quantification of poppy crops.

The results of poppy crops which are presented in the following table were obtained during the period between February and May 2015.

Department	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Nariño	1,230	540	460	475	316	204	24	238	234	229	205	73	159
Cauca	1,155	600	450	538	448	280	126	100	92	102	102	219	208
Huila	624	636	1,135	320	114	45	45	11	12	5	4	4	9,5
Tolima	682	1,359	1,090	265	90	170	170	3	3	2	2	2	5
Cesar	454	651	675	152	3	7	18	2,5	-	-	-	-	5
Valle del Cauca	-	-	-	-	-	-	-	1,5	-	-	-	-	-
La Guajira	-	240	-	68	-	2	4	-	-	-	-	-	-
Caldas	8	-	-	-	-	-	-	-	-	-	-	-	-
Putumayo	-	-	-	-	-	-	-	-	-	-	-	-	0,5
Caqueta	-	-	105	132	52	7	7	-	-	-	-	-	-
Total	4,153	4,026	3,950	1,950	1,023	715	394	356	341	338	313	298	387

Table 26. *Poppy cultivations (hectares) within departments in Colombia, 2002-2014*

Considering the area detected by the National Police, the potential heroin production is estimated around 1 mt⁵³, while the global heroin production (with unknown purity) is estimated at 560 mt⁵⁴, which determines that the country would participate only with 0.2% of the global supply of this alkaloid. However, domestic consumption of Heroin and opium is a growing concern in Colombia.

According to the study of 2012⁵⁵, global consumption of opiates remains below 1%. In the case of Colombia there is no conclusive information on the extent of use of this substance because of the difficulty in quantifying the phenomenon; however, according to the 2013 National Study of Psychoactive Substance Consumption, it is estimated that around 32,000 people have had contact

with heroin at least once in their lives and about 7,000 people demonstrate the use of this substance in the last year.

Another source of information that allowed dimensioning the use of this substance is the demand for treatment, according to which an increase in heroin consumption occurs in cities like Santander de Quilichao, Armenia, Medellin, Pereira, Cucuta, Cali and Bogota.

According to the 2015 World Drug Report, it is estimated that around 310,891 ha of poppy were grown by 2014 in different countries, an increase of 5.3% compared to the records in 2013, being the highest level since 1998. There were increases in Afghanistan, where the area of cultivation increased 7.2% percent, from 209,000 ha in 2013 to 224,000 ha in 2014.



Poppy crop in Cumbitara-Nariño
Source: GME - UNODC 2015

53. Estimates of potential heroin production were made taking as reference the 298 ha identified by the National Police in 2013 and yields per ha of kiln - dried opium reported by the U.S. Government. For further details, refer to 2013 Coca Crops Monitoring Report, page 68.

54. According to estimates reported in the 2014 World Drug Report by UNODC.

55. UNODC. World Drug Report. New York. 2012

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
SOUTHWEST ASIA															
Afghanistan	82,171	7,606	74,100	80,000	131,000	104,000	165,000	193,000	157,000	123,000	123,000	131,000	154,000	209,000	224,000
Pakistan	260	213	622	2,500	1,500	2,438	1,545	1,701	1,909	1,779	1,721	362	382	493	
Subtotal	82,431	7,819	74,722	82,500	132,500	106,438	166,545	194,701	158,909	124,779	124,721	131,362	154,382	209,493	224,493
SOUTHEAST ASIA															
Laos PDR ^(a)	19,052	17,255	14,000	12,000	6,600	1,800	2,500	1,500	1,600	1,900	3,000	4,100	6,800	3,900	6,200
Myanmar ^(a)	108,700	105,000	81,400	62,200	44,200	32,800	21,500	27,700	28,500	31,700	38,100	43,600	51,000	57,800	57,600
Thailand ^(b)	890	820	750												
Vietnam ^(b)															
Subtotal	128,642	123,075	96,150	74,200	50,800	34,600	24,000	29,200	30,100	33,600	41,100	47,700	57,800	61,700	63,800
LATIN AMERICA															
Colombia	6,500	4,300	4,153	4,026	3,950	1,950	1,023	715	394	356	341	338	313	298	387
Mexico ^(c)	1,900	4,400	2,700	4,800	3,500	3,300	5,000	6,900	15,000	19,500	14,000	12,000			
Subtotal	8,400	8,700	6,853	8,826	7,450	5,250	6,023	7,615	15,394	19,856	14,341	12,338	12,338	10,798	11,185
OTHERS															
Others countries ^(d)	2,479	2,500	2,500	3,074	5,190	5,212	4,432	4,184	8,600	7,700	10,500	16,100	13,500	13,300	11,800
TOTAL	221,952	142,094	180,225	168,600	195,940	151,500	201,000	235,700	213,003	185,935	190,662	206,700	238,020	295,291	311,278

Table 27. Global poppy cultivation (hectares), 2000-2014

Source: UNODC, world drug report, 2015

Note: The figures in italics are preliminary and can be subjected to revision to check that the information is up to date. The information relating to estimate methods and definitions can be found within the chapter on methodology within the World Report on illicit crop monitoring

Sources of information: Afghanistan prior to 2003: UNODC, since 2003: National Illicit crop monitoring programme with the support of the UNODC. Pakistan: ARQ, Pakistani Government, US State department. Laos People's Democratic Republic prior to 1999: UNODC since the year 2000: National Illicit crop monitoring programme with the support of the UNODC. Myanmar prior to 2001: US State department since the year 2001: National Illicit crop monitoring programme with the support of the UNODC. Colombia prior to 2000: various sources since the year 2000: Colombian Government. During the years 2008 and 2009, produced was calculated based on regional yield figures and conversion factors from the US State department/ DEA 2005. Mexico:

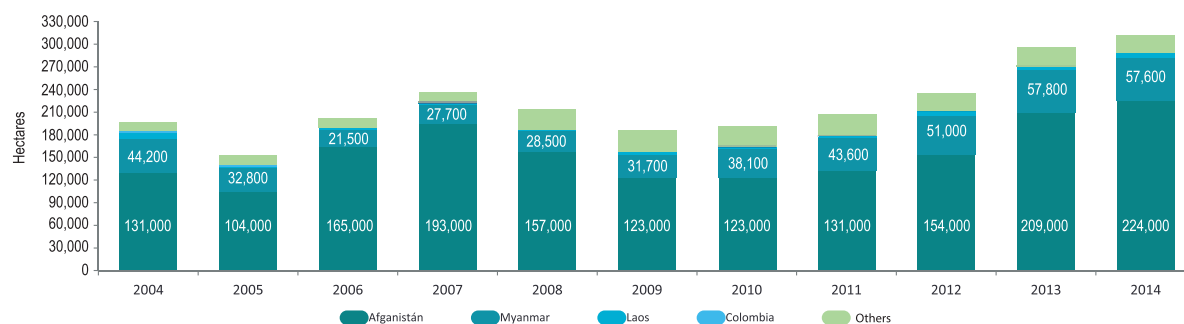
- The estimates derived from surveys of the Government of the States; since 2005 - INCSR 2013 and 2014. According to INCSR 2013 (pg. 25 WDR) due to an important methodological change in the 2011 survey, 2005-2010 estimates refer to growing trends.

a) Include areas that were eradicated after the date of the survey area. The data for 2014 are not comparable with the data for 2013 because two provinces were added and the survey was conducted at a different point during the crop cycle.

b) Due to the continuing decline in cultivation, data for Vietnam (in 2000) and Thailand (from 2003) were included in the category "other countries".

c) The Mexican Government does not back the estimates made by the United States government, these are not part of official figures and the information relating to the methodology used to calculate these figures is not available. The Mexican Government is in the process of implementing a follow-up system in collaboration with the UNODC to estimate the amount of illicit crops and their production.

d) Plant eradication and seizure reports from varying sources outline that illicit poppy crops also exist in the following sub regions: North America, Africa, Central Asia, Transcaucasia, the Near and Middle East/ Southwest Asia, Intra-South, East and Southeast Asia, Eastern Europe, Southeast Europe, Central America and South America. As from 2008, a new methodology was introduced to calculate poppy crops and opium/heroin crop production within these countries. These estimates are superior to previous figures but have a similar order of magnitude. A detailed description on estimate methodology is available within the World Drug Report.



Graph 17. Global poppy crop (hectares), 2004-2014

Source: UNODC, world drug report, 2015

PRODUCTION OF LATEX AND HEROIN

Unlike Asian countries, poppy in Colombia is harvested in the form of latex. If the area detected in 2014 is analyzed, the obtained kiln - dried opium is on average of 18.9 kg / ha / crop. It should be noted that the transformation process requires 24 kilograms of opium latex (equivalent to 8 kilograms of kiln - dried opium) to produce 1 kg of pure heroin, as found in productivity studies of the U.S. Government. It is harvested twice a year in the Colombian territory, except in Nariño, where crops produce a single crop. The following are the yields per ha of the main centers of poppy:

Poppy area	Yield (kg/ha/harvest)
Nariño	16.8
Serrania de Perija	18.4
Eastern Cauca	20.8
Western Huila	15.3
Tolima	13.1

Table 28 Yield per ha of kiln dried opium

Source: U.S. Government. Nariño (2010), Cauca (2009), Huila, Serrania de Perija and Tolima (2004)

Taking as reference the 387 ha identified by the National Police in 2014 and yields per ha of kiln – dried opium reported by the U.S. Government, it would be deemed that Colombia produces about 12 mt of kiln - dried opium representing about 1.5 tonnes of heroin.

PRICES OF LATEX AND HEROIN

In 2014, opium latex prices are on average at \$ 1,401,200/lt (US \$700/lt), a decrease of 32.5% compared to 2013. Prices of morphine and heroin were located in \$10,020,000/kg (US \$5,009/kg) and \$15,059,700/kg (US \$7,528/kg) decreasing in 18.6% and 13.3% respectively. It is noteworthy that the historical behaviour of these prices shows a high volatility and that the market corresponds to closed structures, according to the information reported by the authorities.

municipalities of Buesaco, El Tablon de Gomez, La Cruz and San Pablo, as well as the department of Putumayo, the municipality of Colon⁵⁶.

It is noteworthy that technological advances in methodologies for Remote Sensing presented in recent years, allow UNODC through the SIMCI project and the Government of Colombia, being developing a methodology based on remote sensing, verification overflights, and statistical analysis for the detection and quantification of the area sown with poppy⁵⁷ and for the characterizing of the dynamics of the crop. There is currently a wide range of satellite images coming from various sensors that could substantially improve the spatial, spectral and radiometric resolution, among other key factors, such as the opportunity to purchase, costs and timing; this helps to overcome some of the limitations presented in previous years.

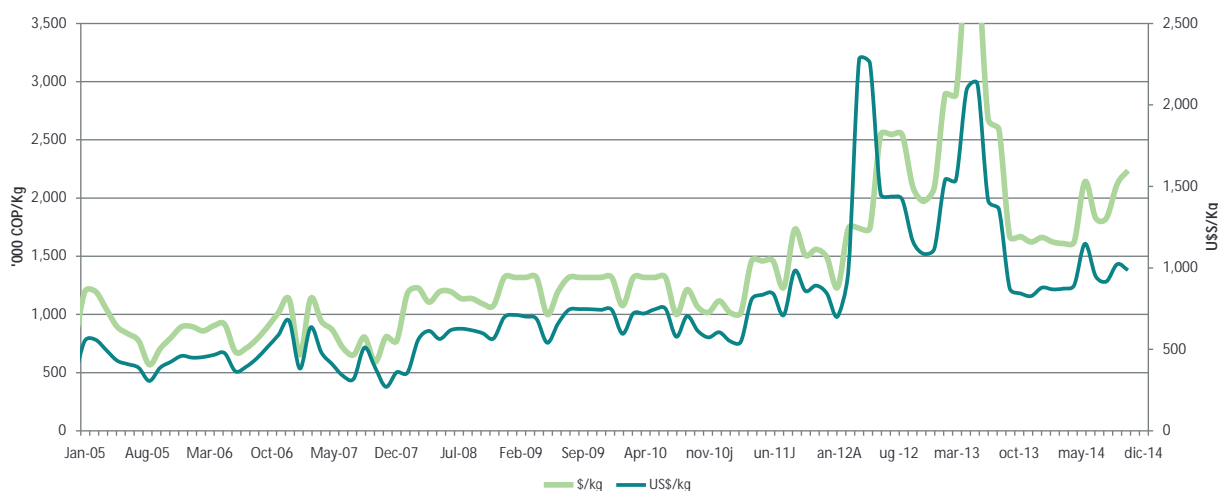
Product	2008		2009		2010		2011		2012		2013		2014	
	US\$/kg	'000 \$/kg	US\$/kg	'000 \$/kg	US\$/kg	'000 \$/kg	US\$/kg	'000 \$/kg	US\$/kg	'000 \$/kg	US\$/kg	'000 \$/kg	US\$/kg	'000 \$/kg
Latex	318	612	358	754	503	953	466	860	634	1,140	1,112	2,077	700	1,401
Morphine	7,369	14,400	7,114	15,162	7,842	14,892	5,804	10,704	8,473	15,241	6,586	12,308	5,023	10,020
Heroin	9,950	19,550	9,993	21,421	10,786	20,421	10,348	19,101	11,661	20,974	9,295	17,371	7,512	15,060

Table 29. Average latex, morphine and heroin prices, 2008-2014

Source: National Police of Colombia narcotics department, DIRAN, SIMCI and PCI for latex

Note:

¹ The prices registered in 2013 - 2014 referring to poppy latex were only reported in litres, whilst these prices were reported in kilos and litres during previous years. In order to guarantee the continuity of this series, it was necessary to convert units (from litres to kilograms) assuming that the density of latex is 1gr/cm³; superior to opium density (0.95 gr/cm³; source: MSDH –Opio Mallinchkrod).



Graph 18. Latex prices in Colombia in Colombian pesos and US dollars, 2005-2014

UNODC is not involved in the generation and validation of poppy area detected in the country; however, since 2003 it performs the monitoring to the eradication of illicit crops in second mode (through the Mobile Eradication Groups - GME), which includes the manual eradication of poppy crops. By 2014, 540.5 ha of poppy distributed in 748 fields were manually eradicated in the country. The intervened departments were Nariño,

56. Information taken from the Monitoring Report to the Forced Manual Eradication carried out by the Mobile Eradication Groups - GME in 2014, United Nations Office on Drugs and Crime - UNODC.

57. Based on the location information from various primary sources (such as DIRAN, Mobile Eradication Groups - GME, Alternative Development, among others), the process of crop characterisation and calibration has been strengthened.

SUPPLY REDUCTION

One of the strategies of Colombia against the reduction of the supply of drugs is part of the development of a series of programs aimed at the following objectives: i) the identification and elimination of illicit crops by aerial spraying with glyphosate, forced manual eradication and voluntary eradication, accompanied by programs conducted by the Alternative Development and the Nation Consolidation Program; ii) the dismantling of the production infrastructure; iii) the control to the chemicals used in the processes of extraction and refining of alkaloids and chemical precursors used in drug production; and iv) the control to the national and international drug trafficking, and; dismantling of drug trafficking networks.

COMPREHENSIVE MONITORING OF CHEMICAL SUBSTANCES IN COLOMBIA

During the year 2014, the Ministry of Justice and Law, led by the Division of Supervision and Control of Chemical Substances and Drugs, and under a strategic partnership with the United Nations Office on Drugs and Crime (Projects SIMCI and PRELAC), continued MONITORING CONTROLLED CHEMICAL SUBSTANCES IN COLOMBIA, under the premise that that administrative control of psychoactive substances, precursors and chemical substances is one of the quintessential components to control the illicit supply of drugs, to the extent that it limits the resources of drug trafficking structures necessary for drug production.

In general, it can be determined that administrative control corresponds to the activities conducted by several government agencies to assure that natural and

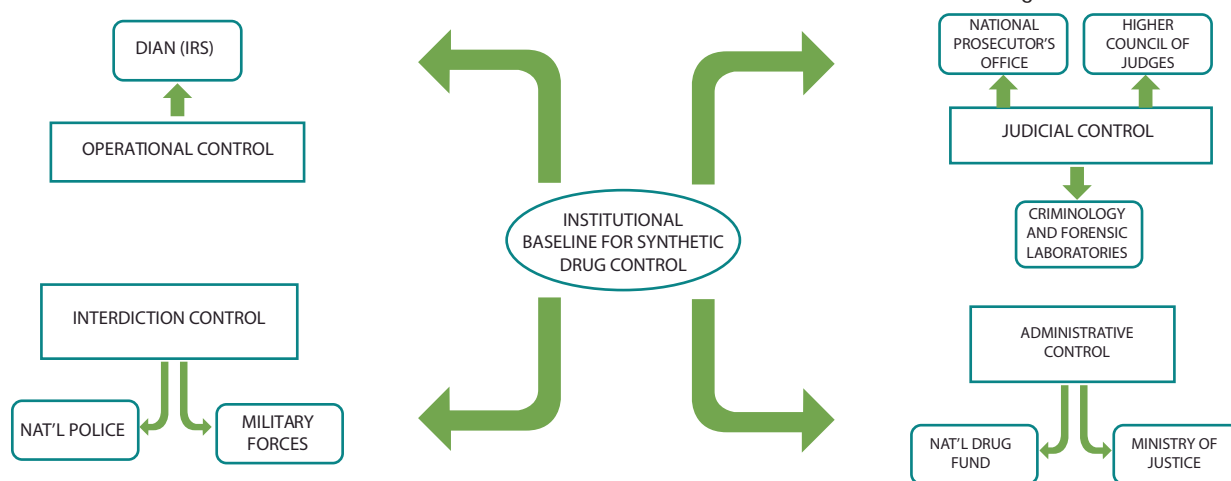


Figure 3. Chemical substances monitoring module

legal persons meet the standards set forth to ensure that chemical substances be used in lawful activities.

Colombia has signed commitments – some of them are binding in nature – with multilateral organisations such as the UN, the OAS and the INCB for the control of drugs, precursors and chemical substances used in illicit drug production⁵⁸. Administrative control of the chemical substances used in the country for producing of drugs of natural origin is performed by the Ministry of Justice and Law, through the Sub-directorate of Control and Supervision of Chemical Substances and Narcotics – SFSQ (from its original Spanish language initials – Subdirección de Control y Fiscalización de Sustancias Químicas y Estupefacientes). This office authorises the use of chemical substances by means of a Certificate of Good Standing for No Reported Drug Trafficking Incidents - CCITE (from its original Spanish language initials – Certificado de Carencia de Informes por Tráfico de Estupefacientes)⁵⁹.

The COLOMBIAN SYSTEM FOR MONITORING CONTROLLED CHEMICAL SUBSTANCES provides technical information which aids in understanding the dynamics of chemical substances and precursors in the legal and illegal fields, through the following mechanisms:



CREATION OF A CHEMICAL SUBSTANCES MONITORING SYSTEM IN THE FRAMEWORK OF NATIONAL POLICIES

A website was designed and created in 2014 to provide information as to the different studies conducted over the last two years of research. This tool was developed

58. These commitments are agreed upon within the International Framework for Drug Control, as a set of conventions and agencies of the United Nations (UN) governing the control of psychoactive substances worldwide. These conventions have been signed by all member countries of the OAS, and include the Single Convention on Narcotic Drugs of 1961, as well as and the relevant amendment to the 1972 Protocol, the Convention on Psychotropic Substances of 1971 and the Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988.

59. Since the entry into force of Decree 2897 of August the 11th, 2011, it falls upon the Ministry of Justice and Law to issue this certificate. The CCITE attests to the absence of records duly substantiated of behaviors related to crimes of drug trafficking, use of figure heads, illicit enrichment and related offenses against the person or company to whom the management of controlled chemical substances is issued and Authorised, including quantities, places and qualities set out therein.

in a modular fashion, and it contains nine different outputs, as follows: 1) rationale for the control of chemical substances in Colombia and the world; 2) geography of chemical substances; 3) risk profiling of CCITE system users; 4) Study of trends in legal use of controlled chemical substances in Colombia; 5) Establishing a baseline on the status of national institutions in the field of synthetic drugs and emerging substances; 6) Trends of chemical substances controlled by CCITE – user companies, according to their corporate purpose; 7) Strengthening of processes for handling, storage and disposal of chemical substances and products in Colombia; 8) Safety sheets and cards with the physicochemical characteristics and potential hazards to humans and the environment for the controlled substances in the country; and 9) A manual for gathering information on chemical substances, drugs and clandestine laboratories. Each of these modules sheds light on the specific products and investigations associated with the particular topic.

In the future, agencies in charge of administrative, operational, interdiction and judicial control, will be able to access the information available in the module "Monitoring Controlled Chemical Substances in Colombia", via a web link. This is a valuable tool for the institutional mission of the various agencies.

CREATION OF EARLY WARNINGS AND DEVELOPMENT OF THE NECESSARY TOOLS TO EXERCISE TIMELY CONTROL OVER SYNTHETIC DRUGS AND EMERGING SUBSTANCES

Over the past five years, world drug reports have been warning about the steady increase in production and use of synthetic drugs, emerging substances and New Psychoactive Substances – NPS – which have already far exceeded the use of drugs of natural origin such as cocaine and heroin. The problem with these new drugs – at least in the national context –

lies in the lack of knowledge about their stages of the production, trafficking, use and control by government agencies. Producers have no assurance that what they get in clandestine laboratories is exactly what they were seeking to produce; in turn, individuals who sell – and those who use – these drugs do not know what substances they are handling in terms of chemical composition or quality (which determines toxicity).

This problem extends to other links related to the different types of control performed by different government agencies. The authorities conducting administrative, interdiction - related, operational and legal controls are faced with difficulties in addressing the problems related to drugs which do not have natural origins because – amongst other reasons – of their recent emergence in Colombia in the illicit substance scenario. The Ministry of Justice and Law has been all too aware of the threat posed by the emergence of synthetic drugs in Colombia, and has coordinated with UNODC (SIMCI) the development of a study to determine the needs for capacity building in order to address this new dimension of the drug problem in the country in a more appropriate manner.

As a general conclusion of this work, the Ministry of Justice and Law, and UNODC were able to determine that Colombian institutions have a considerable advantage over the new drug problem, insofar as to applying many of the strengths that have been implemented against drugs of natural origin for over the past thirty years.

CHARACTERISATION OF THE USE OF CONTROLLED CHEMICAL SUBSTANCES PER ECONOMIC ACTIVITY IN COLOMBIA

Analysis of the lawful use of controlled chemical substances per economic activity by the Ministry of Justice and Law aids in the identification of common features, as well as traceability of users of the Certificate of Good Standing for No Reported Drug Trafficking Incidents - CCITE (from its original Spanish language initials – Certificado de Carencia de Informes por Trafico de Estupefacientes). This study further contributes to strengthening the intervention strategies of the institutions that exercise administrative and operational controls. As an additional contribution, the results of this study can be used as input for the profiling of controlled



Figure 4. Scheme insitucional line basis for the control of synthetic drugs

The study was conducted with the participation of officials from all agencies directly engaged in illicit drug and chemical substance control activities, in different control areas, namely: administrative, operational, interdiction and judicial control. This effort has also included criminalistics and forensic authorities, so as to determine the institutional characteristics vis – à – vis the problem, both at the central and regional levels. In addition to determining needs to address the problem of new drugs more effectively, the methodology allowed to establish strategies that will be suggested to the institutions in order to strengthen their control processes.

substances to facilitate the monitoring of trends in lawful use, through gathering information on key variables that facilitate their comprehension.

In this regard, during 2014 we continued with the characterisation of the use of the 25 controlled chemical substances nationally, thereby adding their relationship with the different economic activities. Economic activity means a process or group of operations that combine resources (equipment, labour, materials, manufacturing techniques inter alia) in order to produce goods and services. An activity is also conceived as a process for

obtaining a homogeneous set of products. To this end, the following steps were developed: i) Definition of the methodology for capturing relevant information and the indicators subject to analysis; and ii) analysis of the variables per economic activity which impact the use of controlled chemical substances in Colombia.

The study universe consisted of all natural persons and legal users of controlled substances and chemicals nationwide. In this second phase of the study, the target population – defined in order to characterise CCITE users – consisted of individuals or companies with a single home office or with branches authorised to use controlled chemical substances during 2013.

One of the relevant conclusions is related to the low concentration of users – headquarters of controlled chemical substances in areas of high risk for drug production, especially in those areas where illicit crops are located. This could become a positive factor for minimising diversion thereof, as their presence in these regions could not be justified. Illicit drug producers recur to a host of mechanisms to gain access to chemical substances, amongst which are often employed, are; the diversion from the legal industry, contraband and illegal production of some of the substances.

Separately, the departments in which there have traditionally been illicit crops such as Nariño, Norte de Santander, Putumayo, Meta and Caqueta, account for less than 1% of users – headquarters who reported information. However, it is important to bear in mind the fact that Valle del Cauca accounts for 9% of users – headquarters that reported information and is located in a high risk region for the production of natural drugs, to the extent that this region could be more susceptible to diversion given its geographical proximity. The greatest loss of traceability in the use of chemicals is determined by the threshold of control thereof.

In Colombia – before January 2015 – it was possible to market some controlled chemical substances without major requirements, in amounts that could not exceed 5 kg and 5 litres for solids and liquids respectively. This is one of the main mechanisms for diversion, and consequently loss of traceability – of controlled chemical substances.

The study found that the economic activity which concentrates most users – headquarters is the trade of controlled chemical substances; this means that the highest percentage of CCITE users in the country is engaged in the distribution of chemical substances for different activities of production of goods and services, or for export purposes. From the point of view of controls, this behaviour would be an indicator of difficulty, as it

is precisely during the commercialisation process that traceability of the dynamics of the substances in the domestic market can be lost.

In the industrial sector, the economic activities which concentrate most users of controlled chemicals are: manufacture of soaps and detergents for cleaning and polishing; perfumes and toilet preparations (48%); manufacture of basic chemicals (14%); manufacture of paints, varnishes and similar coatings, printing ink and mastics (12%); manufacture of other chemicals (8%), other manufacturing processes (8%).

COMPREHENSIVE MONITORING OF CONTROL VARIABLES FOR CHEMICALS IN COLOMBIA - GEOGRAPHY OF CHEMICAL SUBSTANCES.

In 2012, the Ministry of Justice and Law together with UNODC began developing a tool to spatialise all activities – both legal and illegal – which are carried out with controlled chemical substances in the national territory. The following activities related to this product are highlighted during 2014:

a. Data collection manual for chemical substances, drugs and clandestine laboratories.

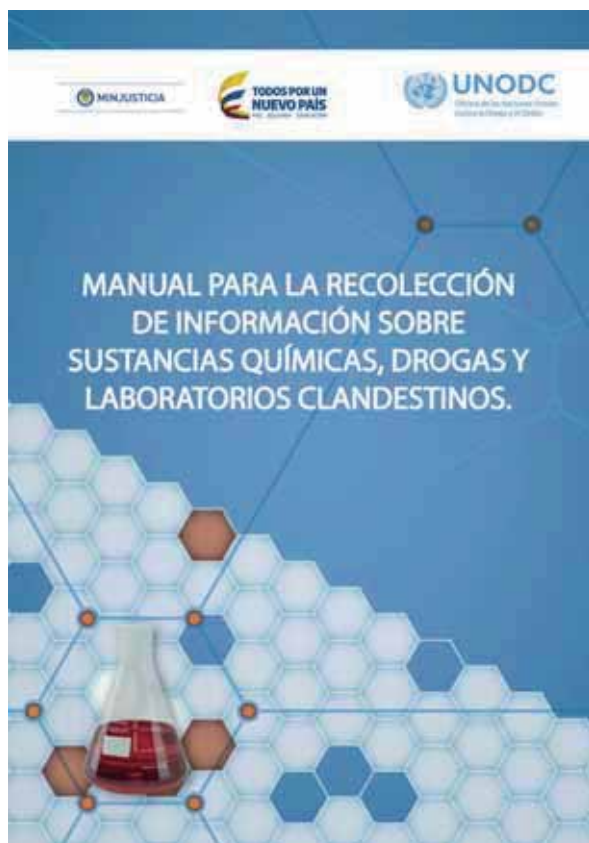
SIMCI project – in coordination with the Ministry of Justice and Law, and with the technical support of the PRELAC / EU Project, developed the Monitoring System of Chemical Substances and Precursors, which is characterised by ease of georeferentiation of the different activities – both legal as illegal which affect the dynamics of the use of chemical substances in the country.

In order to strengthen and complement this system, it has become necessary to readjust the databases that the different agencies of the country have contributed data to for several years, accounting for administrative, operational, interdiction and judicial tasks with regard to chemical substances controlled by the National Drug Board (CNE).

During the first phase of the project it was observed that many of the agencies which collect information lack methodologies that enable them to standardise concepts inherent in the management of chemical substance, thereby resulting in collection and management of information which was somewhat incomprehensible and unreliable. In most cases there are deficiencies in the proper management of descriptors, especially those related to physical quantities, the nomenclature of chemical substances, the dates whereupon the inspection was performed, and even information related to the place where the proceeding was

conducted. These limitations result in the need to train staff responsible for data collection, on technical issues related to management of physical quantities, synonymy of chemicals and characteristics of different types of laboratories, amongst other database management – related key issues.

For these and other reasons, it was deemed convenient and appropriate to prepare the DATA COLLECTION MANUAL FOR CHEMICAL SUBSTANCES, DRUGS AND CLANDESTINE LABORATORIES, for proper data collection in the field.



The document is divided into the following chapters: 1) Descriptors of the indicators used; 2) Physical quantities used; 3) Use of punctuation marks for the magnitudes reported; 4) Characterisation of the source which submits the information; 5) Immobilisation of chemical substances; 6) Dismantling of production infrastructure; 7) Reporting findings in a laboratory; 8) Information to be collected; and 9) Trafficking modalities.

b. Construction of indicators related to the issue of chemical substances for the Colombian Observatory on Drugs - COD.

The methodology utilised in order to develop the indicators sought to cover two topics agreed for publication in the COD; the first issue was related directly to the Geography of Chemical Substances module, which is implemented with a geographic viewer

and includes the following enquiries:

- Companies with valid licenses for the current month
- Distribution per nationally certified substance groups for 2013
- Seizures of chemical substances against coca crops in 2012

The second part of the exercise included the creation of an interface with a simplified display for some national indicators: this development was implemented at the COD – Reporting Section, which allows to display six different readings on the geographic system database. This application seeks to integrate reading and tracking mechanisms for controlled chemical substances in Colombia, but from a geographical approach to the phenomenon. The following elements make up the application:

- National chemical substance import indicator
- National chemical substance import indicator (frequency of imports per year and substance group).
- Number of companies with a valid CCITE for the reporting period.
- Number of seizures by units (kg or gal) against coca per department.
- Distribution in departments per substance groups with a CCITE for the reporting period.

DESIGN AND CONSTRUCTION OF CONTROLLED CHEMICAL SUBSTANCE REPORTS IN COLOMBIA TO BE INCORPORATED IN THE CHEMICAL SUBSTANCE GEOGRAPHY APPLICATION.

A reporting module was designed and built, including the following relevant elements:

I. Reports for the chemical substance import database in Colombia:

- Amount of the chemical substance (disaggregating each of the controlled chemical substances in Colombia) imported, quarterly and annually.
- Quantity of chemical substances imported by country of origin, source and purchase.

- Amount of chemical substances port of entry.
- FOB value
- Net weight per year
- CIF Value

II. Reports for CCITE user companies database

- Authorised amount of chemical substance per department.
- Number of authorised companies by municipality and department.

III. Reports for the chemical substance seizures database in Colombia (disaggregating each of the controlled substances in Colombia).

- Amount of chemical substances seized per department. The application generates information, listing geographic location and quantity of chemical substances seized. Between the years 2011-2013 information on seizures was reported amounting to over 62,000 tons of solids and over 8 million gallons of liquid substances. Graph 19 below shows the distribution of seizures per department; it can be observed that approximately 60% of the total amount seized in the country was achieved in the departments of Antioquia, Valle del Cauca and Meta. The information processed provides tools to control authorities at all levels, thereby allowing them to generate policies aimed at strengthening the fight against drugs.

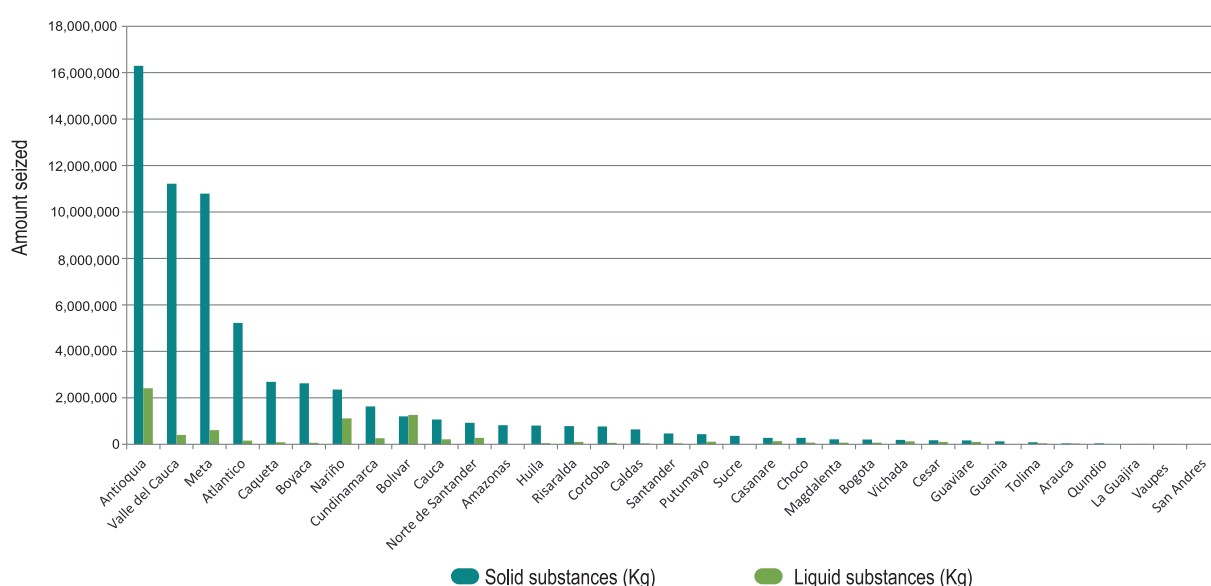
Amount of chemical substances seized by groups. Given the chemical and physical characteristics of the nationally controlled chemicals used in the preparation of drugs, and their importance in processes of transformation of drugs, the application is divided into 8 large groups. The report generates information related to the amount of substances seized by group and for the period between the years 2011 – 2013. Substances which fall under the “Others” category (cement, lime and urea) correspond to substances that have the highest amount measuring unit seized for the period. Graph 20 also indicates that the year 2013 has a record number of drug seizures.

The information collected and processed is an indicator for control authorities of the trends in matter of chemical substances in a given reporting period.

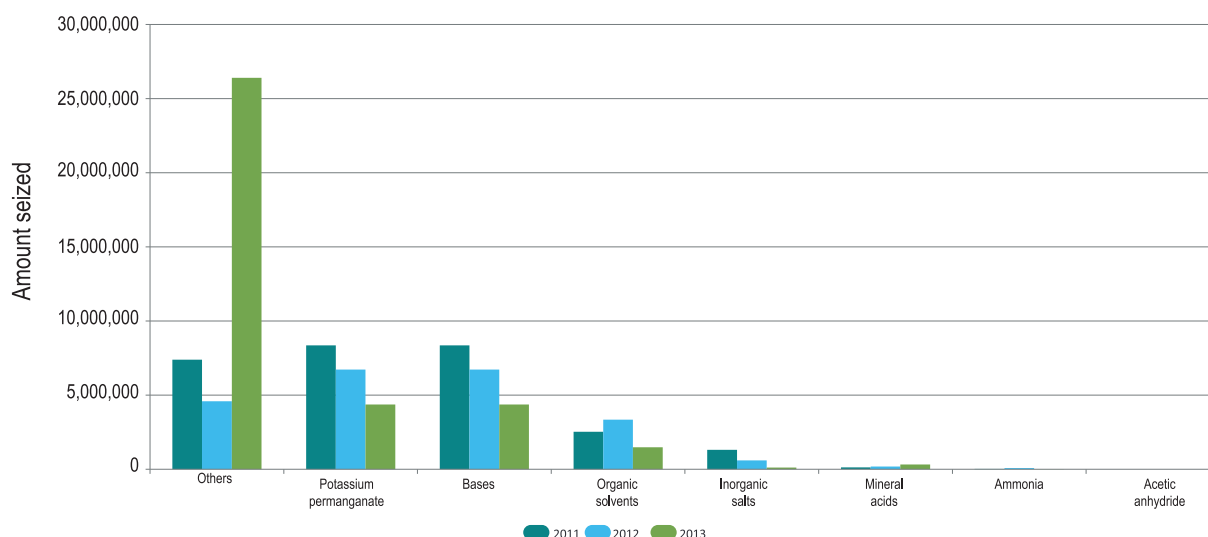
These reports were built with the structure of the databases in the application (2011-2012); however, reports will be automatically updated with the new information upon updating the databases.

The application allows to crosslink information amongst reporting databases; one of the main databases is imports vs. CCITE certificates.

A preliminary version of these reports was prepared in order to have a rendering of their potential layout in Excel, for further validation by the thematic cluster. These reports are currently being incorporated into the chemical substance geography application.



Graph 19. Amount of chemical substances seized (2011-2013)



Graph 20. Amount of chemical substances seized (2011-2013)

STRENGTHENING PROCEDURES FOR HANDLING, STORAGE AND DISPOSAL OF CONTROLLED CHEMICAL SUBSTANCES.

The development of this project contributed to strengthening the processes carried out by users for handling, storage and disposal of controlled chemical substances, products and precursors, by building technical documents (guides, brochures or instructional booklets) aimed at specific users in relation to the controls applied by their use in the production of natural and synthetic drugs.

In order to obtain an analysis of the current status, and identify needs related to best practices for storing chemicals, waste disposal, inspection visits by the controlling agency, and the principle of Common and Shared Responsibility of companies who sell, use or produce chemicals, this project seeks to strengthen the knowledge, habits and responsibilities inherent in these processes, both users and control authorities, regarding controlled chemical substances and products.

It was decided to implement a strategy focused on the development of two inter - complementary workshops, aiming to probe and discover the current behaviour of CCITE users in regards to the issue. The strategy also entailed dissemination of such information with controlling agencies, in order to suggest appropriate measures to meet the requirements of companies. The first workshop consisted of an approach to entrepreneurs from different cities, with an awareness campaign towards the implementation of best practices, technical standards and regulatory provisions currently in force for storage and disposal. Secondly, a Q & A session was held to share CCITE users' queries, comments and suggestions with regard to the topic.

a. Technical documents on issues related to storage, handling and proper disposal of controlled chemical substances and products, used in the production of natural and synthetic drugs

This document instructs, directs and contains the information the user needs for implementation purposes within the company, and thus comply with all the requirements for the application of best practices in storage of chemical substances and waste disposal.

The guide presents – firstly – a series of complete technical documents specifying and outlining the most appropriate procedures and conditions for the design, construction, operation and safety in storage and disposal of controlled chemical substances. A general compilation of regulations is presented, in terms of justice, labor, health and the environment as related to storage. The legal framework and requirements for applying for the CCITE are also indicated. The concept of common and shared responsibility is mentioned, as a key principle in the fight against drugs. Lastly, more specific and precise chemical storage topics are treated and there is an allusion to the importance and need for control and supervision.

Subsequently, an approach is made to safety and emergency issues during the storage process. A general compilation is presented in terms of legal, labour – related and environmental regulations related to the disposal of chemical waste. The treatments used for disposal of waste are included, and an exhibit is finally presented, which includes a list of regulations for chemicals and chemical precursors in Colombia.

A guide on warning labels and care to be taken: that includes the sentences labelled as hazard (H) and precautionary statements (P), is presented within the information of the project to strengthen processes for the

storage of substances and disposal of chemical waste. This guide features warning statements that anticipate the hazard level and care which must be exercised with chemicals.

b. Guide for socialisation of the principle of Common and Shared Responsibility, addressed to users of controlled substances and chemical substances who are CCITE permit holders.

The Ministry of Justice and Law, and UNODC envisioned the design of a booklet to allow users of controlled chemical substances in Colombia to more appropriately apply the principle of Common and Shared Responsibility – CSR. This booklet has been thought of as a most practical tool in the development and adequacy of control processes within the companies using controlled chemical substances.

Based on the provisions set forth in the CSR principle, controls on chemical substances frequently used in illicit drug production processes do not relate exclusively to state agencies, with the understanding that the latter's obligations determine the development of administrative, operational, interdiction – related and judicial control processes, but they also involve the private sector, the civil society, local communities and private individuals.

The Principle of Common and Shared Responsibility should be understood as the mutual commitment to pursue the common objectives of fighting the

worldwide drug problem, and related and ancillary activities. Hence, the principle determines the fulfilment of obligations both collectively and individually, thereby ensuring the proper use of chemical substances as one of the most important activities, under the premise that without chemical substances there are no drugs.

State agencies work permanently in the adoption of mechanisms to exercise increasingly appropriate controls, include the following as the most relevant ones: ongoing training for officials in charge of conducting inspection proceedings, adaptation of regulations to the ever changing dynamics, the acquisition of cutting edge technology in criminology and forensic fields, and conducting technical research so as to acquire better understanding of the problem. However, active participation of the private, chemical substance – user sector is of paramount importance for the control cycle to be complete, including their associations, employees thereof at different levels, and the civil society in general.

To sum, CSR vis-à-vis the drug problem is something that concerns all; the government on the one hand, must provide agencies with sufficient capacity to carry out proper controls; the entrepreneurial sector, because employers must be held accountable for the responsibility of ensuring that chemical substances be used for lawful processes, and society as a whole, to alert whenever the first or the latter breaches the commitments that concern them.

ALTERNATIVE DEVELOPMENT:

A STRATEGY TO TRANSFORM TERRITORIES

This chapter presents the evolution of both the concept and the interventions in alternative development implemented in Colombia. It includes factors of success / lessons learned, as well as some challenges that have been identified in its implementation. Similarly, this chapter shows the way international cooperation – including UNODC – has collaborated with government Alternative Development programmes implemented in the country.

Alternative Development in the country has sought to do away with the dependence on vulnerable rural populations about the economic dynamics generated by illicit crops, showing that this work needs community cohesion for the construction of a collective vision of development.

Besides being a complementary tool for the eradication of illicit crops, alternative development has contributed to the rural development in the country, focusing not only in households but also in the territory. Alternative Development programmes have also aided in forming and strengthening community organisations to promote agricultural production chains based on the peasant economy and business partnerships, seeking their sustainability.

EVOLUTION OF ALTERNATIVE DEVELOPMENT

According to the Political Declaration of the United Nations on the World Drug Problem (1998), Alternative Development is:

“A process to prevent and eliminate the illicit cultivation of plants containing narcotic and psychotropic substances, by adopting rural development measures expressly designed for that purpose. This is done within the context of national sustained economic growth and efforts to achieve sustainable development of the countries which are taking action against drugs, recognizing the particular sociocultural characteristics of the communities and target groups, and within the framework of a comprehensive and permanent solution to the problem of illicit drugs”.

Alternative Development as a concept and overall policy has evolved over the past three decades. Alternative Development began focusing on the substitution of illicit

crops with legal crops, and it is currently seen as a public policy that integrates the promotion of development to control the problem of illicit crops.

The government of Colombia, in partnership with international cooperation agencies, started actions in 1985 for crop substitution through a pilot project in the southern department of Cauca. This initiative was expanded in 1989 to the north of Nariño; other projects joined in, in the departments of Caqueta, Putumayo and Guaviare, in 1990.

The Alternative Development Programme (PDA – from its original Spanish language initials - Programa de Desarrollo Alternativo) was created in 1994 to contribute to the development of rural economy and indigenous areas affected by significant presence of illicit crops, through actions that allow to prevent the establishment of illicit crops and progressively reduce them, under the coordination of the National Rehabilitation Plan (PNR – from its original Spanish language initials - Plan Nacional de Rehabilitación) of the Colombian government.

Consistently, CONPES document No. 2799⁶⁰ in 1995 created the National Alternative Development Plan (PLANTE – from its original Spanish language initials - Plan Nacional de Desarrollo Alternativo), as a comprehensive part of the policy to counter the production and trafficking of narcotics, and as a social strategy of the government.

This programme included the components of food security, technical assistance, transitional employment, trade of surpluses, inter alia.

In 2003 the CONPES 3218 policy guidelines determined on Alternative Development Program -PDA-.

This document establishes the need for illegal crops to be previously – not gradually – eradicated by communities interested in benefiting from alternative development programmes.

As a result of this change in perspective, conditional delivery was implemented for economic incentives to families, so they can assure their subsistence until the production projects and food security mechanisms implemented begin to yield results.

In addition, this CONPES document recognizes the need to generate verifiable commitments between the Government and communities, particularly the need for areas to be kept free of illicit crops, as well as mechanisms to monitor them.

60. CONPES Documents are issued by the National Council for Economic and Social Policies (Consejo Nacional de Política Económica y Social) are strategic documents issued by the Colombian government outlining guides on economic management and social development for the country. This Council coordinates and guides agencies in charge of economic and social management in the Government, by means of the study and approval of documents related to the development of social policies which are presented in sessions.

Subsequently, CONPES document No. 3669 – 2010 coordinates Alternative Development with the National Territorial Consolidation and Reconstruction Policy (PNCRT– from its original Spanish language initials - Política Nacional de Consolidación y Reconstrucción Territorial), which seeks to establish conditions for prosperity and the exercise of fundamental rights.

The 2010 – 2014 Development Plan set the strategic direction of the PNCRT and established the cross – cutting foundations for democratic prosperity and regional development, seeking to bridge the gap of development indicators and existing regional integration between areas traditionally affected by illegality and areas not affected.

In 2011, Decree 4161 ruled on the creation of the Special Administrative Unit for Territorial Consolidation (UACT– from its original Spanish language initials - Unidad Administrativa Especial para la Consolidación Territorial). This agency was attached to the Department for Social Prosperity (DPS – from its original Spanish language initials - Departamento para la Prosperidad Social), and its objective was to “implement, execute and monitor the implementation of the National Policy for Territorial Consolidation, as well as to channel and coordinate differentiated institutional intervention in focalised consolidation regions and areas affected by illicit crops”⁶¹.

The UACT includes the Directorate of Programmes against Illicit Crops (DPCI – from its original Spanish language initials - Dirección de Programas contra Cultivos Ilícitos), which is tasked with the role of “coordinating institutional strategies and programmes against illicit crops, with the guidelines and principles of the National Territorial Consolidation and Reconstruction Policy”⁶².

This is the manner in which the Programme against Illicit Crops with the National Territorial Consolidation and Reconstruction Policy in order to strengthen the coordination of state efforts to sustainably ensure an atmosphere of security and peace in strategic areas of the country.

INTERNATIONAL COOPERATION AND ALTERNATIVE DEVELOPMENT IN COLOMBIA

Alternative Development is a global strategy. Both countries where drugs are produced and those affected by drug use have contributed to the promotion of alternative development programmes.

Alternative Development policies in Colombia have been led by the national government and have received support from different – both multilateral and bilateral – donor agencies, as well as the embassies of countries that consider that Alternative Development is the best way to address the problem of illicit crops.

As part of these joint efforts, UNODC has also been a strategic partner of the Colombian government in activities such as implementation, monitoring and evaluation of alternative development programmes deployed in the country, with the aim of generating income from lawful activities for peasant families. UNODC has a mandate in Colombia which has enabled the implementation of a system for monitoring, follow – up and evaluation to make informed decisions about territory – wide deployment of alternative development strategies. Similarly, UNODC has participated in implementing these strategies, supporting the Colombian government in improving policies aimed at reducing illicit crops in the country. These monitoring exercises aid in generating reliable statistical information that enables decision – making for redirection of the drug policy in the country.

CURRENT NATIONAL ALTERNATIVE DEVELOPMENT STRATEGY

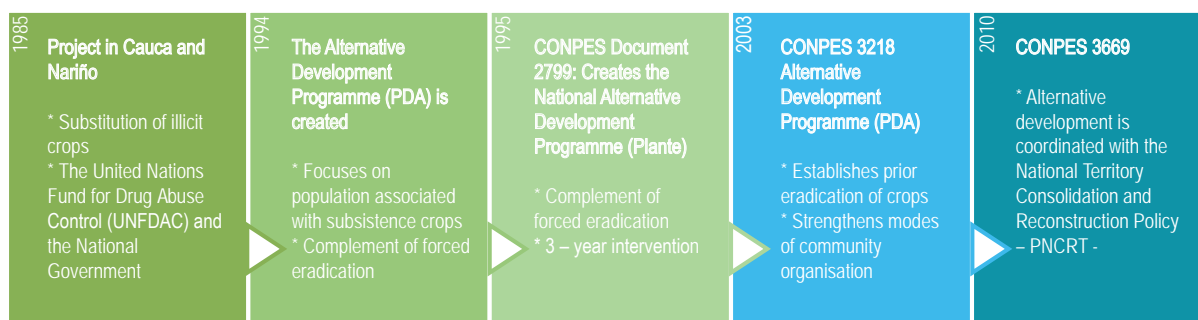
At present, the Consolidation Policy and Territorial Reconstruction - PNCRT- constitutes a proposal by the Colombian State that seeks concerted and sustained effort of local and national authorities, as well as the private sector and international cooperation, to transform the factors that have led to the vulnerability of the territories (among others) to the cultivation of illicit crops. The initiatives aim at promoting economic and social development, recognizing that a single instance, project or programme is not able to solve all the factors that have led to the expansion of these crops, and therefore a range of interventions is required in order to attain the consolidation of areas free of illicit crops.

The PNCRT is based on territorial security, and includes the strengthening of institutions in the territories in which it operates, thereby promoting participation, good governance and regional integration. Eradication of illicit crops (a voluntary duty) in these programmes is a prerequisite for the participation of communities.

In order to ensure compliance with the objectives of the Policy, the DPCI gathers government strategies and actions to support the restitution of the rights of communities that have presence, are vulnerable to, or are under the threat of, illicit crops. This is attained by coordinating eradication, post – eradication and

61. Resolution 00139 issued on the 27th of March, 2014

62. Resolution 00139 issued on the 27th of March, 2014



containment efforts, whilst preventing reseeding or expansion of such crops, and generating licit development alternatives.

The Programme Against Illicit Crops PCI (PCI – from its original Spanish language initials - Programa contra Cultivos Ilícitos) from the Special Administrative Unit for Territorial Consolidation has the general objective “of achieving and / or maintaining territories free of illicit crops, thus contributing to the consolidation of the territory”. To this effect, the following specific objectives have been established⁶³: 1) implement, execute and monitor the implementation of the National Policy for Territorial Consolidation, as well as to channel and coordinate differentiated institutional intervention in focalised consolidation regions and areas affected by illicit crops, 2) developing the Manual Forced Eradication Strategy and the Alternative Development Strategy 3) promoting voluntary manual eradication in communities affected by the presence of illicit crops, 4) promoting the participation of the National, Regional and Local Government, as well as the Community, in the execution of the Alternative Development Strategy, to avoid planting, replanting, persistence and expansion of illicit crops, and 5) implementing the institutional strategies against illicit crops of the National Policy on

Land Consolidation and Reconstruction in coordination with the competent institutions at the national, regional and local levels, promoting a culture of legality, the institutionalisation of the territory, community participation and good governance, and the integration of the territories with a focus on the nation's economic and social life.

Along the aforementioned lines of thought, the Post – Eradication and Containment Strategy was initially composed of the following elements: compliance with the law and promoting a culture of legality (eradication of illicit crops and environmental protection); transitional food assistance; food security; development of a productive initiative and delivery of seed capital; and comprehensive support in all these components. Actions derive from these items in the economic – productive, social and environmental fields⁶⁴.

The Post – Eradication and Containment Strategy in the current administration constitutes family care – oriented strategy in the territories which have been focalised and prioritized by the UACRT, known as “Forest Warden Families for Prosperity”⁶⁵. This model seeks to create conditions for the development of sustainable licit rural economies and contribute to the consolidation of the territories; involving and engaging families in developing good productive, environmental and social – organisational practices.

This model gives families the opportunity to access transitional food assistance, or opt for the implementation or strengthening of production units for Food Safety, implementing or strengthening a productive project, comprehensive support in order to gain support for the transition from illicit to licit economies, and participation in a communications strategy addressed to the communities.

The families which sign up for the Post – Eradication and Containment model – “Warden Families for Prosperity” are committed not to plant or replant illicit crops, attend and partake in the activities planned by the comprehensive support team, and comply with



63. Resolution 00139 issued on the 27th of March, 2014

64. Management DPCI against Illicit Crops Program. New Approach Against Illicit Crops Program-PCI. Version 1 (2012). p.20.

65. Management DPCI against Illicit Crops Program. ABC Model of post-eradication and containment: Warden Families for Prosperity. (2014). p. Four.

the obligations and responsibilities entered into by virtue of the Alternative Development Strategy; thus, beneficiaries access a payment that enables them – in the short term – to have a temporary income to pay for their basic needs.

implementation of good agricultural and environmental practices in the development of the productive activities promoted by the projects.

Scope of Alternative Development in Colombia	
Short and medium term	Long Term
<ul style="list-style-type: none"> Eradication of illicit crops Food security Generation of income Technical Assistance Promoting a culture of legality Creation and strengthening of organisations Accessing / formalizing lands 	<ul style="list-style-type: none"> Building trust among communities Embracing a culture of legality Building capacity of productive organisations (multipliers) Product marketing Environmental sustainability

Figure 5. Scope of Alternative Development in Colombia

As can be evidenced, Alternative Development has evolved through different conceptions and approaches in its implementation. Today, the purpose of Alternative Development in Colombia is not limited to the elimination of illicit crops. In addition to this work, Alternative Development seeks to assure economic development by focusing on the factors which drive the roots of illegal economies. The current Alternative Development approach provides valuable elements in eradicating poverty, by providing short – term food security and generating economic alternatives for long – term vulnerable populations. This strategy also contributes to environmental sustainability by promoting the

RESULTS AND LESSONS LEARNED FROM ALTERNATIVE DEVELOPMENT IN COLOMBIA

Alternative Development in the country has been implemented in stages, so that the work initiated with each of the families is subsequently retaken and strengthened by creating productive organisations to promote sustainability in projects. The creation and / or strengthening of producer organisations has had in impact on the improvement of the living conditions of beneficiary families, and has further strengthened both the social capital in communities and in rural areas of the country.

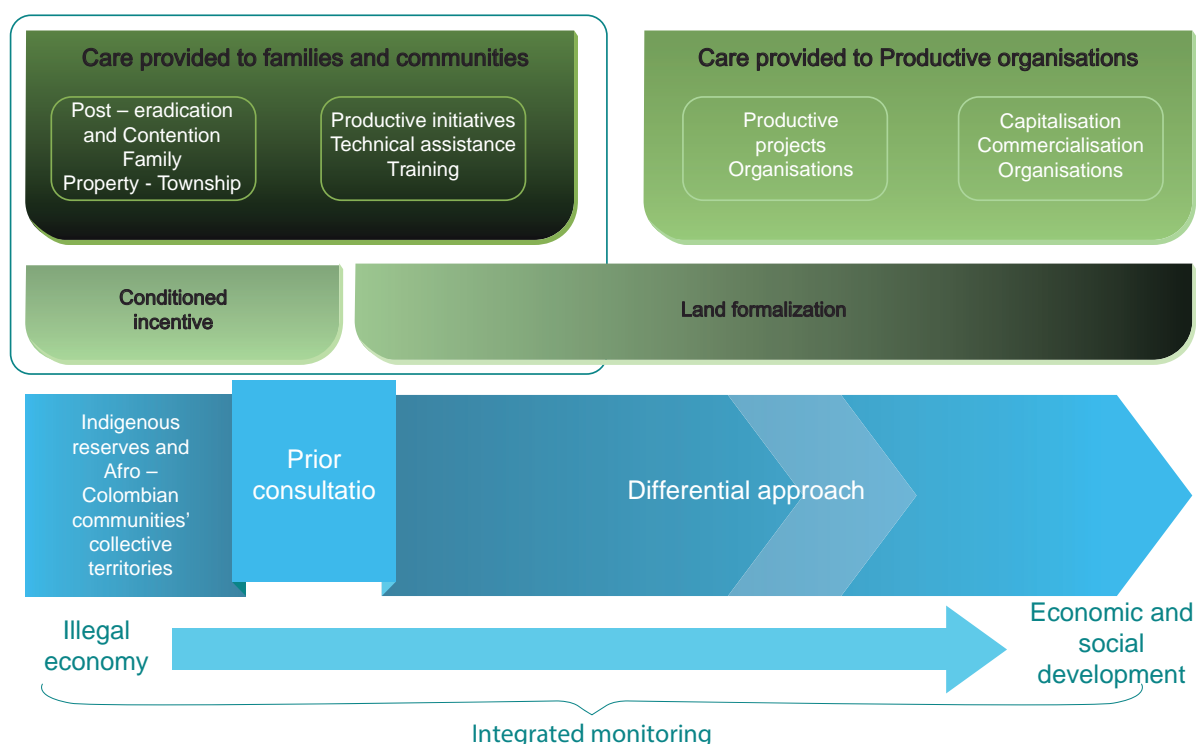


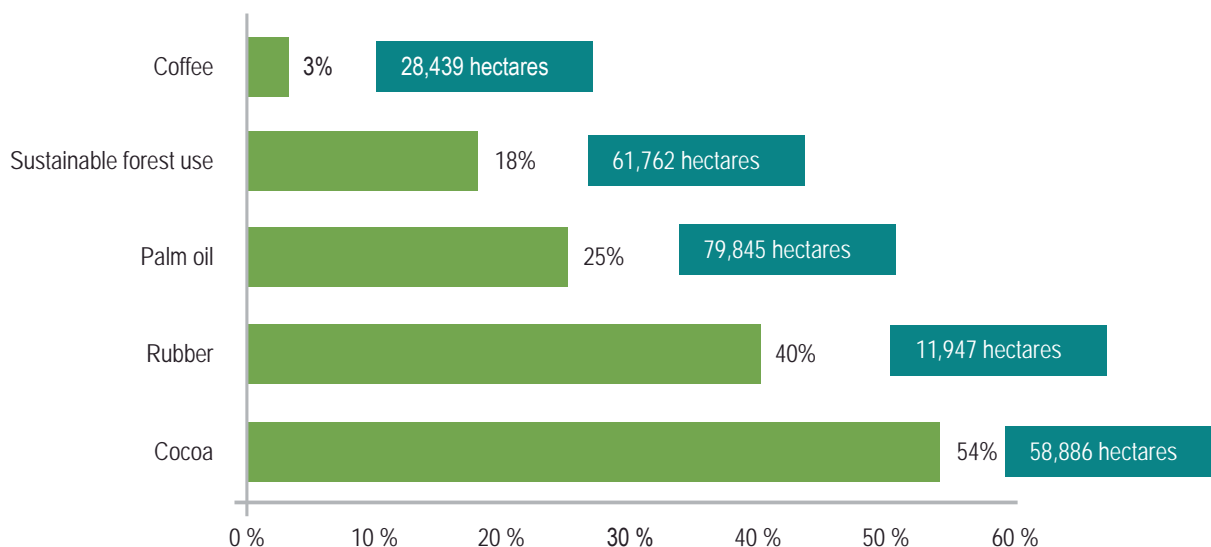
Figure 6. Integrated monitoring scheme Alternative Development

Alternative Development Implementation Stages in Colombia

Alternative Development is a voluntary strategy for vulnerable communities in the territories affected by illicit crops have access to the alternatives offered by the state. Therefore, its focus is not dependent solely on the threat by the presence of illicit crops, but also on the willingness of communities to agree on mechanisms to eradicate them. Similarly, the Alternative Development model in Colombia sets forth the preconditions to intervene in the territory. These preconditions are the

In spite of the aforementioned difficulties, and taking into account the Colombian experience of over a decade of monitoring integrated to Alternative Development, it is possible to identify a number of factors which contribute to successful implementation of this strategy, and which can be understood as lessons learned:

* Organisational strengthening and involvement in productive projects: one of the main strengths of the Alternative Development Programme is the creation and strengthening of producer organisations. This has resulted in the improvement of living conditions of the



Graph 21. Alternative development participation in the agricultural sector

Source: UACT

so-called “street lights”, i.e. minimum directions to avoid security risks for the communities, and guarantee the successful completion of the production project.

Resolution 0393 / 2013 provides that, in order to have an overview the focalised territories vis – à – vis the National Policy on Land Consolidation and Reconstruction, it is necessary to address the peculiarities of each region to be intervened, including the social economic, environmental and security – related aspects.

Along these lines of thought, the particularities of each territory have posed some challenges and constraints in terms of focalisation, including the above – mentioned security conditions which do not allow the entry of Alternative Development Programmes, the presence of Forest Reserve Areas (Act 2/1959), which establish limitations for the development of agricultural activities, unwillingness of some families located in the areas focalised for intervention, and deficiencies in the physical infrastructure of municipalities (access roads and utility and social service coverage) which have a negative impact on sustainability of productive projects.

families involved, besides generating social capital in communities and the strengthening of legality in rural areas of the country. Another advantage of associative processes is joining marketing strategies that improve negotiation capacities for the communities’ products.

According to data supplied by the Colombian Government, productive projects supported by alternative development programmes have contributed greatly to agricultural development. For example, 54% of cocoa grown in Colombia has been established within the framework of this type programmes. Similarly, alternative development has contributed to the planting of 40% of the rubber crops in the country, and 25% of palm oil plantations. These projects have also favored highly developed sectors such as coffee, providing 28,439 hectares (corresponding to 3.2% of the national total).

Alternative development has also allowed communities to earn income in cases where it is not possible to grow traditional products, through sustainable use of forests. Alternative development programmes account for 61,762 ha of forest that have sustainable community management plans.

Montebravo: an example of partnership

A successful example of partnership is the MONTEBRAVO organisation, one of about 600 organisations supported and strengthened by alternative development programmes.

MONTEBRAVO consists of 10 associations in four municipalities in the Bajo Atrato and Uraba: Riosucio, Carmen del Darien, Unguia and Acandí. It consists of 1,969 peasant, Afro-Colombian and indigenous families, who have managed to overcome cultural differences to build a sustainable partnership.



Currently, they have a marketing agreement with the National Chocolate Company (Compañía Nacional de Chocolates) which enables them to shorten the chain of intermediaries between producers and the industrial sector. This strategy has allowed them to commercialise over 770 tonnes of dry cocoa.

* Differential approach and recognition of the particular conditions of the territories: the consideration of social, cultural and economic characteristics, as well as ethnic

and gender – related conditions of the population in each territory, thus leading to the implementation and strengthening of productive options appropriate to the diversity of the country. A clear example of this is the production of Kogi coffee at Sierra Nevada de Santa Marta.

Alternative development with indigenous communities: Kogi Coffee

Kogi Malayo Arhuaco indigenous reservation is part of the traditional territory of the Kogi indigenous population at Sierra Nevada de Santa Marta. Coffee production is carried out in a traditional way (according to indigenous cultural management customs) by 1,600 families distributed in the middle part of the northern slopes of the Sierra Nevada in the departments of La Guajira and Magdalena. Coffee is a major source of income for many families in the Kogi village. Coffee production occurs under the shadow of the forest, and in association with food crops; this promotes environmental conservation of the territory and the cultural conservation. In addition to this, Kogi people believe that coffee is a product that speaks, as coffee travels around the world and can bring a message of sustainable development.

At present, the Kogi population have grown 1,100 ha of wild coffee, typica and caturra varieties, producing 300 tonnes of parchment coffee a year between the months of October and January. Of these, 7 tonnes are transformed and packaged as roasted coffee, ground and grain coffee for “retail” sale; 40 tonnes are exported as green coffee to Cafe Imports (from the US) and Hulk Cafe (from Germany) – a container for each destination – the remnant is sold to distributors as parchment coffee. Current customers for Kogi coffee in the domestic market are: Carulla; they sell the coffee in 82 stores nationwide, and Alkosto, who sells Kogi coffee in five stores in Bogota.

* Comprehensive Support: the multidimensional process promoted by Alternative Development Programmes which includes technical assistance, support to organisations, training on issues of peaceful coexistence and promotion of legality. Comprehensive support has had a strong impact on building social fabric, promoting communication channels between communities and public and private institutions.



In Colombia – especially from the viewpoint of Alternative Development intervention in the form of Post – Eradication and containment, participation strategies are implemented with communities and the productive line to be applied in the property is defined jointly with beneficiaries. The construction of these instruments (called Participatory Rural Diagnosis – DRP) is currently an enabling requirement for ulterior selection and implementation of a productive initiative in focalised territories.

TECHNICAL ASSISTANCE

Between 2003 and 2013, alternative development programmes aided in training over 122,000 families in social - organisational issues, technical – productive topics and promoting the culture of legality. In addition, on – site technical assistance has been provided to improve agricultural processes and transformation of agricultural, livestock and forest products.

Within the framework of the current Post – Eradication and Containment strategy, there have been over 270,000 technical assistance visits to follow – up on the implementation of productive projects, as well as 9,000 training sessions through Farmer Field Schools (ECAs – from its original Spanish language initials - Escuelas de Campo para Agricultores). Additionally, over \$ 24 million has been allotted in investment for food security, transitional food assistance, and productive initiatives in lines such as cocoa, coffee, minor species, sugar cane and silvopastoral projects.

* Formalising land: actions focused on the processes of land acquisition and regularisation of property rights directly impact the culture of legality of communities which were formerly engaged in illicit crops. Formalisation of lands appertaining to beneficiaries of alternative development has been a result of interagency coordination among institutions which lead or promote Alternative Development, such as UACT and the Ministry of Justice and Law, with programmes that support land such as INCODER, the Ministry of Agriculture and local governments, inter alia.

* Commercialisation: In this stage it is sought to design and implement marketing and sales strategies to support Alternative Development organisations in opening business opportunities for their legal products in regional, national and international markets. In addition, support is provided to organisations in creating business relationships and partnerships that provide better conditions of income generation for associates and their families.

The focus of the business strategy is to identify market needs and empower the capacity of organisations to serve markets with quality and competitiveness, supported on training in sales techniques, marketing and logistics, continuous support in the negotiation process with customers and participation in fairs and regional, national and / or international – level business. Suitability of the product with image development, packaging, brand, barcodes and certifications, plays a major role when managing opportunities in different distribution channels such as supermarkets, the food industry and the sector of Hotels, Restaurants and Cafes - HORECA, among others. The latter have shown a 122% increase in the number of business partnerships in the last year, as compared to the previous period.

The marketing strategy of Alternative Development products, promoted by the Government and supported by the commercial area of UNODC, has managed to open up new markets for coffee, cocoa and other products of Alternative Development in 2015.

COFFEE AND COCOA COMMERCIALISATION IN 2015

International commercialisation of cocoa and coffee produced by alternative development peasant organisations has generated economic benefits for farmers that exceed the profits (25 – fold) they would have earned by selling their products in the domestic market.



As a result of participation in a Macro Business Round organized by Procolombia, Alternative Development organisation Coagrobrisas created partnerships with Chimoto Coffee Co. Ltd., one of the biggest coffee roasters and retailers in Japan. In July 2015, Coagrobrisas exports 10 tonnes of green “Rainforest” coffee and 45 tonnes of “Regional” Coffee. In this same line of business, an agreement was signed for the sale of 325 tonnes of cocoa beans by Mision Chocolate organisation.

A total of 12.5 tonnes of fine cocoa and aroma cocoa have been exported in 2015. This cocoa is original from Arauca and the importing company is English – based Willie’s Cacao company. This export was the first by the organisation and is the result of efforts which began in the International Fair Salon du Chocolat in Paris, in October 2013.

Alternative Development programmes in Colombia have left successful results such as those discussed above, and have also identified some lines that can be strengthened to enhance its implementation. Along the aforementioned lines of thought, below are some aspects to be considered in future interventions, which have been identified by the Independent Evaluation to the Alternative Development Programme in Colombia⁶⁶.

* In order to achieve a sustained reduction of illicit crops, it is necessary to have effective State presence in the affected areas. Similarly, it is necessary to establish institutional coordination channels, taking into account significant existing correlations between the presence of illicit crops and socio – demographic variables that characterise these territories.

* Youth Involvement: This aspect is considered quintessential in relation to generational change and the importance of ensuring that rural youth do remain in the country and continue to work with the agricultural tradition of their parents and grandparents.

* Long – term support: an organisation requires at least five years to start witnessing economic or social changes. In this regard, organisations supported by Alternative Development with less than 5 years of creation should have permanent presence in social, environmental, business – related and technical issues.

* Strengthening the stages of processing and commercialisation of the products grown by associations supported by Alternative Development Programmes, in order to improve competitiveness and recognition in national and international markets for products that have contributed against illicit crops.

* To foster savings of a part of the conditioned incentives provided by the programmes, to be subsequently invested in collective projects that involve and benefit those who have common productive lines at the local and regional level.

* Incorporate an environmental management system with a focus on conservation of natural protected areas wherein there is high biodiversity.

66. UNODC. Independent Evaluation of the Alternative Development Programme in Colombia. November, 2014.

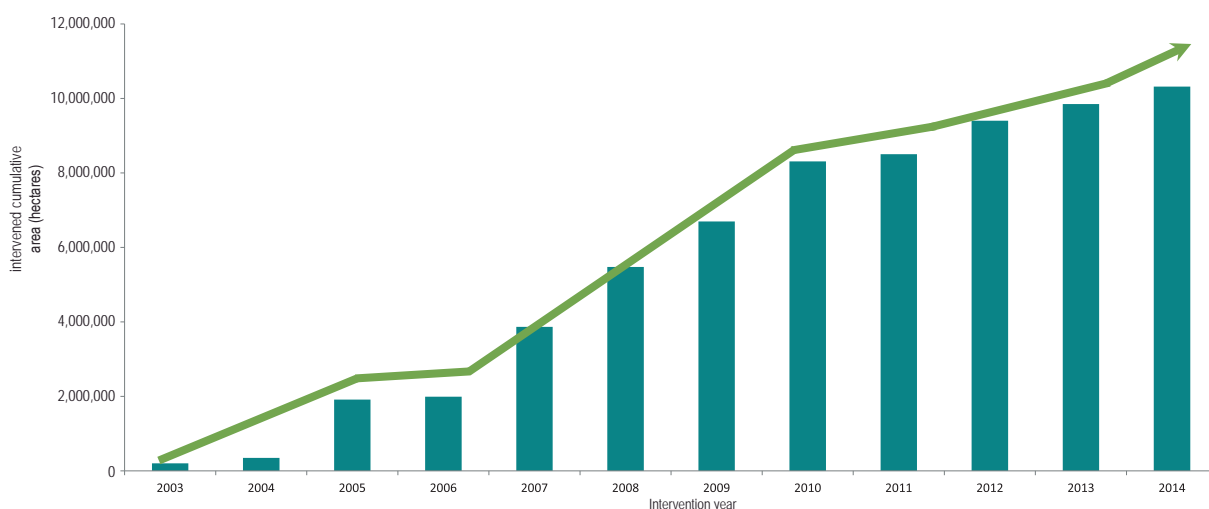
COVERAGE OF ALTERNATIVE DEVELOPMENT IN COLOMBIA

As mentioned in the previous section, in recent years (2003-2014) the Colombian State's alternative development policy has had interventions in the various regions of the country which are threatened, or which are vulnerable by the presence of illegal crops.

The following map shows the wide geographical distribution of the different intervention programmes on territories: Forest Warden Family Programs (2003 – 2013), the Productive Projects Programme, which includes strengthening rural associations (2007 – 2014)

and the Post – Eradication Programme and containment (2012 – 2014). In terms of area, it is estimated that the intervention has reached – over the last decade – ca. 10 million hectares, equivalent to 9% of the national territory, including 362 municipalities and approximately 8,000 townships⁶⁷.

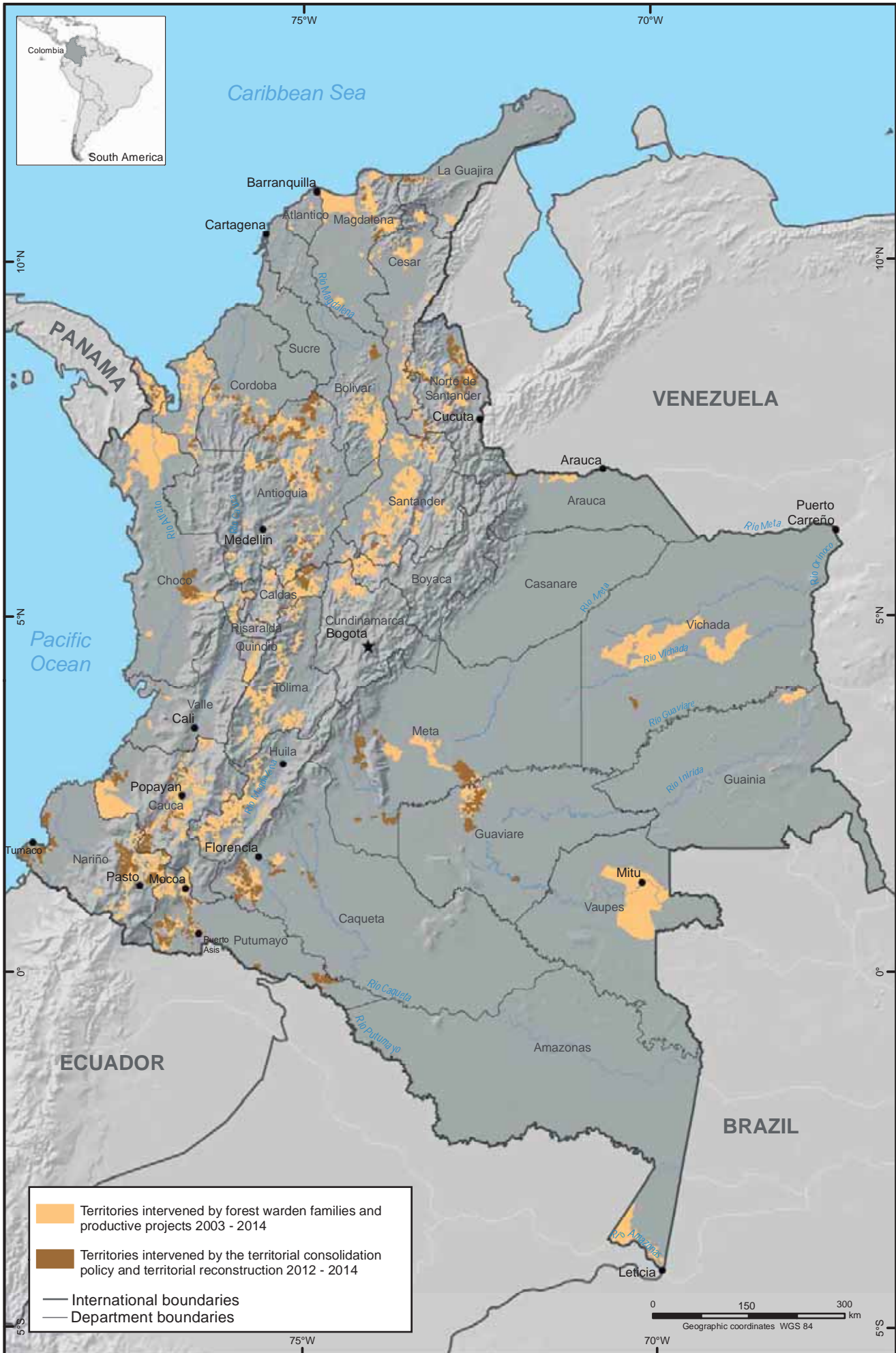
Graph 22 illustrates the progressive intervention implemented in the territory (ha) of the Alternative Development Programmes in the last decade.



Graph 22. Area operated by the Alternative Development 2003 - 2014

67. Further information can be found in the "Executive Summary of the National Meeting on Alternative Development – 2013" <http://www.unodc.org/colombia>

Map 17. Alternative development intervention in Colombia 2003 - 2014



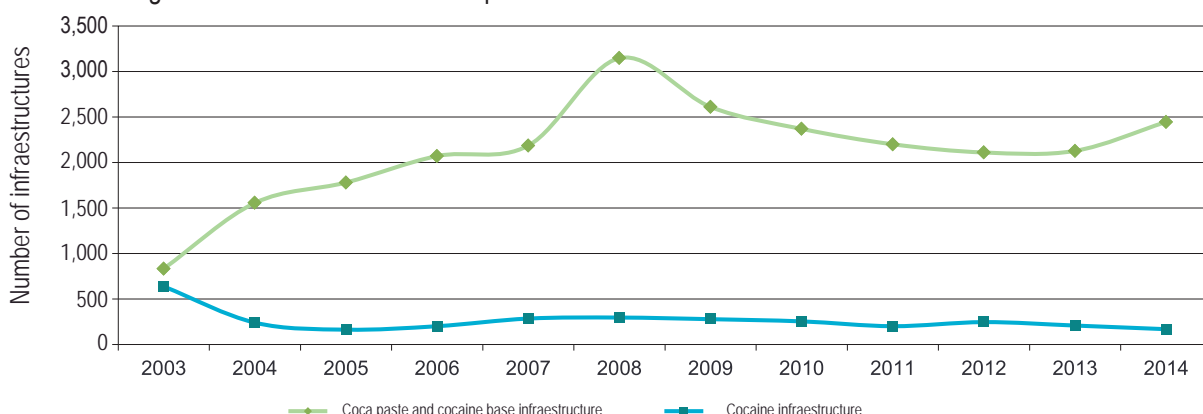
Sources: Colombian Government; National coca cultivation monitoring system supported by UNODC; PCI monitoring system for manual eradication areas.
The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

PRODUCTION INFRASTRUCTURE AND DRUG SEIZURES

UNODC does not participate in the processes of collection, consolidation and validation of information related to the interdiction processes wherein the infrastructure of production is dismantled and drugs and chemicals are seized. However, this report includes the results obtained in 2014 from interdiction processes light of their importance for the analysis of the illicit drug business dynamics.

Illicit drug seizure in Colombia, as well as the detection and dismantling of the infrastructure for their production, are processes which are conducted by the government through operations carried out by the interdictory control agencies. The Colombian Observatory on Drugs – COD, managed by the Ministry of Justice and Law⁶⁸ is responsible for consolidating and reporting the official information.

It must be taken into account that primary data collection is performed by the operating personnel involved in the interdiction proceedings related to production (dismantling drug labs and chemicals), drug trafficking and trafficking of chemical substances and precursors



Graph 23. Manufacture infrastructure destroyed by Public Forces within Colombia, for the extracation and refinement of cocaine from 2003-2014(p)

Source: Colombian Observatory on Drugs, Ministry of Justice and Law

Note:

(p) preliminary and subject to change by the generating source of the data figures may be modified during the year.

(deviation, smuggling and handicraft production). For this reason, it is necessary to carry out staff training processes so that the quality of the information collected in the field is ensured, especially in relation to the descriptors of physical quantities, identification of substances and place of seizure (georeferentiation), amongst other essential elements.

Destruction of the infrastructure for illicit drug extraction and production and chemicals increased by 12% in 2014 as compared to the previous year. The Colombian authorities conducted 2,451 operations, wherein a total of 2,624 infrastructures were destroyed, distributed as follows: 2,446 laboratories for extraction of coca paste and cocaine base, 168 cocaine hydrochloride labs, 1 heroin laboratory and 9 laboratories for the production of potassium permanganate. No dismantling of marijuana greenhouses is reported in this reporting period.

The dismantling of coca paste and cocaine base laboratories was concentrated at a 75% in the departments of Norte de Santander (25%), Antioquia (16%), Nariño (12%), Cauca (7%), Guaviare (6%), Putumayo (5%) and Meta (5%). Upon analysing the historical behaviour of the dismantling of these facilities, it is observed that their location tends to be associated with crop areas and the production of coca leaf. This leads to establish a direct geographical relationship as it would minimize risks related to these activities (as in the case of transport), even in the scenario where the Agricultural Producer with Coca sells the leafs. A 15%

increase is observed with regard to the previous year in dismantled primary production infrastructure, with large increases (over 90%) in the departments of Norte de Santander, Antioquia and Guaviare.

As for cocaine hydrochloride production laboratories, most of the “cristalizaderos” – crystallisation laboratories dismantled were located in the departments of Cauca (29%), Nariño (15%), Norte de Santander (13%) and Antioquia (10%), i.e. departments with a national border or with an outlet to the Caribbean Sea. In the case of Cauca, this department has access to the Pacific

68. Statistical information with regard to seizures and dismantled infrastructure can be found in further detail on the website of the Colombian Observatory on Drugs, at www.odc.gov.co. The information in this chapter was updated as of June 11, 2015, corresponds to the variables available as of the aforesaid date and are subject to updates by the source. 2013 data were validated and adjusted by the Ministry of National Defense.

Ocean; Nariño does too and it additionally has a border with Ecuador. Norte de Santander has a border with Venezuela, and Antioquia has an outlet to the Caribbean Sea. Given the clandestine nature of the production and trafficking of hydrochloride, it is difficult to determine accurate laboratory locations; hence, detection of this type of infrastructure is possible thanks to military intelligence tasks deployed, which include payment of informants.

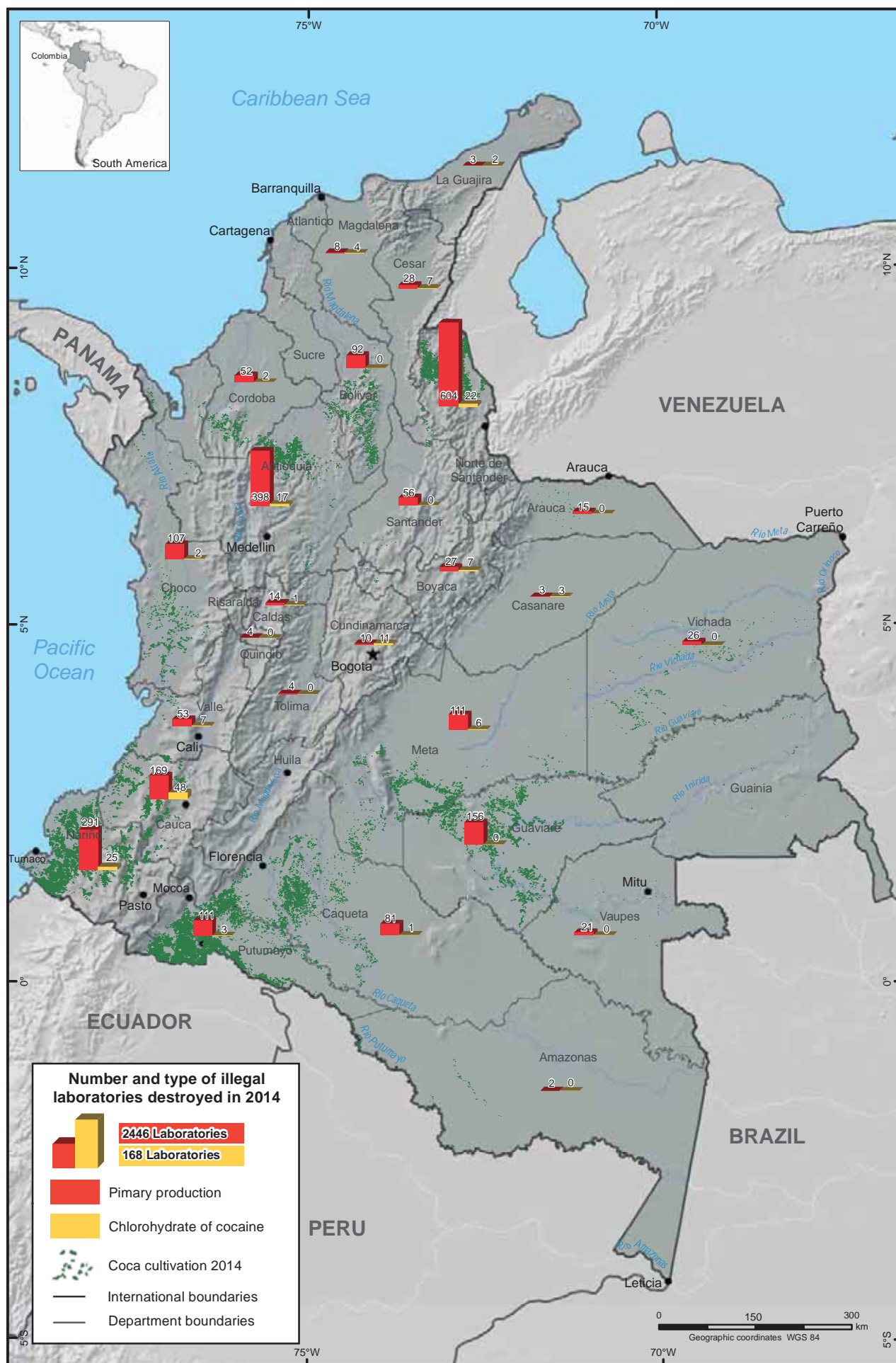
It is worth mentioning that the average of recent years in the number of dismantled infrastructure for primary production (extraction of coca paste and cocaine base) is higher than the average of infrastructure for crystallisation of cocaine hydrochloride or other substances, insofar as the latter are quite difficult to

detect. This type of infrastructure involves considerable financial costs for implementation, coordination with armed opposition groups who approve their operation and guarantee their security, amongst other reasons.

It should be noted that, in accordance with studies conducted by UNODC⁶⁹, it has been found that laboratories for processing cocaine hydrochloride have reduced their production capacity by 50% and 75%, and have turned to structures which are easily assembled so as to allow high mobility. As for location, these structures have been detected at places nearby urban areas or cities.

69. Within the framework of the Characterization of the transformation process from coca leaf into cocaine hydrochloride in Colombia, as led by UNODC - SIMCI and PRELAC projects, supported by the European Union and the Government of Colombia.

Map 18. Destruction of clandestine laboratories and coca cultivation in Colombia, 2014



Sources: Colombian Government; National coca cultivation monitoring system supported by UNODC, DNE for destruction of illegal laboratories. The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

SEIZURES

Drug seizures are an effort undertaken by the Colombian government agencies to reduce supply in the market. According to figures reported by the Colombian Observatory on Drugs, the number of seizures made by the police increased by 50% in 2014, as it rose 35,599 cases in 2013 to 53,246 cases in 2014. Said increase is distributed thus: 59% coca leaf seizure operations, 55% cocaine paste/base and 41% for cocaine hydrochloride. These operations resulted in the seizure of 531 metric tons (mt) of coca leaf, 41 mt of cocaine paste/base and 123 mt of cocaine⁷⁰.

In 2014, and as a result of a 59% increase in interdiction operations, the amount of coca leaf seized increased by 65% over the previous year. These seizures were concentrated in the departments of Norte de Santander (24%), Antioquia (15%), Nariño (12%) and Cauca (12%). Growers tend to sell coca leaf to intermediaries in regions, to a lesser extent there were seizures in the following departments: Valle del Cauca (8%), Guaviare (8%), Meta (5%) and Putumayo (4%).

A direct relationship is observed upon making a comparison between the number of operations and the amount of coca leaf seized. In Norte de Santander,

Drug	Unit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012 ¹	2013	2014 ^(p)
Coca Leaves	kg	688,691	567,638	682,010	818,544	1,064,503	644,353	826,793	871,249	1,022,532	718,992	314,788	531,016
Cocaine Paste / Base	kg	29,471	38,264	109,142	48,159	34,804	54,664	53,034	50,090	54,293	55,010	51,595	40,890
Cocaine Hydrochloride	kg	113,142	149,297	173,265	127,326	126,641	198,366	203,166	164,808	155,832	188,021	165,569	166,355
Opium Latex	kg	27	57	1,632	118	125	172	49	2	193	0	1	1
Heroin	kg	629	763	745	442	537	646	728	337	299	464	403	349
Marihuana	kg	108,942	151,163	150,795	93,745	142,684	254,685	206,811	254,991	348,082	348,472	410,331	302,669
Synthetic Drugs	Tablets	5,042	19,494	148,724	7,888	1,968,857	5,597	132,987	26,299	22,809	56,961	121,151	40,086

Table 30. Volume of illicit drug seizures 2003-2014

Source: Colombian Observatory on Drugs - Ministry of Justice and Law.

¹ Cocaine hydrochloride seizure data in 2012 includes 34.7 mt related to international operations performed in collaboration with the Colombian law enforcement agencies.

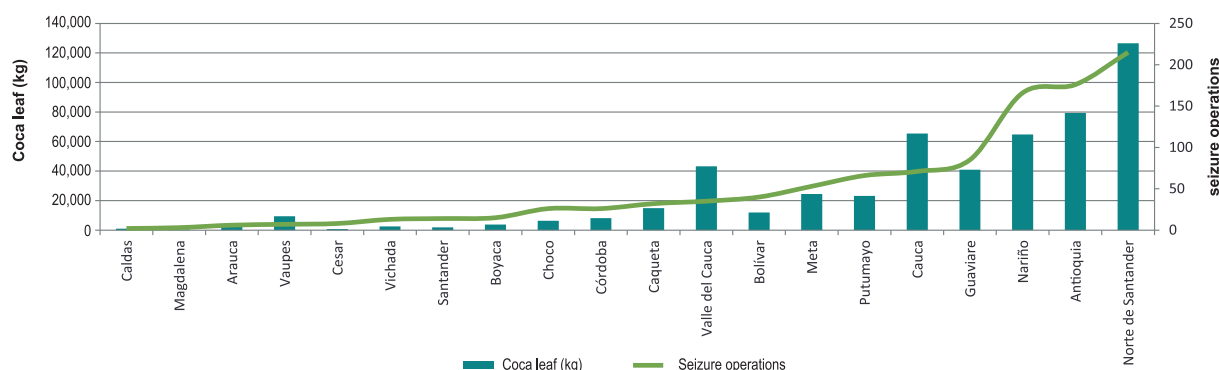
² Cocaine hydrochloride seizure data in 2013 includes 35.8 mt related to international operations performed in collaboration with the Colombian law enforcement agencies as there are no validated tests to characterize them separately. There may even be intermediate products subject to partial oxidation. Therefore, they are added as a single drug called cocaine base / paste.

Technical Notes:

(p) Preliminary data - subject to changes by the data source during the year.

Despite the increase in interdiction proceedings, there has been a reduction in the volume of illicit drug seizures as compared to 2013, except for coca leaf. The volume of cocaine paste/base seizures decreased by 31%, and for cocaine was stable.

Antioquia and Nariño – where over 50% of the operations are concentrated – the amount seized is equivalent to 51% of the total; there is a higher rate of effectiveness in the departments of Vaupes, Valle del Cauca and Cauca,



Graph 24. Seizures of coca leaf per number of operations conducted¹ in 2014^(p)

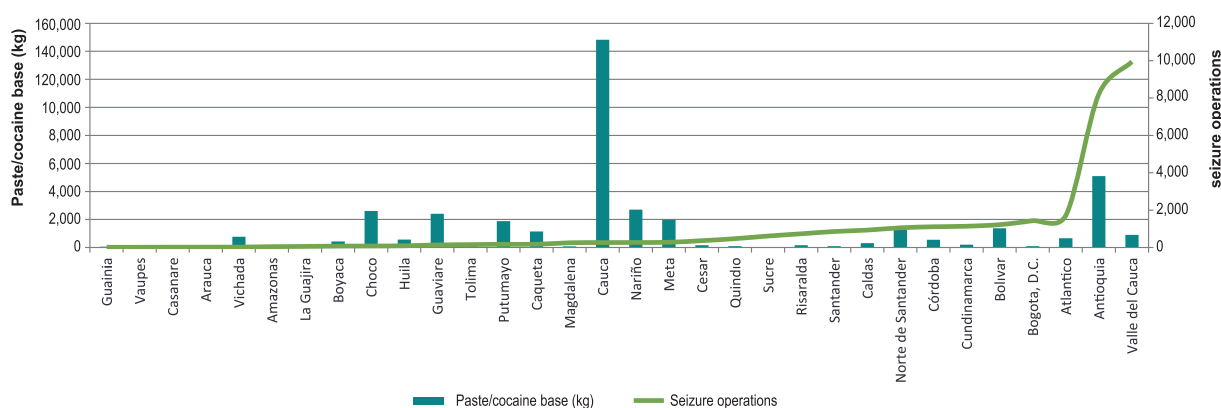
Source: Colombian Observatory on Drugs, Ministry of Justice and Law.

¹ Information taken from the records reported to the Colombian Observatory on Drugs.

Technical Notes:

(p) Preliminary data - subject to changes by the data source during the year.

70. It is worth mentioning that the purity and chemical characteristics of the seized drugs reported are unknown.



Graph 25. Cocaine paste / base seizures per number of operations conducted¹ in 2014^(p)

Source: Colombian Observatory on Drugs, Ministry of Justice and Law.

¹ Information taken from the records reported to the Colombian Observatory on Drugs.

Technical Notes:

^(p) Preliminary data - subject to changes by the data source during the year.

where the percentage of operations is equivalent to 11% and the volume of seizures represents 22% of the total coca leaf.

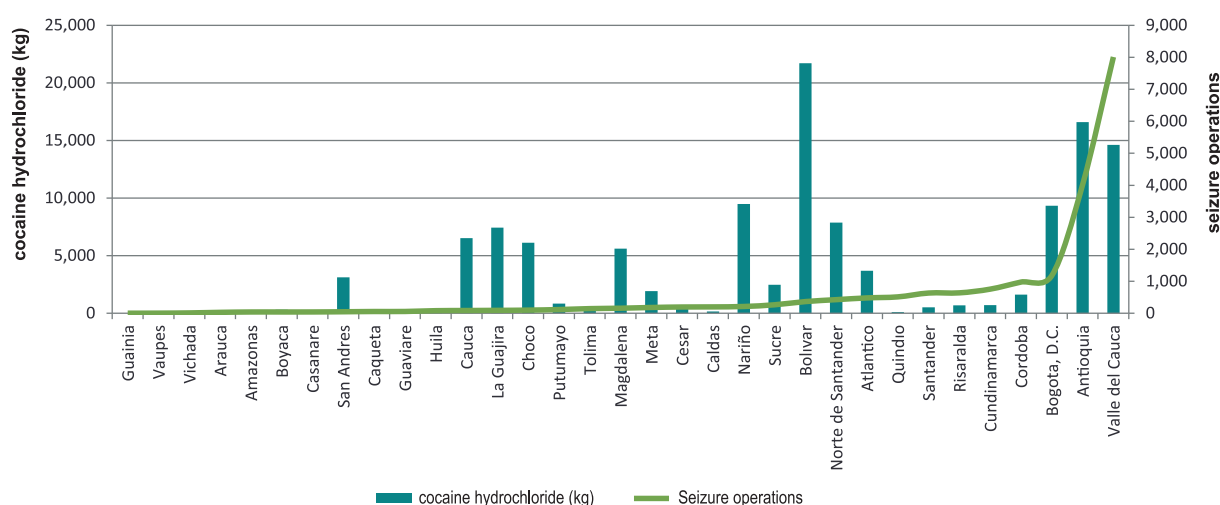
The departments of Antioquia and Valle del Cauca had a 57% concentration of operations, thereby resulting in 15% of the cocaine paste/base seized.

In spite of the fact that the number of seizure operations increased by 55% in 2014, the amount of cocaine paste/base seized decreased by 21% as compared to 2013, dropping from 51 mt to 41 mt in 2014. These seizures were conducted chiefly in the departments of Cauca (36%), Antioquia (12%), Nariño (7%), Choco (6%), Guaviare (6%), Meta (5%) and Putumayo (4%).

The foregoing can be an indicator of the concentration of refining processes in the Pacific Region, this could also explain the growing trend towards international traffic of cocaine paste/base to be transformed in transit countries, especially in Central America.

When comparing the number of operations carried out by the law enforcement agencies to the amounts of cocaine paste / base seized, a higher rate of effectiveness can be observed in seizures carried out in Cauca, Choco and Vichada, where the percentage of operations is 1% and seizures account for 44% of cocaine paste/base seized in 2014.

With regard to cocaine hydrochloride seizures, interdiction operations increased by 41% over 2013, hydrochloride seized volume has increased only 0.5%, from 165 mt in 2013-166 mt in 2014. Cocaine hydrochloride seizures were chiefly in the departments of Bolívar (18%), Antioquia (14%), Valle del Cauca (12%), Nariño (8%) and Bogotá (8%). The purity of the drugs seized is unknown, as the Colombian law



Graph 26. Seizures of cocaine hydrochloride per number of operations conducted¹ in 2014^(p)

Source: Colombian Observatory on Drugs, Ministry of Justice and Law.

¹ Information taken from the records reported to the Colombian Observatory on Drugs.

Technical Notes:

^(p) Preliminary data - subject to changes by the data source during the year.

does not weigh this factor in the determination of the sentence; this is why forensic laboratories do not report this variable.

Upon making a comparison between the number of operations and the amounts of cocaine hydrochloride seized, the behaviour of the Department of Bolivar is noteworthy, as only as low as 2% of the total operations

were performed there resulting in the largest amount of cocaine hydrochloride seized (18%) in 2014. Other significant seizures took place in Antioquia and Valle del Cauca, where 60% of all operations in 2014 concentrated, thus resulting in 25% of the cocaine hydrochloride seized.

Department	Coca leaf (kg)	Paste/cocaine base (kg)	Cocaine hydrochloride (kg)
Amazon		95	162
Antioquia	79,283	5,096	16,585
Arauca	2,475	26	31
Archipelago of San Andres, Providencia and Santa Catalina			3,118
Atlantico		664	3,688
Bogota, D.C.		96	9,342
Bolivar	11,879	1,380	21,696
Boyaca	3,720	434	301
Caldas	1,001	307	165
Caqueta	14,832	1,143	17
Casanare		2	107
Cauca	65,397	14,818	6,525
Cesar	691	171	484
Choco	6,315	2,606	6,125
Cordoba	8,047	549	1,613
Cundinamarca		208	718
Guainia		52	0
Guaviare	40,869	2,404	1
Huila		572	48
La Guajira		46	7,429
Magdalena	495	78	5,604
Meta	24,494	1,986	1,916
Nariño	64,715	2,703	9,482
Norte de Santander	126,560	1,270	7,864
Putumayo	23,185	1,882	839
Quindio		96	108
Risaralda		171	696
Santander	1,854	103	526
Sucre		11	2,476
Tolima		241	315
Valle del Cauca	43,266	910	14,626
Vaupes	9,437	7	0
Vichada	2,504	763	61
Total national	531,016	40,890	122,670
Others ¹			43,685
Total	531,016	40,890	166,355

Table 31. Volume of seizures of illicit drugs per type and department in 2014^(p)

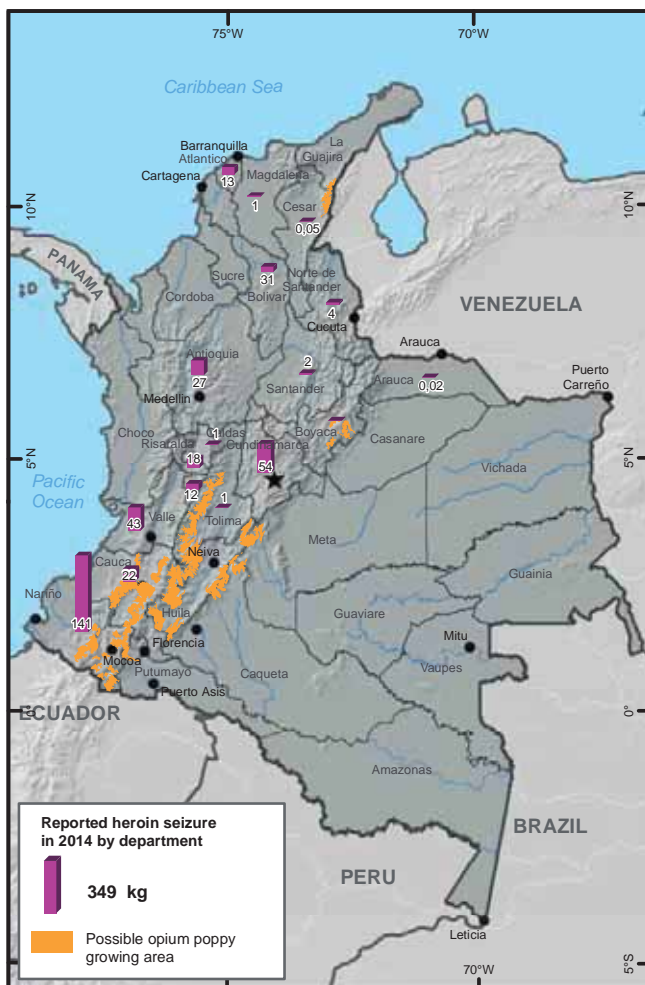
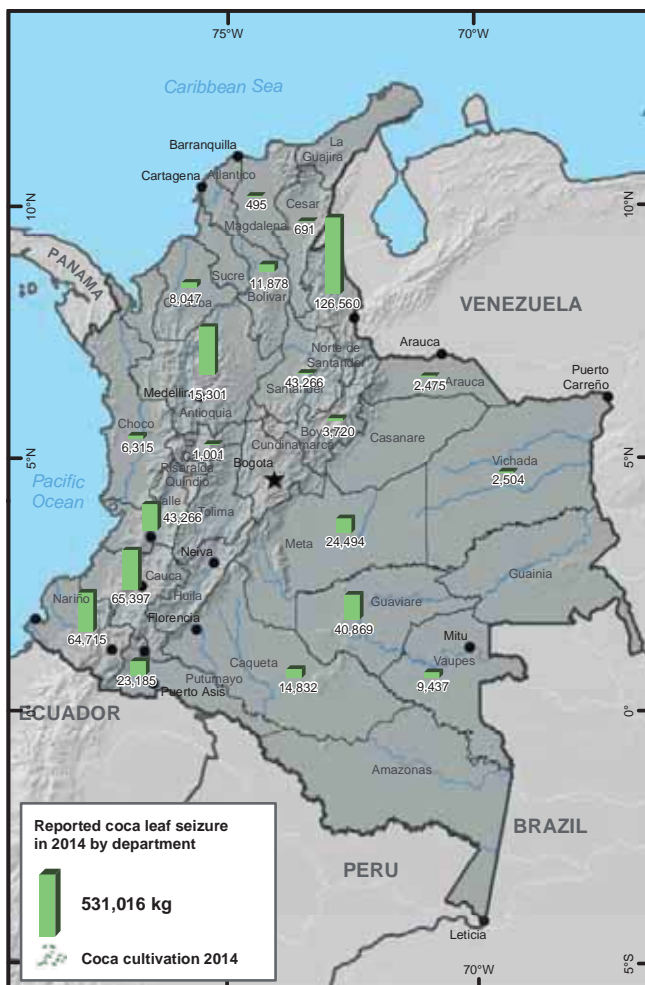
Source: Colombian Observatory on Drugs, Ministry of Justice and Law.

Technical Notes:

¹ Corresponds confiscations in international operations in collaboration with the Armed Forces of Colombia.

^(p) Preliminary figures and subject to change by the generating source of the data; they may be modified during the year.

Map 19. Drug seizures by department and by drug type, Colombia 2014



Sources: Colombian Government; National coca cultivation monitoring system supported by UNODC, for drug seizures: Colombia Drug Observatory DNE. The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

Department	Basuco (kg)	Heroine (kg)	Pressed marijuana (kg)	Latex (kg)	LSD ¹ (Unit)	Amphetamines ¹ (Unit)	Ecstasy ¹ (Unit)
Amazon	3		99				
Antioquia	417	27	32,991		8	524	3,612
Arauca	4	0	2,029			18	
Archipelago of San Andres, Providencia and Santa Catalina	0		2,229				380
Atlantico	104	13	2,113				5,268
Bogota, D.C.	455	54	9,127		14	2,398	1,082
Bolivar	31	10	483				552
Boyaca	9	0	874			140	366
Caldas	77	1	6,018		230	584	4,776
Caqueta	17		136				
Casanare	8		35				16
Cauca	172	22	30,419				14
Cesar	24	0	5,367				198
Choco	4		994				
Cordoba	41		702				
Cundinamarca	159	0	3,408				
Guainia	0		4				
Guaviare	2		44				
Huila	20		10,817				20
La Guajira	9		7,240				
Magdalena	21	1	32,129				2
Meta	23		14,409			94	424
Nariño	101	141	2,149				210
Norte de Santander	183	4	13,861			66	24
Putumayo	12		1,048				4
Quindio	43	12	6,469		24	10	42
Risaralda	124	18	12,024				4,608
Santander	59	2	3,467			950	62
Sucre	2		180		4		282
Tolima	68	1	6,956	1		220	26
Valle del Cauca	269	43	93,203		14	12,366	434
Vaupes	1		3				20
Vichada	19		456				
Total National	2,479	349	301,485	1	294	17,370	22,422
Others ²			1,184				
Total	2,479	349	302,669	1	294	17,370	22,422

Table 32. Seizures of other illicit drugs within Colombia according to type and department, 2014^(p)

Source: Colombian Observatory on Drugs, Ministry of Justice and Law.

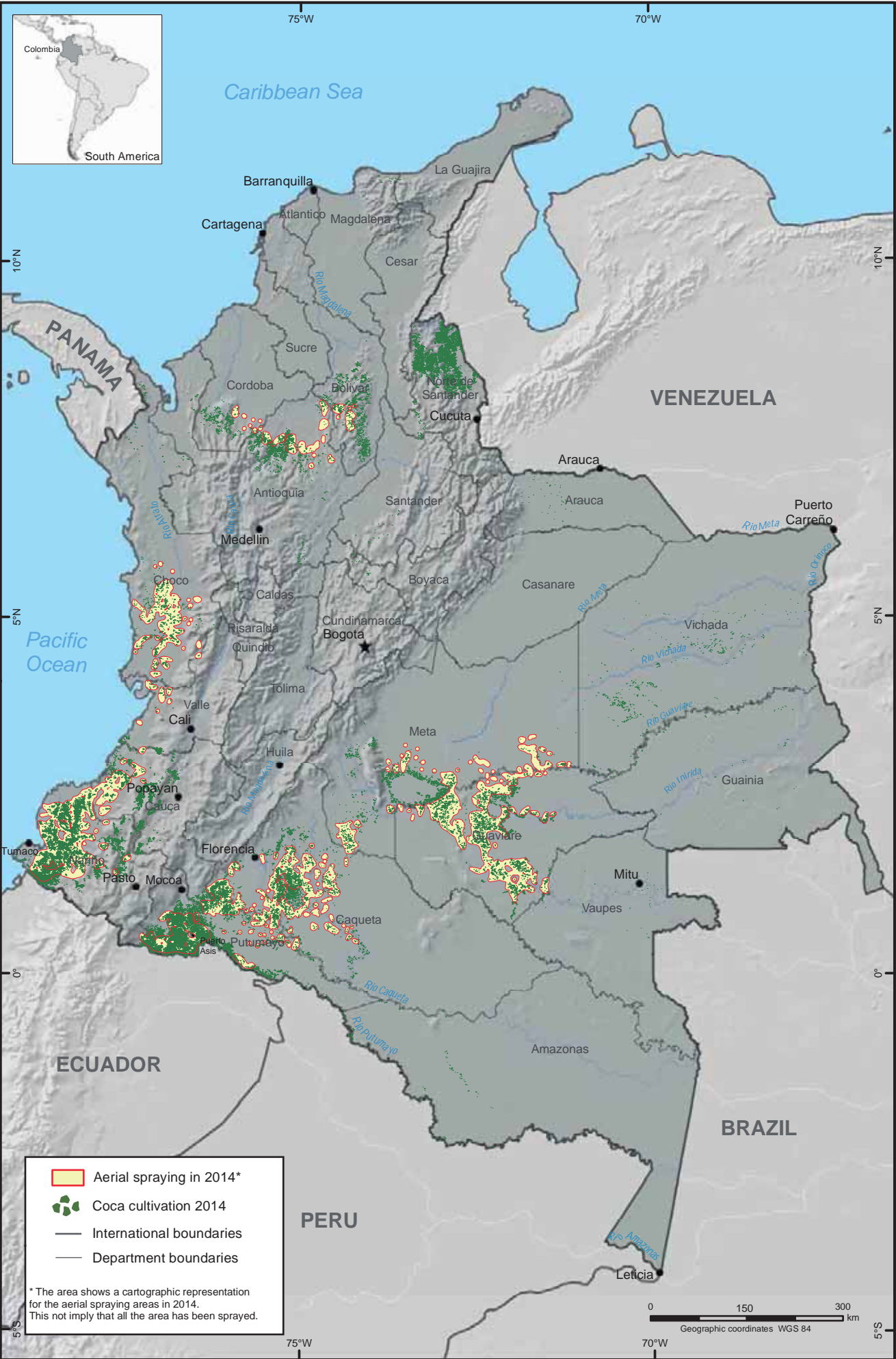
¹ Data refer to the name by which the substance is marketed, there are no laboratory tests to confirm their nature.

² Corresponds confiscations in international operations in collaboration with the Armed Forces of Colombia.

Note:

^(p) Preliminary figures and subject to change by the generating source of the data; they may be modified during the year.

Map 20. Aerial spraying and coca cultivation in Colombia, 2014



Sources: Colombian Government; National coca cultivation monitoring system supported by UNODC; DIRAN for aerial spraying. The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

AERIAL SPRAYING

By order of the National Drug Council (Consejo Nacional de Estupefacentes), the programme of aerial spraying is carried out by the National Police – Anti – Narcotics Directorate. Aspersions are carried out with a mixture of glyphosate herbicide active ingredient, one coadyuvant and water. The chemical mixture has systemic effect (is absorbed by the leaves and transported to the root). In 2014 the National Commission for Verification of Aspersions Operations (Comision de Verificacion Nacional de las Operaciones de Aspersión) estimated a rate of 84% of plant effective death per field. It is necessary to mention that UNODC does not participate in or supervise the aspersions activities. The information presented here is reported directly by the National Police - DIRAN.

the aspersions effort remained the same. And in Valle del Cauca, Bolívar and Córdoba significant decreases were presented.

According to historical reports, 2013 is the year with less aerial spraying reported since 2000; by comparing the number of aspersions in 2014 with the average of the past five years a decrease of 32% is evident, and when compared with data from 2012 a change of – 45% is evident; therefore, although compared to 2013 we can say that aerial spraying showed an increase, in the overall consolidated effort by aerial spraying for that particular year is the second lowest in 10 years.

Growers develop strategic behaviours to reduce the effect of aspersions on coca crops, such as: performing interspersed or mixed plantings; applying substances to isolate the leaf surface from the effect of glyphosate;



Graph 27. Comparison of coca crops within sprayed areas and areas using manual eradication 2001-2014

The aspersed area corresponds to the total of the intervention for one year, calculated by multiplying the length of flight lines by their step width, regardless of the overlap between adjacent aspersions and the number of applications made on the same field during the same year. In 2014, the DIRAN aspersed a total of 55,554 ha of coca, 18% more than the previous year.

27% of the activities were conducted in the department of Nariño, 20% in Putumayo, 16% in Guaviare, 14% in Chocó and 22% between the departments of Caquetá, Cauca, Antioquia and Meta.

According to the data by department, with respect to 2013, a representative increase in the departments of Antioquia (119%), Meta (330%), and Nariño (88%) occurred; in the departments of Chocó and Caquetá

washing the leaves; increasing the number of fields so that some are not affected; rotating the fields in a production unit and decrease the size of the field, among others. The aspersions according to the degree of involvement can cause the loss of one or more crops, reduction of the production or total loss. These effects vary significantly from one region to another, explaining that the aspersions is not the only cause for the reduction or loss of crops.

The above reasons linked to declines or losses due to weather, pests or diseases, let understand that the cultivated area in Colombia is not constant during the year due to actions or factors that induce upward (reseeding and protection against aspersions), or downward (aerial spraying, manual eradication, market problems or factors such as violence).

Department	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Nariño	17,962	36,911	31,307	57,630	59,865	36,275	54,050	39,992	25,940	34,988	37,831	8,101	15,206
Putumayo	71,891	8,343	17,524	11,763	26,491	26,766	11,898	3,777	11,434	9,480	6,504	8,755	11,052
Guaviare	7,207	37,493	30,892	11,865	14,714	10,950	13,061	12,584	17,633	8,917	11,088	6,796	8,485
Choco	-	-	-	425	-	-	-	-	-	4,287	13,259	7,464	7,474
Caqueta	18,567	1,060	16,276	5,452	4,575	5,084	11,085	6,652	16,947	12,888	5,638	5,784	5,393
Cauca	-	1,308	1,811	3,292	1,536	3,557	6,891	11,136	14,450	11,834	10,697	3,409	2,982
Antioquia	3,321	9,835	11,048	16,799	18,022	27,058	10,028	9,281	3,026	9,847	6,971	944	2,063
Meta	1,496	6,974	3,888	14,453	25,915	15,527	9,057	6,756	5,825	2,545	3,152	423	1,821
Valle del Cauca	-	-	-	5	-	-	-	-	-	719	986	2,269	511
Bolivar	-	4,783	6,456	6,443	2,662	7,050	2,214	8,715	4,412	3,564	2,740	1,925	411
Cordoba	734	550	-	1,767	5,588	6,259	3,561	742	546	3,128	1,632	1,183	156
Vichada	-	-	1,446	-	5,485	7,193	5,901	1,699	1,425	1,014	51	-	-
Santander	-	5	1,855	2,042	2,146	1,754	422	1,269	153	92	-	-	-
Norte de Santander	9,186	13,822	5,686	899	1,687	2,683	2,864	1,883	149	-	-	-	-
Caldas	-	-	190	1,090	1,068	284	-	169	-	-	-	-	-
Boyaca	-	-	-	925	831	-	166	117	-	-	-	-	-
Arauca	-	11,734	5,336	2,584	1,400	2,695	2,296	-	-	-	-	-	-
Cundinamarca	-	-	-	43	41	-	-	-	-	-	-	-	-
La Guajira	-	-	449	572	-	-	-	-	-	-	-	-	-
Magdalena	-	-	1,632	383	-	-	-	-	-	-	-	-	-
Vaupes	-	-	756	340	-	-	-	-	-	-	-	-	-
Total spraying	130.364	132.817	136.551	138.775	172.025	153.134	133.496	104.772	101.940	103.303	100.549	47.053	55.554

Table 33. Aerial spraying within coca crops per department and year (hectares) 2002-2014

Source: National Police of Colombia, DIRAN

MANUAL ERADICATION

In Colombia manual eradication strategy is divided into three categories: i) voluntary manual eradication, ii) forced manual eradication with Mobile Eradication Groups and iii) forced manual eradication carried out by the National Police and the Armed Force in patrols throughout the country.

Voluntary manual eradication is carried out in consultation with the communities who eradicate their illicit crops and are linked to Alternative Development programs. This mode does not have a single record that allows knowing the totality of the area voluntarily eradicated by communities.

Forced manual eradication is under the responsibility of the DPCI of the Administrative Unit for Territorial Consolidation, and is performed by the Mobile Eradication Groups -GME⁷¹, accompanied by the Security Forces, to ensure the integrity of members of the GME, who in the execution of their work are exposed

to risks from Landmines (MAP – Minas Antipersona – in its Spanish acronym), Improvised Explosive Devices (AEI – Artefactos Explosivos Improvisados - in its Spanish acronym), and Unexploded Ordnance (MUSE – Municiones sin Explotar - in its Spanish acronym), as well as civil security in general; during eradication efforts carried out by GME in 2014, 196 events of security risk were reported; additionally, the National Police reported that by 2014 a series of demonstrations with blockages occurred in different departments that prevented to continue the efforts to eradicate coca crops, the table below presents data of demonstrations by department.

The third category of eradication is executed by the security forces when in the exercise of their duties and surveillance operations identify illicit crops. The data reported in this mode do not comply with the parameters of reliability and accuracy allowing the certification by UNODC.

71. This type of eradication is certified by UNODC since 2007.

Map 21. Forced manual eradication and coca cultivation in Colombia, 2014



Sources: Colombian Government; National coca cultivation monitoring system supported by UNODC; PCI monitoring system for manual eradication areas. The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

Department	Municipality	amount
Antioquia	Nechi	5
Bolivar	Cantagallo	2
	San Pablo	8
Cordoba	Puerto Libertador	4
	Tierralta	23
Guaviare	El Retorno	33
	San Jose del Guaviare	10
Nariño	Buesaco	5
	Policarpa	31
	Sotomayor	8
	Tumaco	25
Norte de Santander	El Zulia	11
	Sardinata	11
Putumayo	Puerto Asis	36
	Puerto Caicedo	24
Total		236

Table 34. Blockages presented in manual eradication activities, 2014

Source: National Police of Colombia, DIRAN

Forced Manual Eradication

In 2014, 12,496 ha of illicit crops were eradicated, 44% less than the previous year.

In 2014, UNODC verified the manual eradication of 5,326 ha of coca crops and 580 ha between poppies and marijuana are 46.9% of all reported manual eradication. Complementarily, the National Police and the Armed Forces perform forced manual eradication efforts of coca crops throughout the country; in 2014 this mode reported the manual eradication of 6,591 ha. Manual eradication activities were mainly concentrated in Nariño (24%), Guaviare (12%), Antioquia (12%) and Bolivar (8.6%).

Manual eradication has a greater impact on the production of coca leaf, because the plants are completely torn. Reseeding involves additional costs for the grower that requires approximately eight months between planting and first harvest, with low productivity in the initial stage.

UNODC assessed the behaviour of the reseeded activities in areas with forced eradication by superimposing the coordinates reported by GME and coca crops data detected on December 31st, 2014. The table below shows the area of fields that were eradicated manually in 2014 and who were reseeded with coca at the time of the survey. The analysis includes data of coca crops manual eradication reported by DPCI.

The analysis shows that 87% of the total eradicated area has sufficient information to assess the reseeded⁷² and the remaining 13% is covered by clouds. In areas with information it was noted that 37% of the eradicated area presents evidence of reseeded; representing 21 percentage points more than in 2013.

In the national consolidation for 2014, the regions reporting the most reseeded are Pacific (52%) and Amazon (41%). In regions where 100% of the data have been able to assess in recent years, as the Meta – Guaviare case, an increase of 13 percentage points was presented compared to the previous year. In the Orinoco region, in 2013, there was no evidence of reseeded; however, by 2014 the phenomenon recurs. In Putumayo, Caqueta, although in 2013, only 94% of the total information was observed, an increase of 6 percentage points was evidenced in the phenomenon compared to 2013.

In Colombia the behaviour of the manual eradication has three periods: the first from 2001 to 2004 where the trend of the data is to increase; however, the amount of eradicated area does not exceed 6,500 ha; the second from 2005 - 2008 where, in the same way, the trend is to increase, but the figures move from 6,234 ha in 2004 to 31,287 in 2005, representing five times the effort expended; over the next three years this behaviour continues until 95,731 ha eradicated in the country; the highest eradication figure reported for the past fifteen years.

72. Perform the analysis periodically is recommended for a proper reseeded assessment and taking into account the aerial spraying with glyphosate. For this analysis the data of the eradicated areas throughout the year and the coca crops data with cut – off date on December 31st, 2014, are used.

Department	Coca crops		Poppy crops		Marijuana crops		Total
	Eradicated areas (ha)	% of the total	Eradicated areas (ha)	% of the total	Eradicated areas (ha)	% of the total	Area (ha)
Antioquia	782.8	14.7					782.8
Bolivar	576.9	10.8					576.9
Boyaca	2.2	0.0					2.2
Caqueta	181.0	3.4					181.0
Cauca	2.9	0.1					2.9
Cesar	22.7	0.4					22.7
Choco	638.5	12.0					638.5
Cordoba	2.2	0.0					2.2
Guaviare	686.1	12.9			1.3	3.4	687.4
La Guajira	9.1	0.2			0.2	0.6	9.3
Magdalena	9.3	0.2			36.9	96.0	46.2
Nariño	1,879.7	35.3	524.1	97			2,403.8
Norte de Santander	178.9	3.4					178.9
Putumayo	82.2	1.5	16.4	3			98.6
Santander	5.6	0.1					5.6
Valle del Cauca	120.8	2					120.8
Vaupes	135.3	3					135.3
Vichada	9.5	0					9.5
Total	5,325.7	100.0	540.5	100.0	38.4	100.0	5,904.6

Table 35. Manual eradication of coca crops with UNODC verification, by department, 2014 *

* Notes:

This report brings together the overall results of monitoring and certification UNODC to forced manual eradication obtained during the four phases of eradication in 2014. The total of the eradicated area and reported by the Directorate against Illicit Crops Program (DPCI) of the Administrative Unit for Territorial Consolidation (UACT) was 6,099 hectares, of which 5,904.6 hectares (96.8%), divided into 6,792 lots, were certified by UNODC for 2014.

The methodology of validation and certification of Phase I was conducted by census verification of eradication. For Phases II, III and IV, the methodology involves the use of statistical sampling techniques, interpretation of satellite images and aerial photographs of high and medium resolution; and data collected in the field by the Zonal Supports DPCI for each eradicated lot by GME groups; also, the field information of a sample lifted by UNODC monitors. Converging evidence analysis of these criteria allows the validation of hectares eradicated.

Resolution 139 of March 27, 2014 of UACT states that a neutral agency shall validate Manual Forced Eradication conducted by GME. It points out, in this case, that UNODC will write a "Measuring Report of the number of eradicated hectares of illicit crops in areas where the Mobile Eradication Groups (GME)" are present. Its management indicator is a "Report of hectares eradicated by eradication phases by the Mobile Eradication Groups and the ratio of the number of verified hectares / Number of eradicated hectares.

From 2008 manual eradication activities have presented downward trend generating in 2014 the lowest eradication figure in the past 10 years.

When comparing the manual eradication data against the yearly survey of coca crops, it could be seen that despite the downward trend in the eradication, coca

crops data show positive results; however, by 2014 the number of coca crops showed an increase. If we consider the percentage of decrease in eradication, in 2014 the highest value (- 44%) was presented, compared to the average of the past six years represents 16 percentage points less.

Region	Eradication			Reseeding with coca		No Reseeding	
	Hectares	Study area	% of the total area	Hectares	%	Hectares	%
Amazon	140	140	100	58	41	82	59
Central	1,586	1,376	87	335	24	1,041	76
Meta - Guaviare	716	716	100	153	21	562	79
Orinoco	10	10	100	1	12	8	88
Pacifico	2,764	2,234	81	1,163	52	1,071	48
Putumayo - Caqueta	258	258	100	66	25	193	75
Sierra Nevada	19	18	97		0	18	100
Total	5,493	4,752	87	1,776	37	2,975	63

Table 36. Reseeding analysis within manual forced eradication coca crop areas GME, 2014

Source: For eradication DCPI, UNODC for Reseeding analysis

REALTED RESEARCH

SYSTEM FOR DETECTION AND MONITORING FOR EVIDENCE OF OPEN – PIT MINING, WITH AN EMPHASIS ON ALLUVIAL GOLD MINING, IN THE AREA AFFECTED BY ILLICIT CROPS

Overflights performed by SIMCI – with support from DIRAN – in the territories affected by illicit crops have found evidence of a reduction in coca – grown areas in some regions of the country. However, evidence of emergence and expansion of mining activity has been detected in these regions – mainly in floodplains on banks and plateaus adjacent to water bodies. In addition, several researchers have associated mining activities with different forms of illegality, including different financing armed groups outside the law and money laundering groups.

One of the conclusions of the monitoring conducted on the regions affected by illicit crops in Colombia is that area has been reduced in some regions, but territories are yet to become free of phenomena of illegality. This can be explained by the fact that the illegal mining phenomenon ever more strongly present as a new form of criminality, and overflights in areas affected by coca crops have shown a relationship – at least at the geographical level – between coca and recent mining activities. SIMCI has designed in investigation platform based on remote sensors in order to detect evidence of mining activity, as well as a research model. This platform is an analytical tool purported to aid in understanding the phenomenon of this activity and its relationship to other forms of crime.

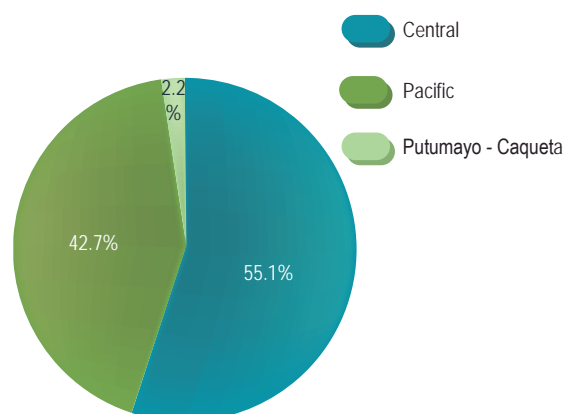
The project will allow to obtain the following: i) a geographic characterisation of physical evidence of open – pit mining with heavy machinery. This characterisation does not allow to discriminate the legal or illegal nature of the activity; however, it is most a contribution of paramount importance in order to improve the framework of reference of the most specialized researchers. The geographical characterisation will include a geographical layer evidence of open – pit mining, with emphasis on alluvial gold mining, in the

area affected by illicit crops. In addition, this tool will also enable historical series outlook, in order to understand the evolution of the phenomenon over the past years. ii) A measurement and characterisation of the relationships between the territory and illegal activities, particularly those associated with mining; and iii) a characterisation of the dynamics of the chemicals being utilized in the processes involved in the activities of open – pit, alluvial gold mining.

This project is in its research model consolidation stage, and is currently conducting studies aimed at the identification of other alluvial gold mining methods, such as the use of dredges.

The results obtained thus far are limited to spatially outlining the physical evidence of mining activities within the territory affected by coca crops.

AFFECTED TERRITORY



Graph 28. Territory affected by evidence of open – pit, alluvial gold mining.

The results of the territory are represented in grids of 5 km² grids. 98% of the territory affected by evidence of mining belongs to the Central and Pacific region, and 2% in the Putumayo – Caqueta region.

Department	%
Antioquia	36
Choco	31
Bolivar	13
Cauca	4
Nariño	4
Cordoba	3
Valle	3
Putumayo	2
Others	4

Table 37. Share percentage for the departments within the territory affected by alluvial gold mining activities.

The ratio of presence of mining against the variation in the coca – grown area shows significant presence of territories affected with mining activities, in areas which show a significant increase of the area grown, such as the municipalities of Caceres and Taraza in Antioquia, and north of the southern Bolivar core, in Bolivar. However, towns like El Bagre and Nechi, where mining has become more relevant, have a downward trend in coca crops.

As for the Pacific core, while there is an increase in the coca – grown area, the mining activities identified are located in areas with a trend to reduction or stability, such as Barbacoas and Magui in Nariño, the coastal municipalities of Cauca (Timbiqui, Guapi and Lopez



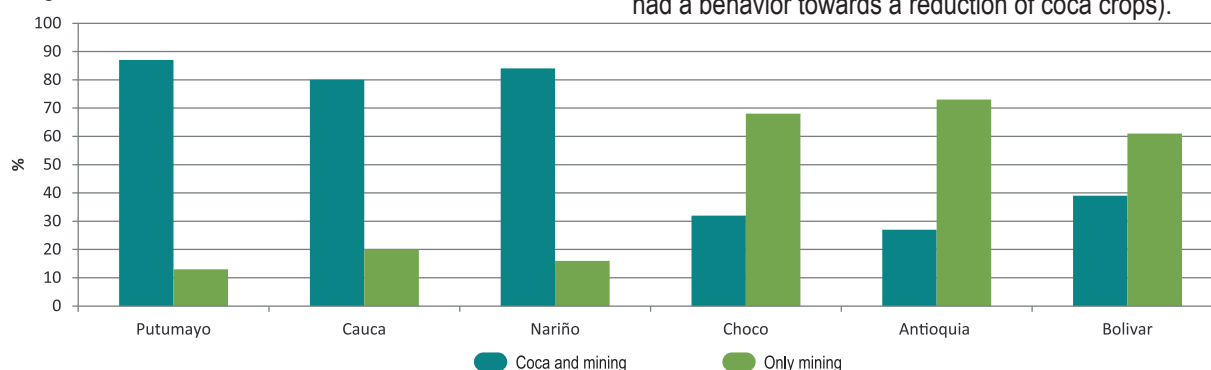
Territory affected by the presence of coca crops (blue line) and activities of open – pit mining (red line). Pacific Region

The departments with the largest presence of the phenomenon are Antioquia, Choco and Bolivar. 33% of this area coincides with areas currently affected by coca crops, as shown in Graph 28 In the departments of Putumayo, Cauca and Nariño, over 80% of the territory with detected mining activities corresponds to the territory affected by coca crops.

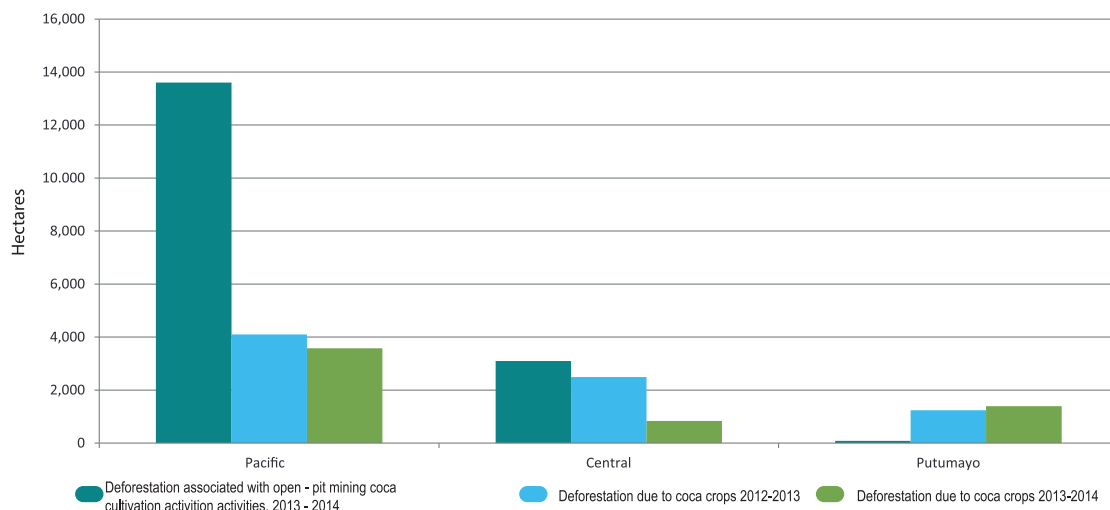
Territory affected by the presence of coca crops (blue line) and activities of open – pit mining (red line). Pacific Region

Micay) and north of Buenaventura in Valle del Cauca. The only exception is observed in Choco, where the presence of mining is very strong in areas with a mild increase in the area affected by coca crops, as in the case of Novita, Condoto, Medio San Juan and Canton del San Pablo.

Lastly, the presence of mining in Putumayo is still incipient, and it is located in the municipalities of Orito and Puerto Guzman, showing an upward trend and small foci in Puerto Caicedo (a municipality which has had a behavior towards a reduction of coca crops).



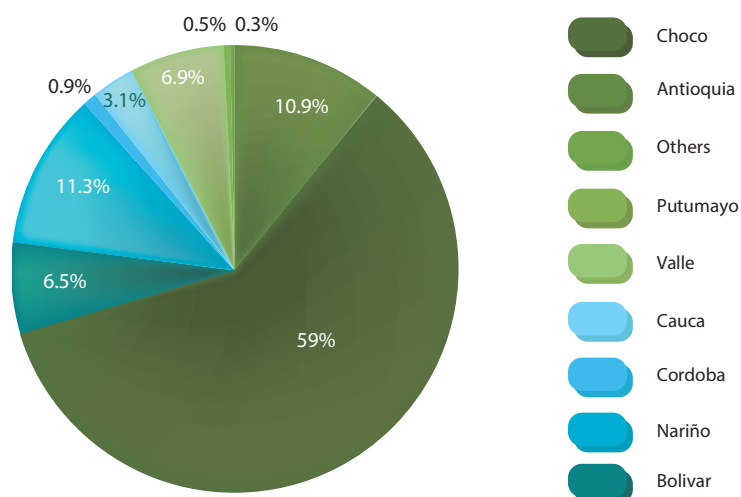
Graph 29. Territory affected in departments with greater presence of mining activities



Graph 31. Deforestation of primary forests associated with open – pit mining coca cultivation activities.

Logging in areas of gold mining causes impacts at different levels such as change in the landscape, alteration and fragmentation of habitats, biodiversity loss and instability of slopes for the same loss of coverage among others. The loss of forest cover is

has monthly. Furthermore, deforestation for purposes of establishing coca crops for the same period was 5,810 ha (2,020 ha less than last year), thus representing 26% of the total deforestation associated with these phenomena of illegality during the past year.



Graph 31. Deforestation of primary forests associated with open – pit mining coca cultivation activities.

associated with alluvial gold mining is concentrated in the departments of Choco, Antioquia, Nariño, Valle and Bolivar and represented over the past year deforestation of 16,784 hectares of primary forest at a rate of 1,400

Choco is the department with the highest percentage of national participation in deforestation for this activity, with 59.5% followed by Nariño and Antioquia with 11.3% and 10.9% respectively.

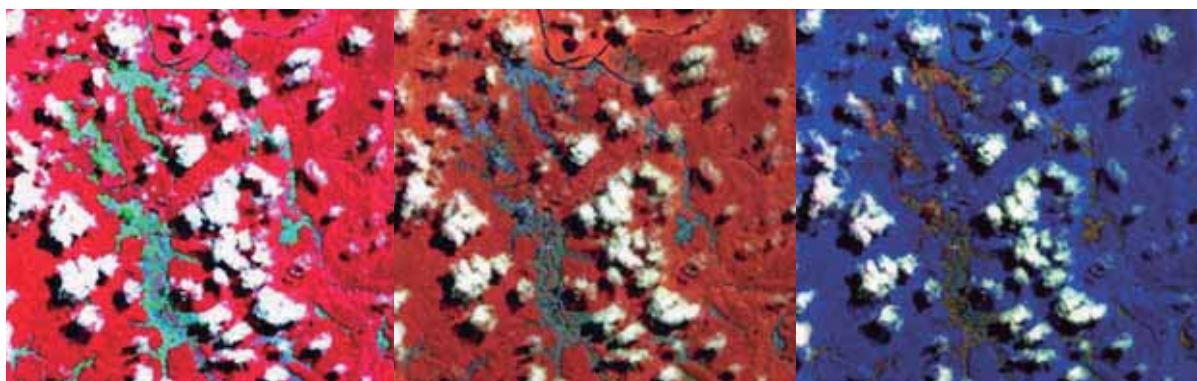
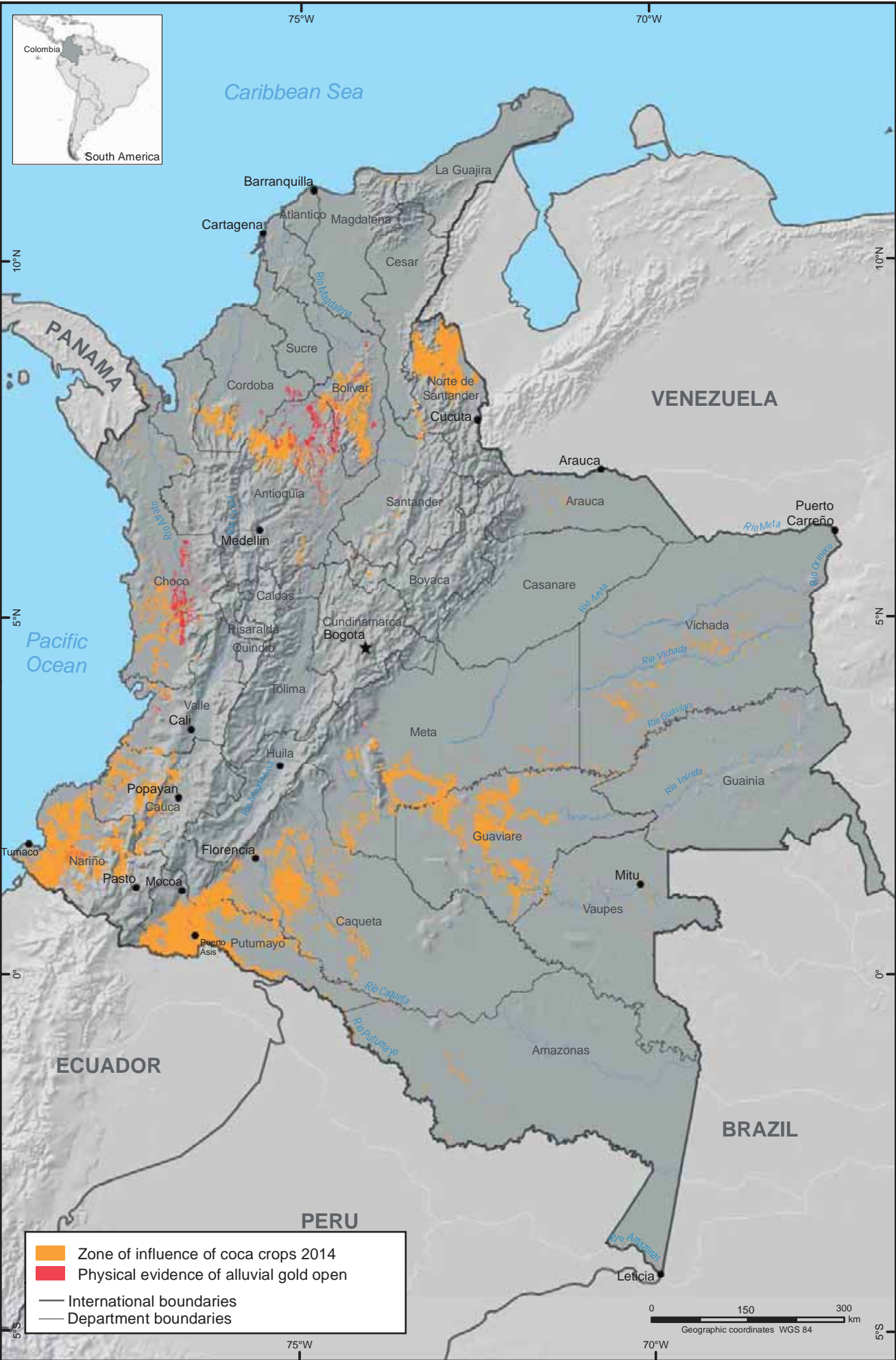


Figure 7. Evidence of mining as displayed in different color compositions) - a) RGB (5,4,7); b) RGB (5,6,3); c) RGB (4,6,5).

Map 22. Physical evidence of alluvial gold open, 2014



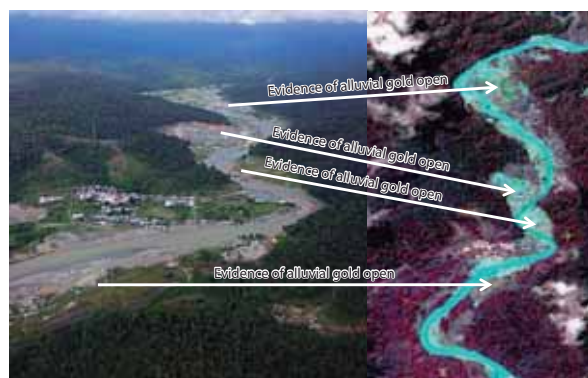
Source: Government of Colombia - National monitoring system supported by UNODC
The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

METHODOLOGY

Detection and monitoring of physical evidence of alluvial gold open – pit mining is based on the science of remote sensors, by means of visual interpretation of mid – resolution satellite images and reconnaissance overflights.

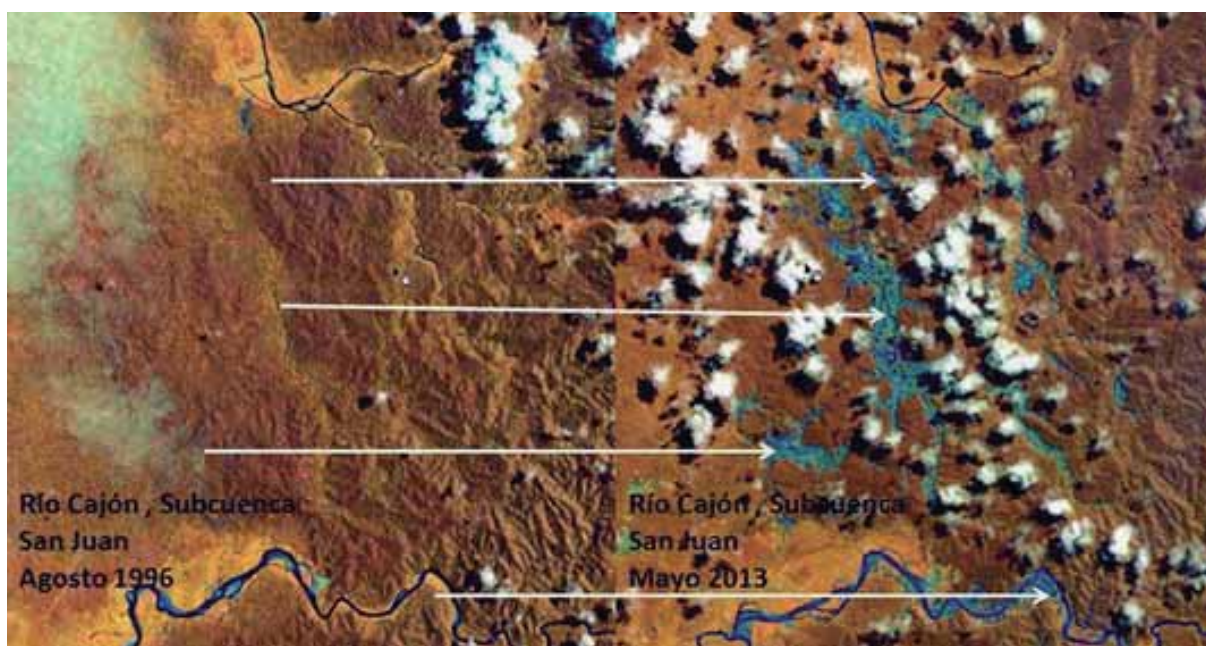
For interpreting this coverage, an exploration was conducted on the totality of the area affected by illicit crops, covered by 44 Landsat 8 images, with pansharpening processing and 15 – meter spatial resolution. Evidence of mining activity was found in 16 of these images, focused mainly in the following regions: Central, Pacific and Putumayo – Caqueta. The minimum unit detected was 4 pixels (900 m²).

Because the images utilised in the coca survey were also used for purposes of spatial dimensioning of the mining phenomenon, a 9% of areas without information is estimated. The data obtained have no adjustments due to areas with no information or temporality.

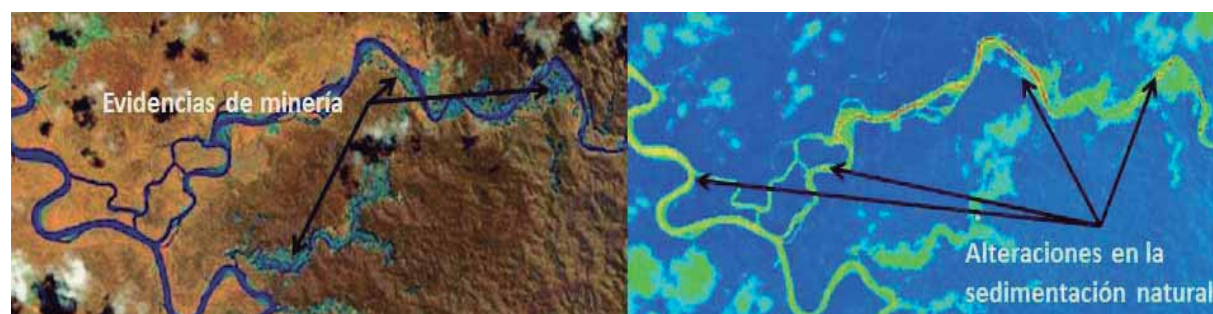


Panoramic view of the affected territory with evidence of mining, and the relevant satellite imagery.

Interpretation of physical evidence of alluvial gold mining was conducted by way of visual interpretation of satellite imagery and aerial overflight detection. Overflights have information records on this phenomenon since 2012. This information – along with secondary operational information provided by the Directorate of the Mounted Police (DICAR – from its original Spanish



Dynamics of change. Left: satellite imagery with predominance of primary forest cover. Right: in Blue, evidence of mining activities. The dynamics shows the change from coverage of primary forest and jungle to anthropogenic processes of alluvial mining activities.



Left: False – color image where evidence of mining activities can be observed. Right: satellite imagery processed by spectral indicators, wherein alterations in natural sedimentation can be observed in orange and red tones, at points of impact and downstream.

language initials Direccion de Carabineros) of the National Police – constitutes the basis of spectral and geographic pattern determination for this phenomenon.

The spectral and geographic pattern determination for the phenomenon which the Project has been working on allows to establish its status in a given period of time, and to reconstruct the temporal dynamics through multi – temporal analysis. Along the aforementioned lines of thought, the platform will provide information on alerts of expansion by analyzing change and movement of the phenomenon.

Ongoing research under the project includes the establishment of early warning of the phenomenon. This study is based on alterations in the river dynamics, by changes in sedimentation of streams originated both from excavations in alluvial terraces and in the riverbed, as well as by adding new solid particles to channels. The research is based on the science of remote sensing using spectral indicators.



Physical evidence of alluvial gold open in Sur de Bolivar

PILOT STUDY FOR PARTICIPATORY CONSTRUCTION OF ACTION PLANS ON DRUGS WITH COLOMBIAN INDIGENOUS PEOPLES

Colombia has over 650 indigenous reservations, whose collective territories can be found along its geography and are regulated according to the uses and ancestral customs of its communities. Some indigenous communities retain the traditional use of coca leaf for sacred and healing purposes. In order to know the characteristics of the traditional uses that indigenous communities give to coca, as well as the differences between this use as compared to illicit crops intended for production and commercialisation.

SIMCI and the Ministry of Justice and Law have conducted a Pilot Study⁷³ to characterise the dynamics of production, consumption and occurrence of crimes related to the drug problem in the territories of three Nasa indigenous reservations, located in the municipality of Morales, Cauca.

Given that indigenous communities have decision-making and territorial authority scenarios and instances, this pilot study will serve as input for the search of new alternatives that generate empowerment and assignment of political responsibility to indigenous communities, so as to address the problem of drug production in their territories.

COCA, CULTURE AND TERRITORY

CHARACTERISATION OF PRODUCTION AND TRADITIONAL USES OF COCA IN 3 INDIGENOUS RESERVATIONS IN MORALES, CAUCA.

A methodology of participatory development was deployed with indigenous councils and interviews with community people who grow and use the coca plant according to the traditional use – i.e. for spiritual and medicinal purposes, in order to obtain the characterisation of production and traditional usage of coca. As a result, the study obtained the following characteristics:

- Only the native ancestral variety is utilized for traditional uses of mambeo (chewing coca), as well as medicinal and ritual purposes. This variety is not contaminated with agrochemicals. Varieties Pajarita or Caucana⁷⁴ are used in these reservations. From the indigenous

worldview, the native coca plant has a stronger relationship with the senses, manages to relate the spirit of man with nature, and has the capacity to meet medicinal functions.

- The average number of coca plants for traditional uses is 10 per family.
- Coca for traditional use is usually grown alongside other products, and (to a lesser extent) they prefer to keep coca crops without any additional products.
- The most appropriate place for planting or maintenance is near the house, as the plant is constantly used.
- The most common growing method (43%) is by means of a seedbed and ulterior transplantation. In other cases, naturally blossomed plants are used and transplanted to the final site.
- The estimated time for the first harvest varies between 5 and 7 months. After that, crops can be harvested at any moment, in accordance with the requirements of use.
- Harvest is done leaf by leaf, i.e. only mature leaves are harvested to be used at the moment, leaving the plant with the rest of leaves.
- In the case of people who use coca but have no crops thereof, it is not common for them to use money to acquire coca, but the transaction is usually based on bartering with other products; this is an ancient practice.

Although communities perceive a decline in the use of the plant within the reservations, it has been found that coca is used for different cultural uses, including medicinal purposes and harmonisation of the family. Community work and ritual uses of coca in political work done by the community are also common.

The permanence of coca in the territory is necessary to safeguard the processes of cultural identity of the indigenous reservations at Morales, Cauca.

73. The study was conducted in pursuance of the agreement signed between UNODC and Corporación Punto de Vista with authorities and indigenous communities in Morales, department of Cauca, with the support from the Ministry of Justice and Law.

74. According to alkaloid content studies conducted by SIMCI for the variety known as Pajarita, the average cocaine percentage is lower than that of other varieties present in the area, as is the case of the Boliviana varieties.



Social mapping workshop in an indigenous reservations in Morales, Cauca

GEOPHYSICAL AND CULTURAL ATLAS OF THE RESERVATIONS AT MORALES, CAUCA.

The process for the preparation of the Geophysical and Cultural Atlas of the 3 indigenous reservations was based on the methodology of Participatory Geographic Information Systems – PGIS. This methodology includes field data collection through social mapping, consultation of secondary information, digitisation and systematisation of the information gathered for the generation of mapping, and consolidating all the information on the geophysical and Cultural Atlas of the territory.

The maps elaborated are the result of the work done by the community in social mapping workshops. In these work sessions, the communities recorded their knowledge about their territory, and correlated it with high resolution satellite imagery to include interest points for health, education, sacred rituals, recreation, market – supply, environmental, administrative, political and institutional issues, thoroughfares and roads. The information was consolidated in a geodatabase and published in an atlas, which serves the community as educational and research material. The result is a geographical approach to the current state of the indigenous reservations, and serves as input for these territories' life plan and planning purposes. In the same context, and in order to generate a sense of community ownership with Atlas (thereby contributing to strengthening their culture), captions in the maps were translated into the Nasa Yuwe native language.

Ksxa'w wesx yat	Sitios de interés
<p> Piya Yat leçxkwe Yuçe'jnxhii yat tu'txh bají'saa Paa denxi yat Salón Comunal Pkhakhenxi yat wala Salón de reuniones comunitarias Pwesenxi ukwe Fxu'çwa' </p>	<p> Escuela Puesto de Salud Partero Albergue Salón Comunal Caseta comunal Salón de reuniones comunitarias Cancha Construcción </p>

Figure 8. Captions in the maps into the Nasa Yuwe native language, Geophysical and Cultural Atlas of the 3 indigenous reservations

HABITS OF USE OF PSYCHOACTIVE SUBSTANCES IN THE 3 INDIGENOUS RESERVATIONS IN MORALES, CAUCA

In order to explore the situation of the population of the reservations regarding the use of psychoactive substances, considering both substances most commonly used and consumption patterns, surveys were implemented with a population sample disaggregated by sex and age, covering population aged 12 to 45⁷⁵, and segmenting the sample in all the townships of the reservations.

The findings include alcohol as the most predominant substance, with a prevalence rate of 26% last year – below the national prevalence rate which is 58%. The age of onset in alcohol consumption is 16 for both men and women (1 year below the national age of onset). Harmful use of alcohol may be affecting about 4% of the population in the reservations. Tobacco is the second most consumed psychoactive substance in the reservations, with a prevalence of 7.5% last year, below the national prevalence is 16%, with an average age of onset at 16.5, similar to the national average of 16.8 years; tobacco use is found exclusively in males.

Regarding illicit psychoactive substances, mild use of marihuana, cocaine and basuco was found. No cases of heroin use were found in these reservations. Illicit psychoactive substances has a prevalence of 0.72% in the last year and a prevalence of 3.65% in their whole life; age of onset in consumption is 16 years. This consumption is markedly higher in men than it is in women.

Moreover, the study included a set of cultural variables which indigenous authorities wanted to explore, in order to obtain useful information for the design of their own value reinforcement policies among the Paez people. In this regard, changes have been observed in the ancestral customs, for example, marked disuse of the Yuwe Nasa language – only 27% of the population still uses in everyday activities, and over 50% of the

75. Population selected taking into account age range of highest concentration of consumption in accordance with the National Consumption Study, 2013.

population does not understand the language, nor can they use it. 86% of respondents believe it is important to strengthen traditional medicine, mainly to strengthen their own health, to preserve the community's customs, and to avoid the use of allopathic medicine. In addition, 86% of respondents state recognizing themselves as believers in any Western cult or religion; however, 76% of the population do not believe in traditional medicine.

WEAVING NETWORKS

On the occasion of the 15th anniversary of SIMCI, a new edition of the event "Weaving Networks" (Tejiendo Redes) was held in Bogota on March 5 and 6, 2015. This event had the objective of creating, consolidating and disseminating networks of academic information amongst researchers. In previous years, attention focused mainly on research on the drug problem; however, the theme spectrum was expanded this time to new illegal activities taking place in the territory, with a view to the post-conflict scenario Colombia would face. The event also covered a geographic perspective; this explains this year's name "Weaving Networks: geography of crime, territory and post-conflict".

12 lectures were made by national and international researchers, following to four thematic sections: geography of crime; security and drugs; crimes against the environment, and transnational crimes, during the first day of the event. Mario Laserna Auditorium of the University of Los Andes hosted the event, with the support of the Research Group on Prisons, Criminal Policy and Public Safety from the School of Law at the abovementioned university. The second day consisted of a workshop at the Lancaster House Hotel in Bogota; some of the lecturers from Day 1 attended, as well as officials of agencies and NGOs interested in the subject of the meeting, in addition to staff from UNODC (SIMCI, Alternative Development and PROJUST). Four thematic groups (technology, crime, information handling and information management) worked under the World Cafe methodology.

UNODC
Oficina de las Naciones Unidas
contra la Droga y el Delito

Universidad de los Andes
Facultad de Derecho

O.D.C. OBSERVATORIO DE DROGAS DE COLOMBIA

TEJIENDO REDES
Geografía del delito,
territorio y posconflicto

Marzo 5 de 2015
7:30 a.m. a 6:00 p.m.

Universidad de los Andes
Edificio Mario Laserna
Auditorio B
Calle 19 A No. 1-96 este

Entrada libre – cupo limitado

Inscripciones:
<http://eventos.uniandes.edu.co/tejiendoredes>

Coordinado por:
Sistema Integrado de Monitoreo de Cultivos Ilícitos-SIMCI-
y Grupo de Investigación en Prisiones, Política Criminal y
Seguridad Ciudadana

Geografía del delito

Seguridad y drogas

Delitos contra el medio ambiente

Delitos transnacionales y fronterizos

INFORMATION TECHNOLOGIES AT THE SERVICE OF THE COLOMBIAN GOVERNMENT

The United Nations Office on Drugs and Crime – UNODC works hand in hand with the Colombian State to “develop national capacities to address and prevent drug production, trafficking, abuse and other forms of organised crime”. Rendering the information produced by the SIMCI project to the State and the civil society makes part of this strengthening process.

This process began collaboratively in 2004, with the creation of SIMCI's spatial information bank⁷⁶, an initiative that provides access to spatial information processed by the Project. Since its launch to date, this

information exchange agreements. The remaining percentage (39%) consists chiefly of technical cooperation agreements. SIMCI started its first exercises in the year 2014 seeking to strengthen these mechanisms of information exchange, minimizing inter - institutional paperwork and provide services in an ongoing fashion; to this effect, free technologies were implemented in order to publish the information generated as a result of development its monitoring activities, thus enabling interested parties to have direct online access thereto via the Web.

The main advantage of implementing these automated mechanisms for information exchange is the integration of geographic information produced by SIMCI with various available sources, such as the Colombian Observatory on Drugs - COD, considering that one

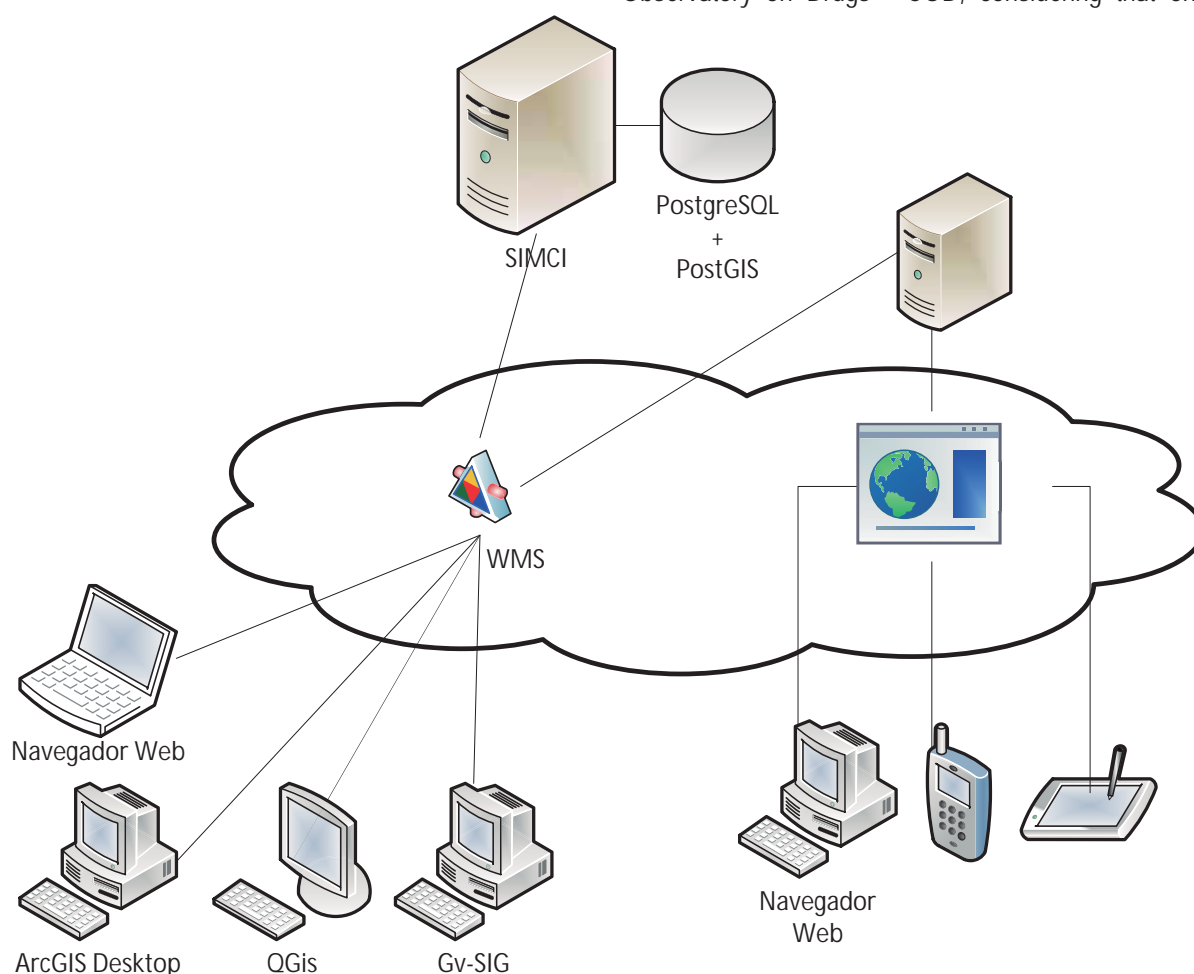


Figure 9. Conexión between user and SIMCI scheme

website, has had 26,094 visitors and its pages have been consulted over 47,000 times. This website has a record of over 2,000 visitors over the last year, with a monthly average of 181 hits; the months of September and October have the highest visitor record.

Additionally, SIMCI currently has 39 national and international interagency agreements, of which 61% are

of the main objectives of the project is to monitor the variables that explain the phenomenon of illicit crops from a territorial approach, as well as to delve in its different dynamics and relationships from space.

With these approaches, SIMCI supports and strengthens the Colombian State's management capabilities by providing permanent, timely and reliable access to the

information produced. In addition, this model serves as a pilot for other organisations to join the initiative, so that information can be accessed in a much more user-friendly and timely manner to all stakeholders.

Web – based geographical services were adopted from the information exchange mechanisms available, the reason being that they are related to the four possible scenarios⁷⁷ of access to information, which respond

of parameters in the service, as defined by the OGC⁷⁹, thus allowing to customise access parameters to the geographical services through a URL web address⁸⁰ and using an HTTP request.



Figure 10. COD geographic viewer

to the Colombian State's current needs; these access scenarios are: i) by the general public; ii) by geographic application developers; iii) by specialised users; and iv) by information production divisions which provide and / or access geographical resources of joint interest.

ACCESS TO INFORMATION

Currently, the geographic information produced by SIMCI is available for consultation and use at the Colombian Observatory on Drugs⁷⁸. Unrestricted access has been implemented and is available to the general public. A geographic viewer has been implemented seeking to facilitate the use of geographic information; this viewer that allows (among other things) to look for information coverage by way of keywords, viewing geographic web services provided by SIMCI, and looking up historical attributes associated with each of the prioritised topics.

This, nonetheless, is not the only way to access or use these geographical services. More experienced users with a keen eye for web-gis application development will enjoy direct access to the services through management

Standard parameters of these services are: VERSION, REQUEST, LAYERS, FORMAT, SRS, STYLES, BBOX, TRANSPARENT, EXCEPTIONS, WIDTH, and HEIGHT. By customizing these elements, SIMCI's geographical services can be implemented in any Web application which allows its use⁸¹.

Additionally, it is possible to access these services through the use of free – access client type (or licensed access) software for Geographic Information Systems – GIS. This means that anyone who has installed one of these programs on your personal or corporate computer may access the SIMCI – produced maps, and integrate their own information to SIMCI information.

77. Sosa, R. (2011). Geographic Web Services and Electronic Government. Montevideo, Uruguay: PEDECIBA Informatics Computer Institute - Faculty of Engineering University of the Republic
78. <http://www.odc.gov.co/Portals/1/Geodata/visor-odc.html>

79. <http://www.opengeospatial.org/> Open Geospatial Consortium
80. Uniform Resource Locator, URL. This is a character string with which a unique address is assigned to each of the information resources available on the Internet
81. OpenLayers, ArcGIS API for Javascript, Leaflet

Similarly, it is possible to use WFS (Web Feature Service) services, whereby users may utilise geographical, geometrical and alphanumeric information in a direct fashion. This type of service is particularly useful if users in the field would prefer to more actively and collaboratively interact by editing, adding or deleting information or geographic attributes, in accordance with the interests of the institution providing the service.

All the possibilities of access to information are conditioned by their construction methodology. In the case of SIMCI information, the methodology used – and therefore the byproducts derived thence – are geared toward a national scale and can therefore only be consulted at a maximum detail level of 1:500,000 scale. This caveat is important since users have the possibility to zoom in on digital layers and visualisation can be done SIMCI's geographic web services, but this type big scale analysis is not recommended.

TECHNOLOGICAL DEVELOPMENTS IN SIMCI.

To address these information needs, SIMCI began implementing a geographic database using the PostgreSQL engine⁸² and Postgis complement for

spatial information management, which has over 200 functions for spatial information processing and analysis in raster⁸³ and vector format⁸⁴.

Structured storage of geographic information and historical data provides the link to the map server responsible for publishing geographical services, thereby adding security and robustness to the information integration model.



Figure 12. Access Interface GeoServer

The next component to be implemented is a web map server purported to produce maps from source – based specification and styles. The map server used by SIMCI is Geoserver⁸⁵; it allows to share, edit and visualise geographic data, supports OGC standards and can manage the conFiguretion of all the essential elements for publishing map services through a Web interface.

Finally the server's conFiguretion is required so it can make the maps available on the Internet. This is a process which only needs conFiguretion of security options, having a public IP address and the corresponding domain.

WMS⁸⁶ services were used for SIMCI. The geographical server responds to requests made by returning a map image that has been previously configured, in addition to the geographical, geometrical and thematic information obtained from the geographic database. Service conFiguretion includes a styles file⁸⁷ wherein all geographic coverage display settings geographic are established, e.g. colours, text, line thickness, inter alia.

This type of maps is provided ready – to – use for end users and in any case only for viwing purposes. Its functionality is addressed to the thematic representation of data.

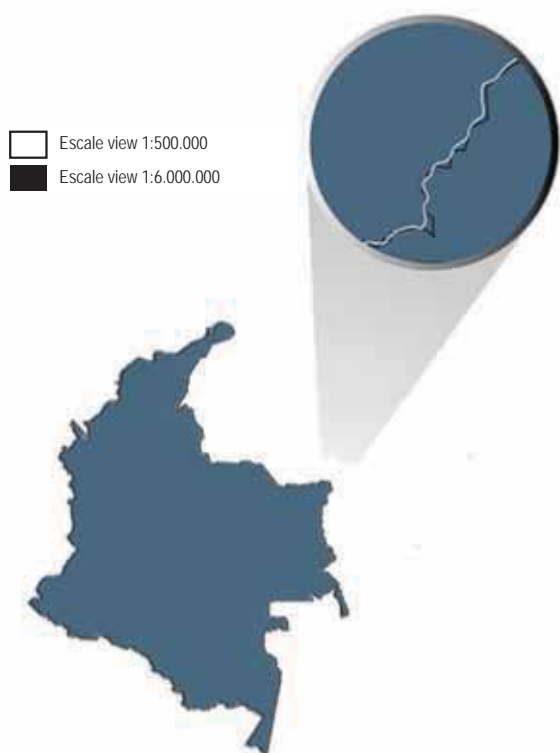


Figure 11. Based cartographic generalisation process

82. www.postgresql.org/

83. Graphic image stored as an array of digital values

84. Slight geometric representation format for polygons, lines and points, or combinations thereof as multigeometries.

85. <http://geoserver.org/>

86. WMS, from its acronym in English, Web Map Service.

87. <http://www.opengeospatial.org/standards/sld>

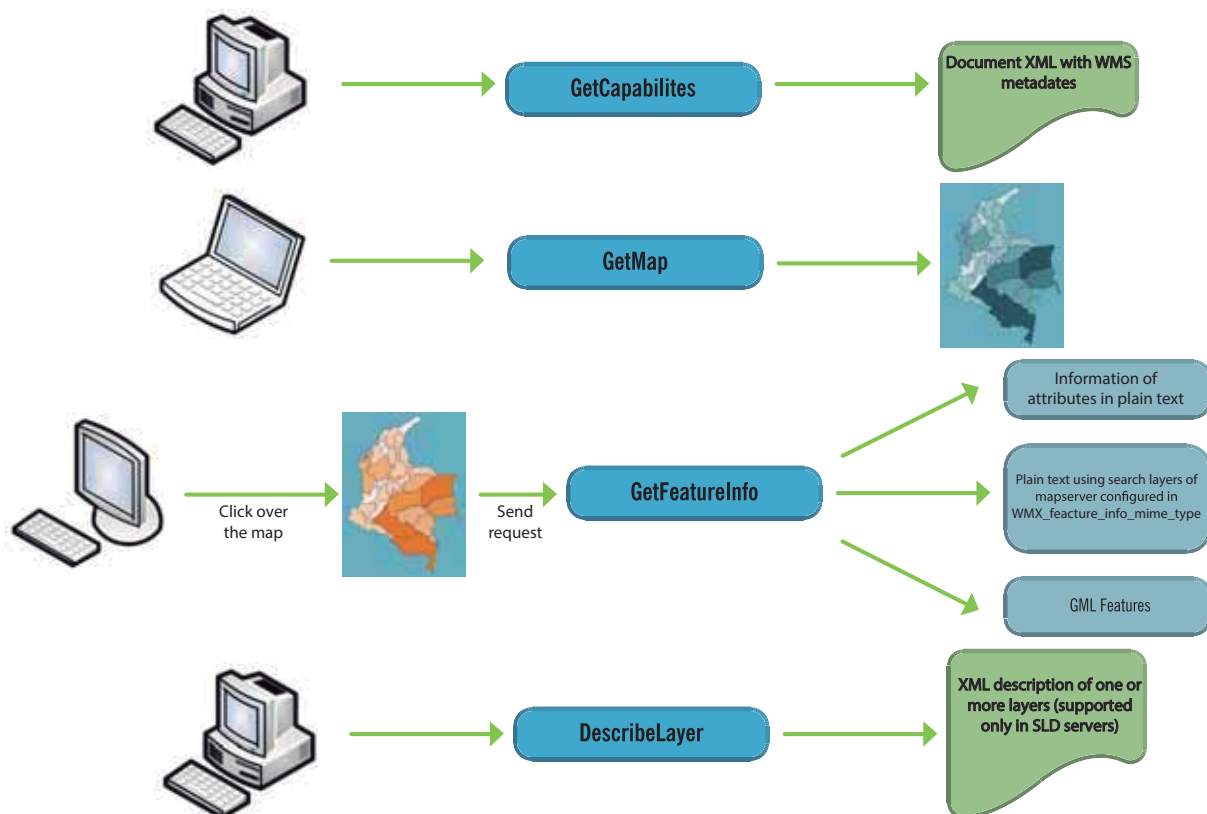


Figure 13. Basic functions of a WMS service

This map service is dynamic; it responds with a different image from the server according to the requirement. For instance, if the user wishes to zoom in, it is only necessary to adjust the BBOX parametre wherein the geographical coordinates are established for the window representing the viewing area, for the geographical server to generate a new image of the map requested, according to the new parametres.

The final sensation for users is that an approach or zoom has been made on the coverage information displayed, as shown below:

“So can and can’t I do with the WMS service provided by SIMCI?”

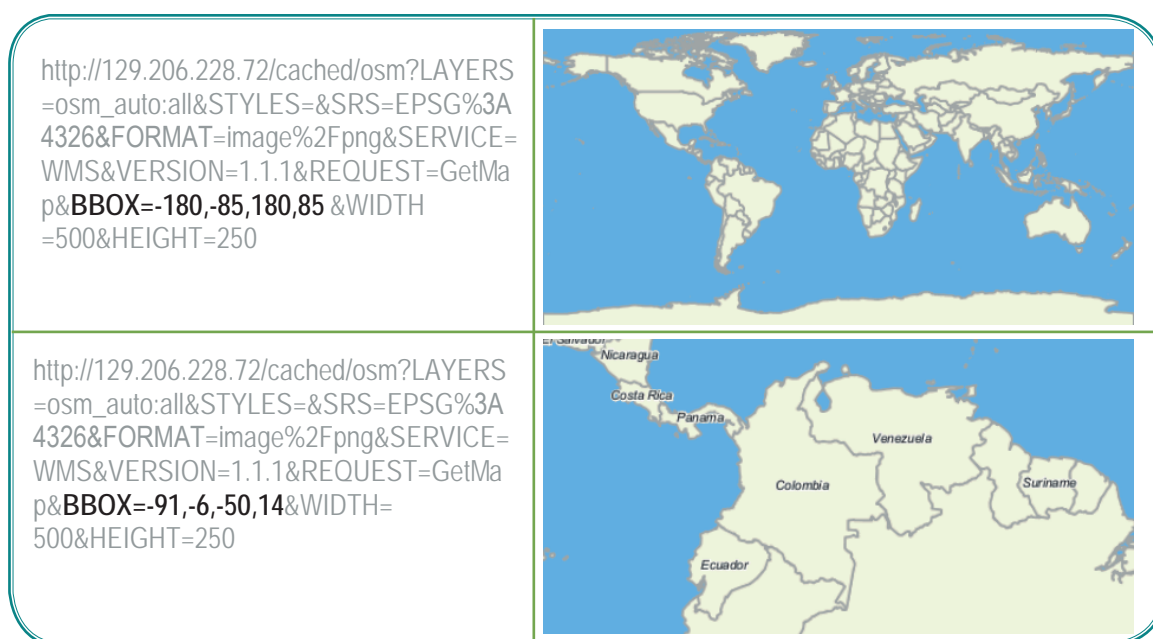


Figure 14. Parameter BBox custom example

Action	Yes!	No!
Integrate it into my web viewfinder	x	
Load it into my desktop GIS software	x	
View it on my Smartphone **	x	
Upload directly from a web browser	x	
Integrate it with my own geographic information	x	
Create new maps using it as a base	x	
Refer to the information associated with each geographic feature	x	
Change the type of image to be displayed, jpg, gif, png, etc.	x	
Modify the SRS ¹ according to my needs	x	
Combine other layers of the same source available	x	
Query the server to display different forms of raster images	x	
Redirect it from my own map server	x	
Query and display the map captions	x	
Customise display to fly – by mode *	x	
Modify the original display style, colours, backgrounds, fonts etc.		x
Modify the values associated with geographic features		x
Add or remove geographical elements		x
Perform spatial analysis directly on the map		x
Edit it in any way		x

Table 38 WMS service offered SIMCI

**This feature requires an advanced knowledge of SLD style files.*

***Internet connection is required.*

METHODOLOGY

CENSUS OF COCA CROPS

The monitoring of coca crops in Colombia is supported in the interpretation of satellite images, along with the validation of the data obtained by aerial reconnaissance. For the interpretation of areas under coca cultivation in the 2014 census, the project downloaded and georeferenced a total of 115 images (94 Landsat 8 and 21 Landsat 7) that were effective or provided support to the interpretation of coca cultivation in the country.

Since the census of 2013, the SIMCI project implemented the use of the Landsat 8 satellite. It was launched on February the 11th, 2013 to lend continuity to the data capture, archiving, processing and distribution for at least five years, in a manner consistent with the operation of the Landsat 7 system.

The mission carries two sensors aboard; the first, the "Operational Land Imager (OLI)", captures images in 9 shortwave bands with a spatial resolution, for all them, of 30 meters, except for the panchromatic band of 15 meters. The other sensor, the "Thermal Infrared Sensor

Region	Effective images	Date
Pacific	15	August 2014 - February 2015
Catatumbo	5	September 2014 - February 2015
Central	5	August 2014 - December 2014
Putumayo-Caqueta	9	August 2014 - February 2015
Amazonas	3	November 2014 - December 2014
Arauca-Vichada	8	November 2014 - April 2015
Sierra Nevada	3	November 2014 - January 2015
Meta-Guaviare	5	December 2014 - January 2015

Table 39. Effective images census 2014 by region in Colombia

Landsat 7: images between October 2014 and February 2015 were downloaded, Landsat 8, since July 2014 to April 2015. The image of July was taken due to the difficulty of obtaining information due to cloudiness problems in the country, especially in the southwestern area.

84.35% of the study area was covered with satellite images obtained between November 2014 and February 2015, the remaining 15.65% of the total number of images corresponded to a period between July and September 2014. The acquired images cover the entire national territory (1,142,000 km²) except for the islands of San Andres and Providencia.

(TIRS)", gets images in two thermal bands with spatial resolution of 100 meters, useful for collecting data on the heat emitted by the earth's surface and thus monitors the water consumption, among multiple applications.

Against its predecessor Landsat 7, the most important changes occur in OLI since the band 5 excludes an absorption band of water vapor to reduce the interference of the atmosphere. In addition, this sensor has two additional bands; the band 1 to observe the ocean's colour and quality in coastal areas and the band 9 to detect cirrus type clouds, unnoticed on previous platforms. The panchromatic band, to be narrower with respect to the one of Landsat 7, allows a greater contrast between areas with and without vegetation.

Map 23. Satellite images used for the coca cultivation survey in Colombia, 2014



Source: Colombian Government - National monitoring system supported by UNODC

The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

Taking advantage of this technological improvement, it was decided to merge each of the bands with a spatial resolution of 30 meters and the panchromatic band of 15 meters to obtain a product known as pansharpening of 15 meter of resolution; this process yields a new image with spatial resolution of 15 meters. This operation allows further delineation and interpretation of the area sown with coca cultivation; it has a greater visual

The calculation of the total area planted with coca in Colombia in the year 2014 is the result of the following processes:

Identification and acquisition of satellite images: one of the main difficulties in image acquisition is the frequent cloudiness over the Colombian territory. For this reason a permanent monitoring of the passage of different

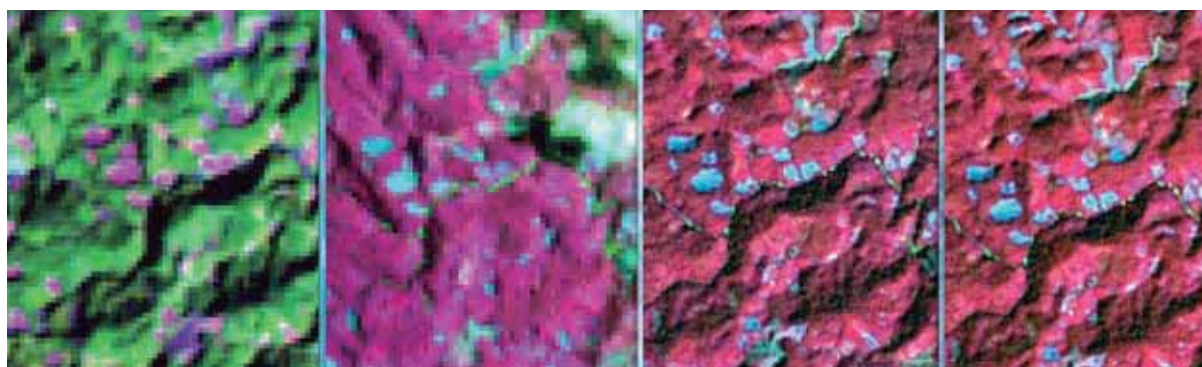


Figure 15. Example of improvement pansharpening.

a b c d Landsat scene 7 to 30 mt. (A) without pansharpening Landsat 8 to 30 mt (b) Landsat Scene 8 pansharpening mts. en 16 bits to 15 (c) and 8 bits (d)

discrimination of the crops against other coverings which generate confusion because the texture and tone are improved; and the fields corresponding to coca crops are better defined.

The project developed – with the support of BOKU University – decision trees for the interpretation of coca crops in satellite images in three regions: Meta - Guaviare, Putumayo - Caqueta and Cauca - Nariño. The goal is to document the process performed by the interpreter to qualify a lot as coca crop, taking into account the dynamics of the cultivation in each region.

satellites is kept for images that provide information on areas with clouds. The following satellites were used to conduct the 2014 census of coca crops.

Landsat 8 captures data in 8 spectral bands with a spatial resolution of 30 meters, two thermals with resolution of 100 meters and an additional panchromatic band of 15 meters. The satellite has a 16 – day repeat cycle, which allows obtaining images with different cloud cover. Its bandwidth of 185 km is appropriate for regional studies and the radiometric resolution is 12 bits, it refers to the

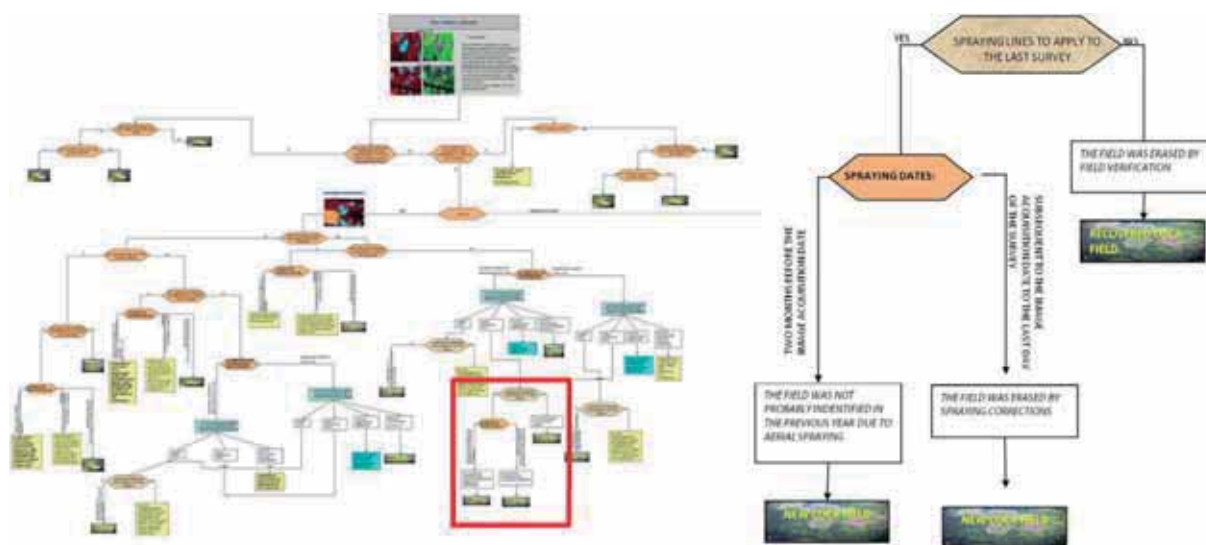


Figure 16. Detail of an physiotherapeutic decision tree designed as a key aspect in the interpretation of coca crop cultivations.

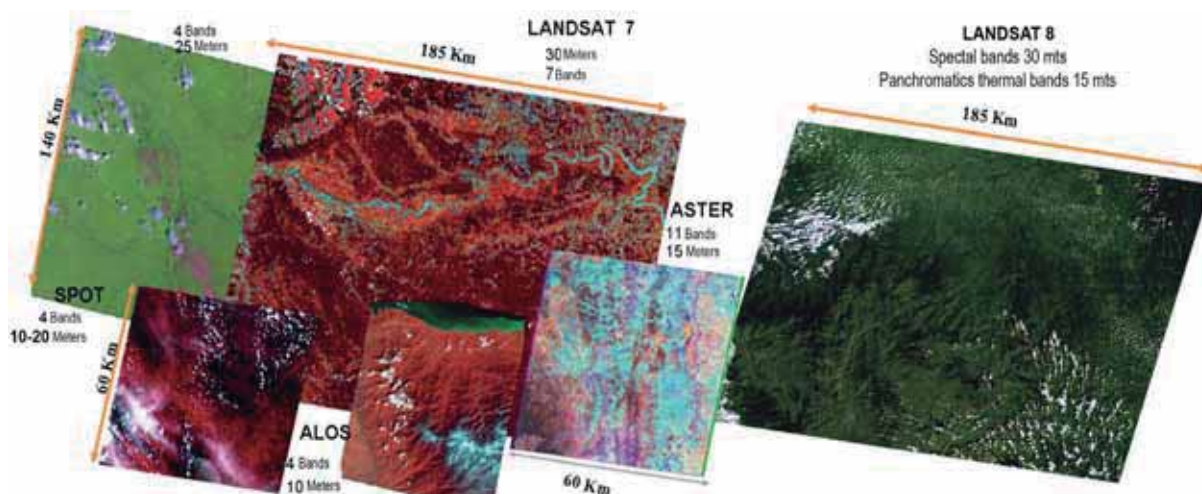


Figure 17. Remote sensing consulted.

Sensors	% 2005	% 2006	% 2007	% 2008	% 2009	% 2010	% 2011	% 2012	% 2013	% 2014
LandSat 7 ETM+	92	89	89	95	69	67	88	100	4	18
LandSat 5 TM	-	-	-	-	13	11	7	-	-	-
SPOT 4 and 5	5	3	3	4	-	-	5	-	-	-
ALOS	-	-	3	1	11	22	-	-	-	-
ASTER	3	5	5	-	7	-	-	-	-	-
IRS6 – LISS III	-	3	-	-	-	-	-	-	-	-
Landsat 8	-	-	-	-	-	-	-	-	96	82
Total	100	100	100	100	100	100	100	100	100	100

Table 40. Contribution of satellite images from 2005 to 2014 used in censuses in Colombia

variability in the spectral radiance of the image that can capture the sensor and helps to give more detail to the interpretation of the image.

Landsat 7 ETM + has 6 spectral bands with a spatial resolution of 30 meters, two thermals of 60 meters and an additional panchromatic band of 15 meters and

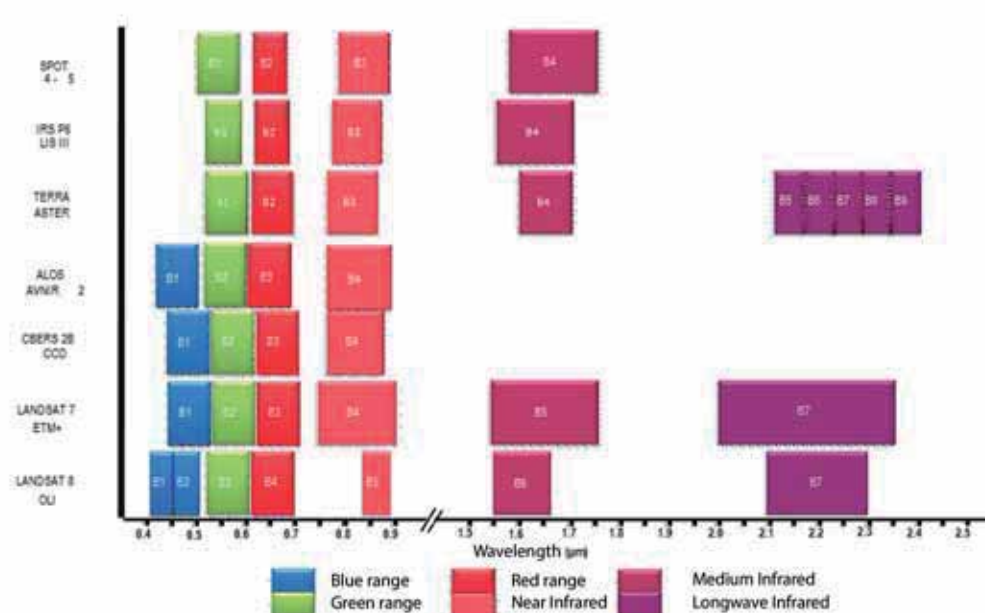


Figure 18. Spectral comparison between bands of SPOT, IRIS, ASTER, ALOS, CIBERS, LANDSAT 7, LANDSAT 8.

radiometric resolution of 8 bits. The satellite has a 16 - day repeat cycle and captures data with a scene size proportional to Landsat 8, appropriate for regional studies.

The figure 17 is related to the different sensors that the project permanently consults, and according to their spectral and spatial characteristics are viable for monitoring coca crops. However, since 2008, Aster only has the first three bands running due to sensor failures while Alos miss capturing images from 2011.

MINIMISATION OF AREAS WITHOUT INFORMATION

The constant presence of clouds in the Colombian territory, hinder to obtain cloud - free optical imaging which involves loss of information. To minimise this loss of information, a permanent monitoring of images captured by the different satellites is performed, with date near to December 31st, in order to replace areas without information due to the presence of clouds

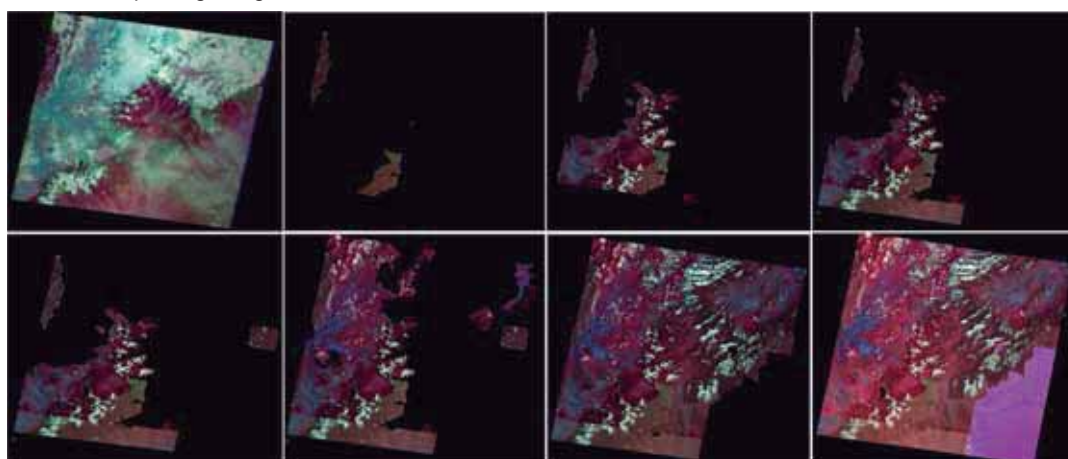


Figure 19. Example of minimization of areas with no information

a	b	c	d
e	f	g	h

From a Landsat 7 ETM+ image (a) and by means of the selection and addition of information available in other 5 Landsat images (c, d, e, f and g), and 2 ASTER images (h), a built image is obtained (h).

IMAGING PRE - PROCESSING

To use information acquired through the use of satellite images together with information from other sources (e.g.: digital elevation models, aspersion lines, eradication ranges, among others) it is required that both the coordinate system of the images geographically referenced and the information from other sources (secondary data) match.

GEOGRAPHICAL REFERENCE SYSTEM USED

- Projection System: Transverse Mercator (Gauss_Krueger)
- Datum: Bogota Observatory, corresponding to the main projection meridian
- 1924 International Ellipsoid.
- Mosaics geographically referenced, in the previous projection system.

and shadows with free areas obtained from other images. Each segment of used image is analyzed a single image taking into account the possible settings for seasonality. This constant search for images is performed so as to ensure a greater coverage of the areas of interest.

RADIOMETRIC AND SPATIAL IMPROVEMENTS

The radiometric improvement is aimed to enhance of the spectral characteristics of the data to facilitate and optimise the visual interpretation of coca crops.

Various filters that modified the value of the pixels are used in order to improve the spatial characteristics of an image using the values of neighboring pixels, its function is to highlight linear features such as hydrographic and road networks in the image.

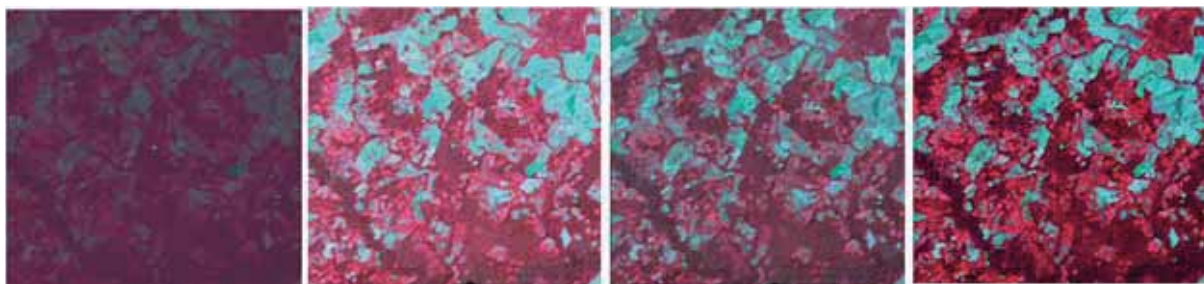


Figure 20. Example of radiometric enhancement.

a b c d The original data (a) is subject of different processes of shine and contrast highlight (b, c, and d)

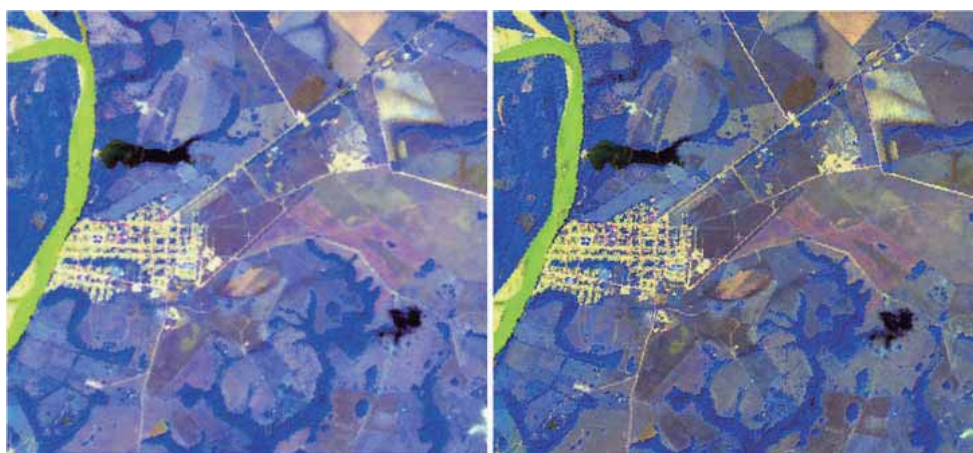


Figure 21. Example of spatial enhancement.

a b The original data (a) is subject of a spatial filtering process (b)

COLOUR COMPOSITION

Multispectral imaging capture information in various ranges of the electromagnetic spectrum, a band in an image corresponds to a portion of the electromagnetic spectrum in this way, through the combination among bands different colour compositions are obtained that facilitate the discrimination of interest coverages present in the satellite image. Obtaining a colour composition depends on the purpose of the interpretation and the bands used; different colour compositions highlight the same coverage differently.

VISUAL INTERPRETATION OF COCA FIELDS

The features of the Colombian territory make the establishment of a defined schedule of cultivation not necessary; this in conjunction with the spectral characteristics of coca crops that in their different growth phenological stages overlap with other plant coverages prevents the use of an automatic supervised classification to obtain coca crops. The identification of coca fields relies on the visual interpretation of satellite imaging supported on: the spectral behavior, interpretation elements (tone, shape, texture, pattern), geographical environment and the specific characteristics of the area. Coca class in all of its vegetative states can be considered as a composition of areas where areas

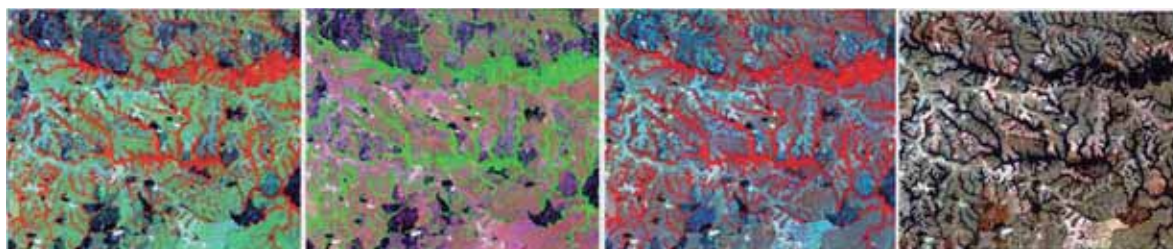


Figure 22. Example of different colour compositions.

a b c d From a Landsat 7 ETM+ image, some of the colour compositions used: (a) RGB(4,5,3), (b) RGB(5,4,3), (c) RGB(4,3,7) and (d) RGB(7,3,2).

of high and medium density leaf density and low leaf density areas are mixed; depending on the density a different response of the soil is obtained, this allows that the spectral response of a coca field is found in a wide spectral range.

The interpretation of the coca fields includes three stages:

- 1- Preliminary Interpretation of coca crops
- 2- Verification overflights
- 3- Edition.

reseeding, bare ground, other crops and others. This process has improvements such as the editing reduction of the information gathered in the field and concurrently allows the construction of a geographical referenced historic archive of the verification missions.

The overflights planning focuses on four basic aspects: general monitoring, verification of changes in crop densities, monitoring areas opened in the previous census and expansion areas. The verifications are carried out with 5 miles scanning and an average of 3,000 feet of height.

In addition to the vector file to be built during the overflight, a digital camera combined with GPS for taking pictures, a video camera that captures additional

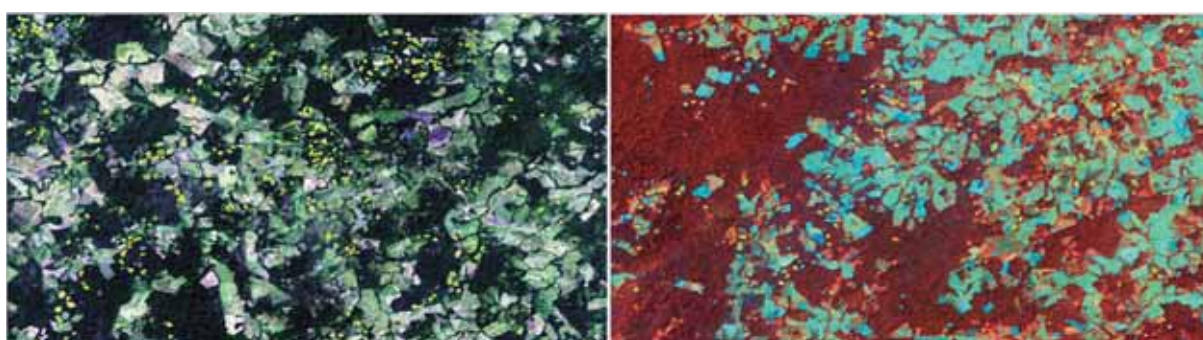


Figure 23. Visual interpretation

a b Coca fields visually interpreted (yellow outline) in ALOS - AVNIR 2 image, colour compositions: Natural RGB (3, 2, 1) (a) and False colour RGB (4, 3, 2) (b).

Preliminary interpretation of coca crops

The process of preliminary visual interpretation is based on: the points mentioned above, it is also taken into account the analysis of the historical series of coca and the secondary information from various sources among which it is contemplated the use of aerial photographs, information on aerial spraying and manual eradication and information provided by different government agencies and the UN system.

information and GPS to record the position of areas with or without coca is used. All these resources are used for the editing processes of the preliminary fields interpreted in office. The verification overflights are supported by the DIRAN, and to prepare the 2014 census of coca 9 missions were performed with duration of 103 flight hours.

EDITION

The information collected during the verification overflights is used to adjust the preliminary interpretation taking into account the date of the images and actions of aspersion and eradication carried out in the area covered by the image. Once this adjustment is carried out the interpretation file of coca crops is obtained.

VERIFICATION OVERFLIGHTS

The verification overflights are required to adjust and then validate the interpretation. This verification is based on direct visual inspection of the areas affected with coca crops from an aircraft. For the 2014 Census a direct capture system from the information obtained in the field of satellite imaging using a tablet that is synchronised with a wireless GPS antenna was implemented. This device allows the creation of a shapefile type vector file, built by the expert during the overflight; it has assigned the characteristic of the area identified in the field based on a list of attribute, coca field, high or low density area,

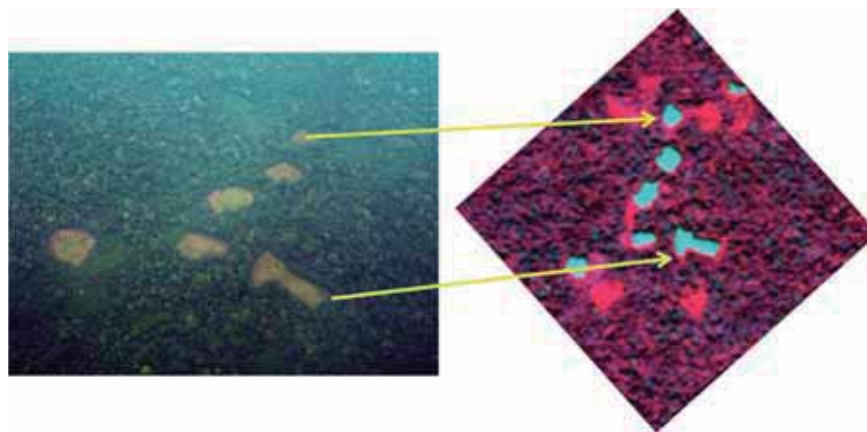


Figure 24. Photographic record of verification overflights and its equivalent in satellite image.

DIGITAL CLASSIFICATION OF COVERAGES AND LAND USE.

Besides coca crops, other plant coverages are interpreted with emphasis on the areas of influence of the coca - growing regions, based on the legend adapted by the project. These coverages are an input of the multi - temporal analysis of coverage that is conducted annually and its main objective is to determine the dynamics of coca crops against other plant coverages.

The interpretation of coverages, other than coca cultivation, is carried out through a supervised classification. Based on the knowledge of the interpreter, a group of pixels (with minimal variability in their digital levels) is selected representing a given coverage and

is used as training area to classify all of the pixels that correspond to such coverage in the image. This process is carried out with the other coverages referred to in the legend. The algorithm used is the one with the maximum likelihood, which uses a probabilistic model in formulating rules for the award of value to pixels. 12 of the classes of the establish legend are obtained through this process: Primary forest and rainforest, secondary forest, pastures and low stubble, high stubble, bare soil, other crops, rocky outcrops, flood plains, clouds and gaps; other coverages for being linear as bodies of water, roads; the urban areas are worked by hand and not by classification, the same happens with the coca crops that are interpreted visually.

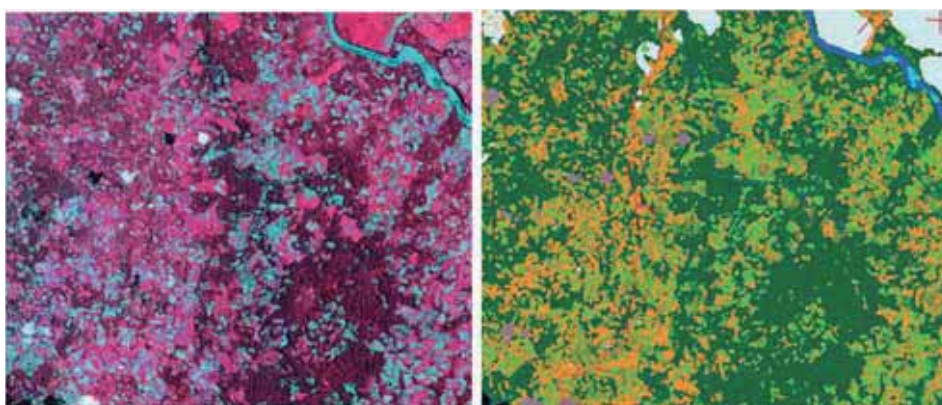


Figure 25. Digital classification of land covers.

a b

SPOT RGB (3, 2, and 1) image (a) and its corresponding land cover Classification (b).

Map 24. Study area distributed by region and coca cultivation in Colombia, 2014



Source: Colombian Government - National monitoring system supported by UNODC

The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

ADJUSTMENTS AND ESTIMATES

The interpretation of areas sown with coca from satellite images is complemented with the implementation of a series of settings to improve the data, and reduces the error associated with the lack of information (presence of clouds) or the difference between the date of the image and the cut - off date of the census.

ADJUSTMENT BY FORCED MANUAL ERADICATION

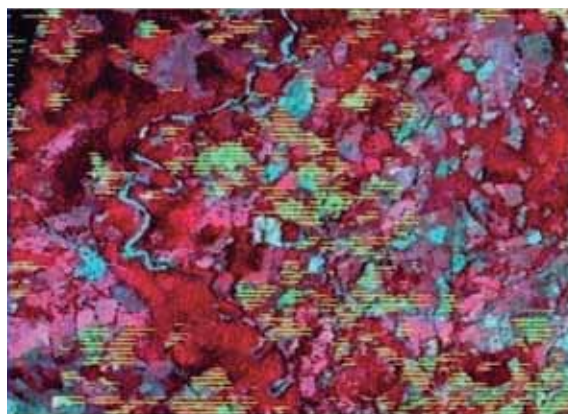
As part of eradication efforts, coca crops are manually plucked with the registration of their coordinates, date of eradication and other variables related to the crop. With the previous information the related settings are carried out depending on the date of the image, date of eradication and the cut - off date of the census. When eradication is carried out after the date of the image, the areas planted with coca are interpreted, however if this eradication was carried out before the cut - off date of the census, the interpreted coca fields are eliminated in the adjustment process.



Coca plots that were manually eradicated (after the date of the image) in white

ADJUSTMENT FROM ASPERSIONS

The coca fields are aspersed from aircraft as part of the programme of aerial spraying of illicit crops. The aspersion lines are automatically recorded. After transforming the coordinates into the coordinate system of the satellite imaging, a range (buffer) is plotted according to the type of aircraft around the recorded aspersion line. The ranges, representing the aspersed area, are overlapped over the interpreted coca and corrections are applied taking into account the date of the image, the aspersion date and the cut - off date of the census as follows: all the coca fields identified in images acquired before the aspersion date and before the cut - off date are eliminated. The estimated survival percentage of the sprayed crop, that according to DIRAN was 8.8% in 2013, is added.



Coca cultivation with aspersion lines in yellow.

ADJUSTMENT FOR DIFFERENCES IN THE IMAGING ACQUISITION DATES

In the satellite image you can only observe the crops present at its acquisition date. Therefore, you must apply a correction factor to obtain the estimates at the cut - off date of December 31st. This factor is calculated as a monthly rate of increase or decrease depending on the trend of the coca crops in the images of the same area used in consecutive censuses. This rate is then applied to the initial interpretation for the number of months separating the acquisition date and the cut - off date of December 31st and to calculate the area of coca that must be added or subtracted from the final statistics.

ESTIMATE ON AREAS WITHOUT INFORMATION

Clouds and shadows are reduced as much as possible using multiple images of the same area and forming mosaics that reduce the area without information. In 2013, an effective coverage of 86% was achieved. This means that the entire area affected by the presence of coca, 14% had restrictions by lack of information; this percentage is heavily concentrated in the Pacific region and Cesar.

To adjust the effect where the coverage of imaging free of clouds is definitely not possible to obtain, the areas with information in two consecutive years are delimited; then by comparison with the previous year trends of coca crops are estimated. The result of the trends in areas with information is applied to areas without information

ESTIMATE OF SMALL CROPS

SIMCI project based on the analysis of the historical series of coca crops has established the existence of a trend towards reducing the average field size of coca in Colombia (from 2 hectares in the year 2000 to 0.58 in 2013) as a change in the type of cultivation. Although the phenomenon is significant in proportion to the total number of detected fields (2.8% in the year 2000 to 21.5% in 2009), it does not mean a proportional increase in the total reported area (0.1% to 4.8% in the same period). However, the inclusion of such fields in the census data is considered a contribution to improve the accuracy in the area.

The spatial resolution of 15 meters used for the census of 2013 has improvements which include the following: The texture happens to have greater relevance for the process of interpretation in improving thematic accuracy (yellow range). The boundaries threshold for each field is reduced, this means that the definition is more precise and at the same time expands the possibility of interpreting increasingly smaller fields compared with Landsat 7 (white range).

However, the images used in the census of coca crops limit the detection of fields with areas smaller than 0.1 hectare. The estimation of small fields seeks to include in the census the proportion and significance of the fields which are not detectable by the above mentioned limitations. To facilitate comparison, the historical series were adjusted applying the estimation of small fields.

A regular systematic sampling framework with assessment surfaces of 20 km² was used separated at a distance of 20 km in areas of historical presence of coca crops. Coca fields were interpreted in complementary images of high spatial resolution and compared with the interpretation carried out in the 2009 census.

A cluster analysis was performed⁸⁸ where the parameter to model is the proportion of small fields in each of the clusters. Interpreted areas were crossed with master

frame of grids of 1 km * 1 km to determine the number of elements within the cluster. Finally, in order to control the variability, the analysis by region was stratified. The actual coverage of each of the grids within the conglomerate was checked, eliminating those with a percentage smaller than 50% coverage in the grid⁸⁹.

Verifying the variance between clusters in each region homoscedasticity is found, i.e., the variance behavior between clusters is controlled for each of the strata. There are significant differences between regions and therefore this stratification factor is significant for the analysis of information (Table 41).

The estimate is determined by the proportional weighing of the coca area found in the cluster with respect to the area of coca found in the region, affecting this weighing the parameter proportion of coca areas smaller than 0.25 hectares in the cluster; it is expressed by:

$$F_i = \sum_{j=0}^{n1} \sum_{j=0}^{n2} \frac{A_j}{A_i}$$

A_j: Area of coca cultivation lots less than or equal to 0.25 in the region. j = 1, 2, 3, 4, 5, n

A_i: Area with coca cultivation lots identified in the region. i = 1, 2, 3, 4, 5, 6.

The above analyses show that the sample sizes are acceptable and ensure the variance homogeneity by region, whereby the weighted average behaviour of clusters as the behaviour of the parameter in the region is set⁹⁰.

Means with the same letter are not significantly different				
Duncan Grouping		Media	N	Region
	A	0.3744	117	Central
	B	0.2204	104	Pacific
	B	0.2087	88	Putumayo - Caqueta
C	B	0.1450	76	Guaviare - Meta
C		0.0958	42	Orinoco

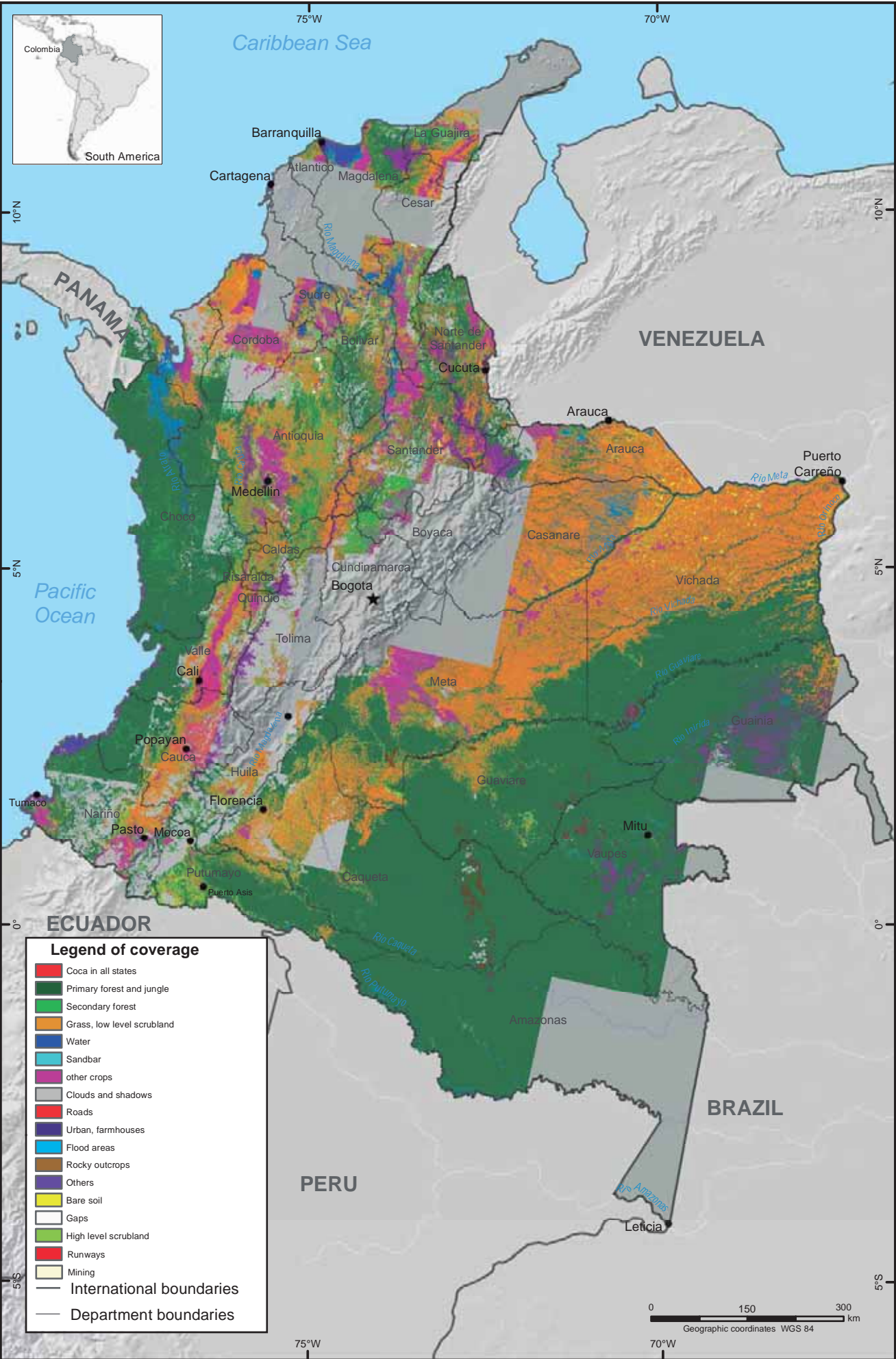
Table 41. Means difference tests within Duncan grouping

88. Cluster analysis allows us grouping individuals taking into account the characteristics of interest through distances, in order to assess the construction of homogenous groups to characterise the population.

89. Inclusion criteria of grids observation units.

90. The methodological details are available at: Adjustment factor for correcting small fields in the 2010 census

Map 25. General map of coverage 2013



Source: Colombian Government - National monitoring system supported by UNODC
The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

PRODUCTION AND PERFORMANCE ESTIMATES

In estimating the potential cocaine production in Colombia three key steps are considered: i) the conversion of coca leaves into basic paste commonly carried out by farmers; ii) the conversion of the

Between the years 2004 and 2005, the SIMCI project and the National Narcotic Drugs Directorate (Dirección Nacional Antinarcóticos) developed a probabilistic sampling methodology in order to characterise and estimate production and yield of coca leaf in Colombia. The general framework of the investigation covers three thematic areas: (i) establish productive

Region	Department
Meta- Guaviare	Meta and Guaviare
Putumayo-Caqueta	Putumayo and Caqueta
Central	Bolívar, Antioquia, Córdoba, Santander, Cesar Boyaca, Cundinamarca, Caldas and Risaralda
Orinoco	Arauca and Vichada
Pacific	Nariño, Cauca, Choco and Valle del Cauca
Catatumbo	Norte de Santander
Sierra Nevada	Magdalena and La Guajira
Amazon	Amazonas, Guainia and Vaupes

Table 42. Regions of study

cocaine basic paste into cocaine base; and iii) the industrial process to obtain cocaine hydrochloride. The calculations related to the first two steps are performed based on the results of productivity studies, while the third step is estimated with reference to data published by the Government of the United States.

characteristics associated to coca cultivation and Coca Agricultural Production Units (UPAC – Unidades Productoras Agropecuarias de Coca – in its Spanish acronym); (ii) characterise socio - economically the coca farmers; and (iii) identify the persistence of coca crops.

Region	Baseline phase 1	Phase 2				Phase 3				Regional total
	2005	2007	2008	2009	2010	2011	2012	2013	2014	
Meta-Guaviare	309		300					300		909
Central ^(a)	165	165				180				510
Putumayo-Caqueta ^(c)	240		210 ^(b)				240			480
Orinoco	150				135			150		435
Pacific	255			276					270	801
Catatumbo	135	135				120				390
Sierra Nevada	135	135				45 ^(d)				270
Total	1,389	435	510	276	135	345	240	450	270	4,050

Table 43. Number of surveys conducted according to research phases ^(e)

Note:

(a) The Central region is formed by Bolívar, Antioquia, Córdoba, Santander, Cesar Boyaca, Cundinamarca, Caldas and Risaralda departments. In previous studies, this region was known by the name of southern Bolívar since the geographical configuration of the coca cores was established in this area.

(b) Study by the National Anti-narcotics Directorate, only has performance data and run production for this survey, therefore, information relating to the characteristics of the crop, as well as social, economic and market characteristics, among others, are not recorded in this book because the microdata of the information collected is not available.

(c) No field operations to estimate performance are executed in the Amazon region. This area is assumed to have the same performance as the one obtained in Putumayo-Caqueta, by geographic continuity and association of agricultural practices.

(d) In the region of Sierra Nevada, the dynamics of coca cultivation showed a sharp reduction and coca lots to apply harvest tests in the selected sample were not found. Therefore, for purposes of production estimates and output rates figures captured in 2007 are used.

(e) In 2005, the information collected at baseline corresponds to the Phase I of the productivity study, while regional update between the years 2007-2010 refers to Phase II. Updates made in the regions of Sierra Nevada, Central and Catatumbo in 2011, Putumayo-Caqueta in 2012 and the ones published in this report concerning Meta-Guaviare and Orinoco correspond to Phase III, which ended his round in 2014 with the completion of field operations in the Pacific region.

This study allowed establishing the research baseline and a structure for the execution of subsequent updates, gaining national consolidation every three years. In the conceptual framework of the research is contemplated the identification of particularities and territorial dynamics differentiated around the cultivation of coca in their social, economic, institutional, cultural and environmental dimensions. To assess the problem at the regional level, the country was divided into eight regions under study:

The collection method is through field surveys to direct PAC informants. The research coverage is regional and refers to areas of impact of coca crops in the last two annual coca censuses prior to the field application. The research started with a baseline in 2005 and the national implementation between 2007 and 2010, the second phase of implementation was executed; the third phase was implemented between 2011 and 2014. The following table sets forth the years of implementation of the research and the number of surveys conducted in the territory for the two phases of study.

The methodology used in productivity studies is multi-stage sampling based on the master framework areas. The master framework of areas is a grid construction of 1 km x 1 km with a single and unique identification for the entire national territory. It is important to emphasise that the methodology used, being probabilistic, allows extrapolating information from the sample to the population. Since the universe of producer is not known, the location of the coca fields coming from annual surveys conducted by the SIMCI project is taken as reference, where the census is constituted the population universe (what is called Framework of Areas).

The statistics units of observation are as follows: i) Primary Sampling Unit (UPM – Unidad Primaria de Muestreo – in its Spanish acronym) is related to the grids that are found in the statistical framework, ii) Secondary Sampling Unit (USM – Unidad Secundaria de Muestreo - in its Spanish acronym) corresponds to the coca fields identified in each one of the UPM; iii) Tertiary Sampling Unit (UTM – Unidad Terciaria de Muestreo - in its Spanish acronym) is the selected lots in the coca field. The observation unit coincides with the USM. The crop testing is conditioned to productive fields only. The sampling framework is constructed based on coca censuses and applied a sample design of type:

Probabilistic: Each UA (coca field) has a known probability and nonzero of being included in the sample.

Stratified: The first level of stratification is given by the coverage of land use. The grids (UPMs) are classified

into strata Crops (1), mixed Crops (2), Grasses (3), Natural forests and Other uses (4), based on the information of the map of coverage of land use SIMCI / UNODC.

Tri - stage sampling: In the first stage, Primary Sampling Units (UPMs), consisting of grids of 1 km * 1 km, are systematically selected; which were selected with Probabilities Proportional to the Size (PPT – Probabilidades Proporcionales al Tamaño – in its Spanish acronym) of the coca surface thereof. In the second stage, the Secondary Sampling Units (USMs) made up of the coca fields within the UPMs (grids) of the first stage, which are designated with the PPT of its coca area are systematically chosen. In the third stage Tertiary Sampling Units (UTMs) called fields within the USMs included in the sample of second stage are randomly selected. Two fields are selected, which have a shape of a five square meters rectangle or a trapezium with a surface similar to the above. In each of these fields crop testings are carried out to measure and weigh harvest the green leaves of coca.

The methodological process includes interviews with coca leaf growers and crop testing based on the guidelines of the United Nations Manual. Currently, UNODC / SIMCI and the Government of Colombia are developing experimental studies of alkaloid content of the coca leaf and laboratories' efficiency; however, to date the benchmark of this information remains the reports of the US government.

QUALITY CONTROL

Quality control to processes suggests that a good quality in processes improves the reliability of the final data, since it can detect and adjust for inconsistencies that may occur and thereby improve the degree of ultimate reliability.

The quality control to the 2014 census consists of three basic lines: the first refers to the settings of the data which are not associated with the interpretation itself, but to reduce the error associated with lack of information (clouds, gaps) and temporality; the acquisition of images with the least amount of clouds and near the cut - off date of the census, is a priority factor for the full coverage of the territory, for this census the adjustment incidence for lack of information was 6% nationally. This reduction is due to the use of images coming from the Landsat 8 sensor launched in early 2013, which does not present any failure in the SLC (scan line corrector) and to the reduction in areas without information which was 8.8% nationally, five percentage points less than the 2013

census and that was obtained by using multiple images for the same area achieving an average of 2 images per area for the national territory and 3.5 images for the Pacific region, which has historically accounted for the largest percentage of coverage clouds.

The second line is based on the intensity and distribution of the fieldwork for the validation and adjustment of thematic nature of the data. This activity contemplated for the 2014 census, 9 missions for land Overflight which used 103 flight hours with a distance of 15,000 kilometers covering 54% of the area affected by coca crops and 88% coverage in the number of images used in the census. However, due to public security and climatic conditions, the areas of the departments of Amazonas and Cauca could not be overflown.

As the last line a quality control to processes was carried out based on specific assessments to the different activities involved in the data of the annual crops census (geographic referencing and interpretation).

Line	Process	Reference Value	Valor 2014
Processes not associated with the interpretation	Areas without information	Maximum 20%	8.8%
	Adjustments associated with areas without information	Maximum 15%	6%
	Date image	Optimal: date less than 60 days from the date of court	72%
Fieldwork	Fieldwork coverage	30% of the minimum affected area	54%
	Fieldwork image distribution	100% of the images used should relate to fieldwork	88%
Census data	Geo-referencing	RMS flat zones <1	RMS national X= 0.58
		RMS mountainous zones <3	RMS national Y= 0.56
	Interpretation	Performer evaluation and interpretation, minimum 40% of the images	81%
		Validation based on atypical errors, 100% of the images	100%
		Confrontation dynamics and field trends, 100% of images	100%

Table 44. Quality control parameters, 2014

a. Geo - referencing: a correct geographic - referencing can control the distortions in the satellite image to ensure the proper geographical position, a good measurement of areas and comparability with historical census and other data layers. For the geographic - referencing control, three types of factors are taken into account: number of points, its distribution in the image and rigor on location: The assessment of the geographic - referencing is carried out using the indicator "Mean Square Error", the RMS represents the degree of correspondence in the transformation between the control points used.

RMS values set out in the Project contemplated for mountain areas RMS <3 pixels and for flat areas RMS <1 pixel. The national RMS value of the 2013 census is 0.58 pixels in the X coordinate and 0.56 pixels for the Y coordinate. The average for the X coordinate for flat areas is 0.5 and 0.49 for the Y coordinate. For the mountain area the average values are 0.62 and 0.45 respectively. Both mountain areas and flat areas comply with the geographic - referencing parameters of the project.

b. Control to the process of interpretation involved three basic filters: i) Assessment and validation of data between interpreters. This allows validating the interpretation of the areas by other interpreters. ii) Geographic data validation; and iii) Comparison of the dynamics obtained with the historical trend, with the information of the activities generating dynamics in the region and with the findings of the verification field.

The 2014 census strengthened the control of atypical data in previous censuses conducted by a geographic validation model, based on the use of technical tools and automatic mechanisms that ensure the objectivity and standardised the verification; overall, the model allowed validating information regarding: i) atypical fields by shape and area, ii) expansion of areas of historical influence and iii) altitudinal validation.

RELIABILITY

Identification of coca crops through satellite images is a fundamental input to the estimations of areas sown with coca, territory affected by the phenomenon of coca crops, potential cocaine production and income from planting coca, among others.

Since 2002, the project has committed to measure and improve the reliability of the interpretation; initial assessments led by ICMP are focused on the thematic reliability and accuracy of user data obtaining values higher than 95% reliability (the assessed regions were

Putumayo - Caqueta, Meta - Guaviare and Nariño). In 2008 and 2009, in the municipalities of Vista - Hermosa (Meta) and Caceres (Antioquia), with the support of the Department of Landscape, Spatial and Infrastructure Sciences of the University of Natural Resources and Applied Life Sciences, Department of Landscape, Spatial and Infrastructure Sciences (BOKU) in Vienna, case studies based on the use of aerial photographs and high - resolution images were carried out to measure the reliability of the data interpretation obtained for specific regions. The results allowed us to conclude that i) the field surveys improve the initial interpretation, ii) the interpreter's expertise in a specific area is positively reflected in the reliability of the final data and iii) the spectral resolution of the images has strong impact on the thematic discrimination.

Boku made two recommendations i) the use of images of high spatial resolution with at least one band in the near infrared⁹¹, as a basis for building field truths and getting the boundaries accurately and the inclusion of fields below 0.25 ha and ii) mandatory field survey to validate the field truths, stage that was not carried out in these studies and therefore does not validate this comparison input. These recommendations have been adopted in subsequent studies and since 2010 the project has included in the census data an adjustment by the estimation of small fields (< 0.25 ha).

In the year 2012, a case study was conducted in the Caqueta Department (Union - Peneya) based on the comparison the result obtained between the interpretation in medium - resolution images used for the construction of census data, the field truths built by overflight with high spatial resolution image support (Pleiades constellation, 12 - bit radiometric resolution, spatial resolution of 2 meters and spectral of 4 band that includes one of the near infrared). The assessment focused on the ability to identify coca fields (thematic accuracy), delimitation thereof (geometric accuracy) and restrictions inherent to the images used. The obtained results reported high thematic accuracy and user accuracies above 89%. There were found differences in the accuracy of the boundaries derived from the spatial resolution of the image used (30 meters) and errors of omission related thereof.

In accordance with the findings and recommendations of the 2012 study for the 2013 reliability assessment (case study Miraflores - Guaviare) and for the processing of the 2014 census, the use of medium - resolution images with pansharpening processing was implemented, to improve accuracy in the boundaries and to incorporate to the interpretation fields smaller than 0.25 ha, which affect the overall thematic accuracy

⁹¹. The infrared band corresponds to a range of the electromagnetic spectrum that provides information relevant for the study and discrimination of vegetation.

and the error of omission by this factor. The field truths were built with the established parameters. The results obtained in the assessment of the 2013 reliability corroborated the previous findings and reported a strengthening in the overall delimitation of the fields and the field interpretation between 0.1 and 0.25 ha. For this reason, the 2014 census data does not include adjustment estimation of small fields. By the year 2015 a regional case study will be conducted in the department of Nariño which will continue to refine the characterisation of the interpretation.

The studies and assessments conducted to the reliability have allowed identifying strengths and weaknesses of the interpretation and improving techniques in the process of obtaining the data. Although assessments have focused on case studies for specific regions, the obtained results have been adopted for the whole territory and strengthen the quality of data on thematic, geometric and coverage parameters and providing robust, objective and technical information for the development of research that improves the characterisation of the phenomenon of drugs in the Colombian territory.

As part of the commitment to strengthening, adapting and efficiency of the methodology to the new challenges imposed by the dynamics of illicit crops in the territory, during the 2015 an external and historical assessment of the project will be carried out to measure the achievement of established goals and objectives with particular emphasis on the methodology used for measuring area of coca crops, basic input of the annual census of illicit crops and research conducted by the academic community. The assessment will determine the impact that the Project has had on the formulation of public policies and comprehensive understanding of the phenomenon of drugs in Colombia, among others

ATTACHMENTS

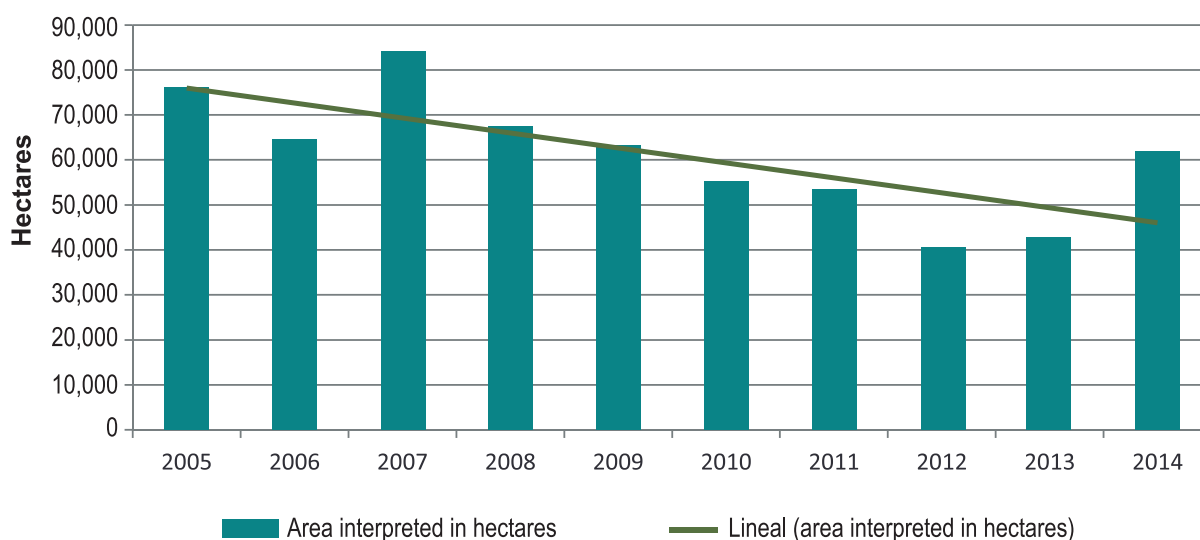
ATTACHMENT 1: ESTIMATE FOR AREAS WITHOUT INFORMATION, AERIAL SPRAYING AND AGE OF THE IMAGING IN 2014

In 2014, the satellite coverage for the development of the census of coca crops was 91%, 2 percentage points higher than coverage in 2013. Improving the coverage represented a larger area available for interpretation reflected in an increased coca area interpreted in 2014 and in an overall decrease in the adjusted area. The

Pacific region is the area with lowest satellite coverage, so that the data in this area should be analyzed with caution.

The figure shows the areas cultivated with coca interpreted in the satellite imaging and its trends without estimations applied to calculate the national figure.

The weight of the estimations applied in the different surveys along the historic series varies from 11% in 2005, to 17% in 2004, 2006 and 2008. By the year 2014 the weight of the settings is 11%; however, it should



Graph 32. Coca cultivation interpretation without adjustments, 2005 -2014

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Area estimation without information	6,362	8,418	8,357	9,962	6,177	5,492	8,843	5,328	5,377	4,243
Correction of age of the image	1,020	1,135	-917	391	371	-119	936	1,834	-119	1,830
Correction of aerial spraying	2,315	3,349	7,625	3,266	2,843	1,378	159	30	95	1,221
Total	9,697	12,902	15,065	13,619	9,391	6,752	9,938	7,192	5,353	7,294
Percentage/census	11	17	15	17	14	11	15	15	11	11
Area interpreted in hectares	76,053	64,968	83,888	67,334	63,634	55,061	53,826	40,597	42,836	61,838
Area reported in hectares	86,000	78,000	99,000	81,000	73,000	62,000	64,000	48,000	48,000	69,000

Table 45. Historical adjustment series, 2005-2014

Department	Interpretation Ha	Corrections			Census 2014 (ha)
		Aerial spray- ing (ha)	Areas without infor- mation (ha)	Temporality (ha)	
Amazonas	157	0	1	15	173
Antioquia	2,230	3	30	30	2,293
Arauca	30	0		-5	25
Bolivar	1,564	1	8	-8	1,565
Boyaca	14	0		0	14
Caldas	0	0		0	0
Caqueta	6,861	0	3	-322	6,542
Cauca	5,222	14	366	787	6,389
Cesar	9	0	1	0	10
Choco	1,069	336	248	89	1,742
Cordoba	486	2	72	0	560
Guainia	70	0		-4	66
Guaviare	5,526	89	14	30	5,659
La Guajira	0	0		0	0
Magdalena	9	0		0	9
Meta	5,006	16		20	5,042
Nariño	13,704	283	2,902	394	17,283
Norte de Santander	6,544	0	305	95	6,944
Putumayo	12,234	463	245	665	13,607
Santander	26	0		0	26
Valle del Cauca	408	14	37	103	562
Vaupés	110	0	1	-2	109
Vichada	559	0	10	-57	512
Total	61,838	1,221	4,243	1,830	69,132

Table 46. Estimation by zones without, aerial spraying and date when the image was taken in 2014

be noted that 45% of these settings is concentrated in Nariño, which in turn showed 69% of settings in areas without information and 25% of the planted area. It is also necessary to point out that 17% of the settings are located in Putumayo, with 6% of the settings in areas without information and 20% of the area cultivated with coca

ATTACHMENT 2: LIST OF SATELITE USED IN THE 2014 COCA CENSUS

LANDSAT 8 OLI		
<i>PATH</i>	<i>ROW</i>	<i>Acquistion date day</i>
4	57	2015/02/09 - 2014/10/04
4	58	23/12/2014
5	56	14/12/2014
5	57	2015/03/04 - 2015/04/05
5	58	2015/04/05 - 2015/02/16
5	59	05/04/2015
5	60	14/12/2014
6	55	21/12/2014
6	56	06/01/2015
6	57	21/12/2014
6	58	21/12/2014
6	59	21/12/2014
6	60	21/12/2014
6	61	18/10/2014
6	62	19/11/2014
7	54	2015/01/29 - 2014/09/07
7	55	10/11/2014
7	58	20/12/2014
8	52	04/01/2015
8	53	04/01/2015
8	54	2015/01/04 - 2015/02/05 - 2014/09/07
8	55	04/01/2015
8	56	04/01/2015
8	58	04/01/2015
8	59	21/02/2015
8	60	21/02/2015
9	52	08/11/2014
9	54	26/12/2014
9	55	26/12/2014
9	56	20/08/2014
9	57	2015/04/17 - 2014/10/23
9	58	2014/08/20 - 2014/12/26
9	59	2014/12/26 - 2015/02/28 - 2014/11/08
9	60	04/08/2014
9	60	28/02/2015
10	54	02/01/2015
10	55	02/01/2015
10	56	27/08/2014
10	57	2014/08/27 - 2014/11/15
10	58	2015/01/18 - 2015/03/07
10	59	2015/03/07 - 2015/03/23 - 2015/01/02 - 2014/07/10
Total		56

LANDSAT 7 ETM+		
<i>PATH</i>	<i>ROW</i>	<i>Acquistion date day</i>
4	56	15/12/2014
7	59	20/12/2014
7	60	20/12/2014
7	61	01/10/2014
Total		4

ATTACHMENT 3: METHODOLOGY FOR THE ESTIMATION OF THE PRODUCTION OF COCA LEAF, COCA PASTE, COCAINE BASE AND HYDROCHLORIDE

The SIMCI project, in a strategic partnership with national and international, public and private institutions, has conducted studies and methodologies to strengthen the estimation of cocaine production in order to be set to an indicator reflecting the dynamics of the factors involved

hydrochloride from the years 2005 to 2014 applying methodological settings socialised last year, as well as the comparability with the traditional methodology.

The methodology for the estimation of the annual production of cocaine hydrochloride uses existing information on hectares, yields by hectare, conversion factors of the extraction and refining processes, purity and others. The convergence of the information related to the processes of transformation of the leaf into cocaine hydrochloride that contributes to the production calculations, is summarised in the following procedures:

1.	Fresh coca leaf production (PHC)	=	$\text{Yearly productive area}_n (\text{AP})^{85} \times \text{annual coca leaf yield}_n (\text{RAH})$
2.	Cocaine base production(PBC)	=	$\text{PB}_1 + \text{PB}_2 + \text{PB}_3$
	where,		
	Production of coca paste carried out in UPAC (PB ₁)	=	$(\text{PHC}) \times \% \text{ coca paste producers} \times \text{coca paste yield per mt of coca leaf UPAC (RPB)} \times \text{paste/base coefficient (RB/RPB)}^1$
	Cocaine base production carried out within UPAC (PB ₂)	=	$(\text{PHC}) \times \% \text{ growers that produce cocaine base} \times \text{cocaine base yield per mt of coca leaf within UPAC (RB}_1)$
	Cocaine base production carried out outside of UPAC (PB ₃)	=	$(\text{PHC}) \times \% \text{ growers that sell coca leaf} \times \text{cocaine base yield per mt of coca leaf outside of UPAC (RB}_2)$
3	Pure cocaine hydrochloride production	=	$(\text{PBC}) \times \text{cocaine base purity (P)} \times \text{base conversion factor kg/ hydrochloride kg (RHCL)}$

Table 47. Synthesis of procedures for cocaine hydrochloride production estimates

¹ A coefficient is estimated for the yields of coca paste and cocaine base, obtained from manufacturing studies, with the aim to express the quantities of coca paste in reference to cocaine base. Nevertheless, within cases in which no cocaine base yields are registered, it is assumed that the coefficient equals 1.

in their transformation such as: i) the establishment of coca production area; ii) obtaining fresh coca leaf per hectare; iii) extracting the alkaloid from the cocaine paste; iv) oxidation of cocaine - based paste; and v) crystallisation to obtain cocaine hydrochloride. As a result, in the previous report settings were implemented to the traditional method of calculation, focused on strengthening of two strategic variables: production area during the year_n (AP) and yield of the cocaine base by tm of coca leaf external to the UPAC (RBe). This Appendix shows the changes occur in the estimation of the production of coca leaf, cocaine paste and cocaine

In 2013, two settings were incorporated into the methodological processes used in the production calculation: the permanence factor that improves the estimations of production area and the differentiated cocaine base conversion factor that allows incorporating new trends in the extraction process of the alkaloid. These settings affect the continuity of the historical series so in this section are details about its impact and a comparison between these estimations and those carried out with the traditional methodology for the period 2005 - 2014. The changes that affect the estimations used in the traditional methodology and in the adjusted are summarised in the following table:

Indicator	Variable	Traditional approach	Adjusted approach
Yearly coca leaf production _n (PH)	Productive areas per year _n (AP)	AP = average (area under survey of year _n and area under survey of year _{n-1})	AP = \sum (area of the lot under survey of year _{n-1} X permanence factor)
Cocaine base production obtained from coca leaf sales, as processed by stakeholders different from farmers	Coca leaf – cocaine base conversion factor	The same behaviour of conversion factors reported by farmers I productivity studies is assumed	Higher efficiency is assumed in extraction processes that efficiency found in agricultural producers with coca. 1.8 conversion factor obtained from transformation efficiency studies.

Table 48. Summary of the methodological changes from the traditional and adjusted methodology

First, the productive Area during the year_n (AP) seeks to estimate the hectares that have remained productive throughout the year. In the traditional method, the productive area is calculated from the average of the last two censuses under the assumption that new and abandoned fields are productive only half the year. It should be noted that while this indicator is a proxy for the establishment of productive hectares, does not incorporate the dynamics affecting the permanence of the fields during the year, and the impact on the production factors such as the interdiction of the State, climate and pests, among others. Following this, a spatial analysis methodology was developed to allow the estimation of the permanence of the coca crop by building a factor that allows modeling, field to field, the dynamics of the cultivated area in the year based on the incorporation and systematisation of the information available from the variables that affect directly the stability as forced eradication, aerial spraying and plant coverage, among others.

The methodology of the permanence factor included spatial information (geographic referencing) as: i) ranges of the areas manually eradicated by the Mobile Eradication Groups GME (Grupos Mviles de Erradicacion – in its Spanish acronym), ii) ranges of the areas aspersed by the aspersion programme with glyphosate of the National Government, iii) data from the census of coca crops for each cut - off date since 2001, iv) land coverages interpreted using satellite imaging with SIMCI legend since 2000, v) areas without information on the presence of clouds of the images used for each annual census of coca crops. However, new variables may be subject to inclusion for the strengthening of the model to the extent that information is available.

The permanence factor is calculated according to three categories of fields: stable, new and abandoned⁹²; furthermore, and in order to include spatial analysis on the behavior of the aforementioned variables, each categorised field may belong in turn to a subcategory generated from the definition of possible scenarios of impact⁹³. The factor ranges from zero (0) and one (1) and is applied directly to the measured area in hectares for each region. For example, a permanence factor of 1 means that a field was productive throughout the year, while if it is 0.5 it was only six months in production; if it is zero (0) means that, despite its detection in the monitoring of coca crops, it was not productive, i.e. it could be subject to interdiction throughout the year⁹⁴. As a result, the productive area during the year_n (AP) was obtained from the implementation of the methodology of the permanence factor presented below:

Taking as reference the adjustment to the estimation of the productive annual area and keeping constant the annual yields of fresh coca leaf from studies of productivity, a new series of production of coca leaf is projected going from 612,518 tm in 2005 to 308,544 tm in 2014.

Secondly, taking into account that there is a sale of coca leaf which is processed outside the Coca Agricultural Production Units - UPAC, in the traditional methodology it is assumed that while the extraction process is performed by an external agent, the Yield of cocaine base by tm of coca leaf outside the UPAC

92. The stable area corresponds to the fields identified in the last two censuses consecutively (t) and (t - 1). It is considered as new fields to the detected area in the current census (t) and that was not in the previous census (t - 1). The abandoned fields make reference to the area identified in the previous census (t - 1) which was not present in the actual census (t).

93. For example, the subcategories may be due to the following scenarios: i) aspersed, ii) aspersed and eradicated, iii) aspersed, eradicated and historical iv) aspersed and historical, v) eradicated, vi) eradicated and historical vii) historical and viii) without intervening.

94. Under this scenario, a field that was aspersed features an unproductive period (three months) which is calculated based on the percentage of survival; if the field was eradicated manually, it is assumed an unproductive period of eight months depending on what the plant needs to regenerate again for harvest.



Graph 33. Yearly productive area in hectares: traditional methodology vs adjusted methodology, 2005-2014

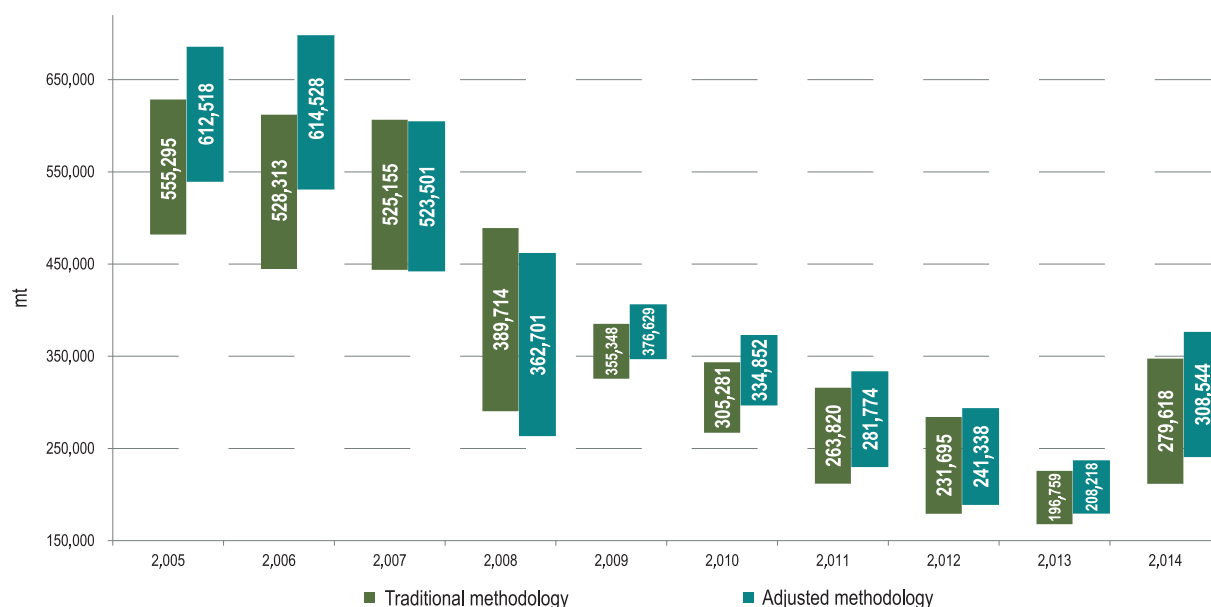
Note:

¹ The boundaries of the production area during the year are constructed from the variance in cultivated hectares reported in the census.

(RBe) associated with the transformation from the sale of the leaf are equal to those registered by the grower to cocaine base⁹⁵; the above because it only has the factor of conversion of the leaf into base reported by the productivity studies⁹⁶.

Given the scenario of the increased in the sales of the coca leaf by the producer and the collection by other agents, it became necessary to incorporate the

traditional methodology a differentiated conversion factor of transformation to cocaine base, on the assumption of an efficiency in the extraction processes higher than the registered by the farmer with coca as a result of large scale production and the best use of inputs. This conversion factor (1.80 kg of cocaine base per tm of fresh coca leaf) was estimated from the results of 33 processes of cocaine base, under controlled conditions,



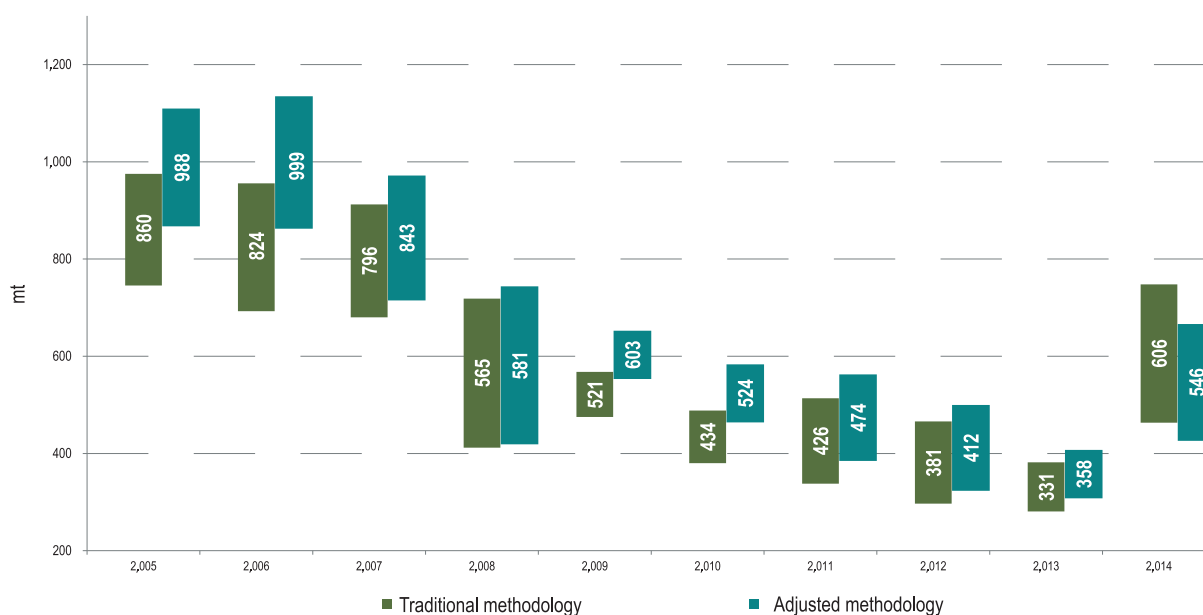
Graph 34. Fresh coca leaf production in metric tonnes: traditional methodology vs adjusted methodology, 2005-2014

Note:

¹ The boundaries of the production area during the year are constructed from the variance in cultivated hectares reported in the census.

95. It is clear that while the extraction process would be conducted outside the UPAC by agents other than the grower, they continue to take place in the same region due to the high risks of interdiction when transporting the input involving both marketing of the leaf as well as its transformation are directly associated with the areas of influence of the cultivation.

96. To the extent that the information corresponds to interviews conducted with coca farmers and the characterisation of the production processes within the UPAC.



Graph 35. Cocaine base production in metric tonnes: traditional methodology vs adjusted methodology, 2005-2014

Note:

¹ Productivity studies are not carried out based on the information from the Amazon region, for which the production estimates are carried out considering the results from the Putumayo-Caqueta region.

² Cocaine base production estimates are carried out based on the estimated annual production area in relation to permanence factor, labour distribution during the sales process and coca leaf transformation and the crop yields and extraction process for each one of the regions studied under controlled conditions.

³ The potential production estimates are calculated based on 95% trusted intervals within the annual coca cultivation area. Based on these intervals and the maintaining the coca leaf, coca paste and cocaine base yield parameters, the market structure determined by the survey and the conversion rate of coca leaf to cocaine base, obtained from efficiency studies into transformation, the production potentials can be estimated using the top and bottom limits of confidence intervals. The aforementioned outlines the minimum and maximum production potential estimates during the different links in the chain associated with the variety of cultivated hectares reported during the coca censuses.

4. Given the increasing number of growers who sell fresh coca leaf, from 63% in 2013 to 68% in 2014, in the traditional methodology a greater potential production of cocaine base is estimated. to the extent recent outputs reported by the PAC (with implicit output of 2.34 kg of cocaine base per tonne of fresh coca leaf) are used, they remain higher than those used in the adjusted methodology, which correspond to those obtained in exercises of efficiency of transformation (with an output of 1.8 kg of cocaine base per tonne of fresh coca leaf).

Output used in traditional methodology for estimating the amount of cocaine base processed outside the UPAC were obtained: i) Productivity studies Phase III in the regions: Catatumbo (2.20 kg cocaine base tonne of fresh coca leaf), Central (1.66 kg of cocaine base per tonne of fresh coca leaf) Orinoquia (1.3 kg of cocaine base per tonne of fresh coca leaf), Pacific (2.7 kg of cocaine base per tonne of fresh coca leaf); and ii) Productivity Study Phase II in the regions: the Amazon and Putumayo-Caqueta (1.68 kg of cocaine base per tonne of fresh coca leaf), Meta-Guaviare (1.5 kg of cocaine base by tm fresh coca leaf), Sierra Nevada (1.11 kg of cocaine base per tonne of fresh coca leaf).

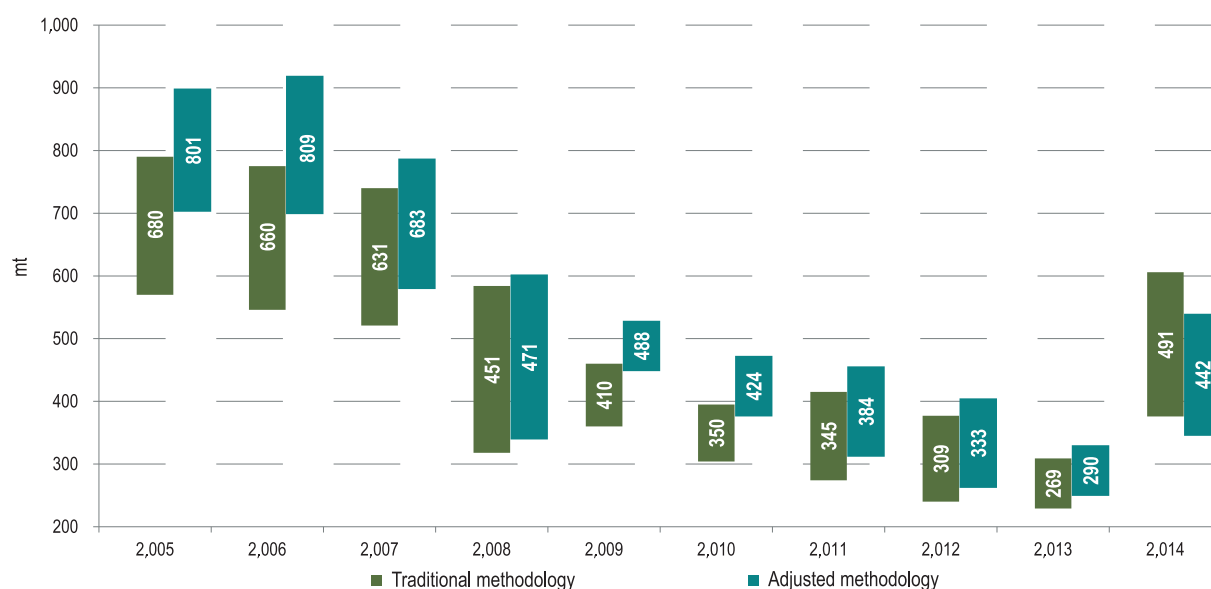
under the Efficiency Study of the transformation of cocaine hydrochloride carried out by the UNODC and the Government of Colombia⁹⁷, which would be updated only after the entry of new information.

and maximums of production in order to strengthen the estimations and improve the accuracy of the results. Therefore, the methodology proposed in this report may be sensitive to be updated in the near future.

As a result of the inclusion of the previously proposed settings and keeping constant the methodological processes implemented in other variables, a new series of production of cocaine base is estimated passing from 988 tm in 2005 to 546 tm in 2014 and cocaine hydrochloride from 801 tm in 2005 to 442 tm in 2014.

Currently, the SIMCI project continues to carry out the methodological review of the scope in each of the variables and the construction of the minimums

97. The conduction of these experimental exercises allows simulating, under controlled conditions the production processes of the leaf extraction, oxidation and crystallisation to cocaine hydrochloride during the years 2010 - 2012. Additionally, it allows characterizing inputs and chemicals used for the transformation of the leaf. Following the results obtained from the exercises carried out to date, was a factor of 1.8 kg of cocaine base by tm of coca leaf, which would be associated with the large scale extraction processes. The foregoing constitutes an efficient approach to the efficiency of the transformation in a real laboratory. Currently, UNODC / SIMCI and the Government of Colombia are developing and strengthening experimental studies of alkaloid content of the coca leaf and laboratory efficiency.



Graph 36. Cocaine hydrochloride production in metric tonnes: traditional methodology vs adjusted methodology, 2005-2014

Note:

¹ Productivity studies are not carried out based on the information from the Amazon region, for which the production estimates are carried out considering the results from the Putumayo-Caqueta region.

² Cocaine base production estimates are carried out based on the estimated annual production area in relation to permanence factor, labour distribution during the sales process and coca leaf transformation and the crop yields and extraction process for each one of the regions studied under controlled conditions.

³ The potential production estimates are calculated based on 95% trusted intervals within the annual coca cultivation area. Based on these intervals and the maintaining the coca leaf, coca paste and cocaine base yield parameters, the market structure determined by the survey and the conversion rate of coca leaf to cocaine base, obtained from efficiency studies into transformation, the production potentials can be estimated using the top and bottom limits of confidence intervals. The aforementioned outlines the minimum and maximum production potential estimates during the different links in the chain associated with the variety of cultivated hectares reported during the coca censuses.

⁴ To estimate cocaine production, data is used obtained from the marketing and performance studies within primary transformation (leaf to cocaine base) and data obtained by the United States Government, in relation to the efficiency of secondary transformation (base to cocaine hydrochloride at 1:1) and base purity (81%). These estimates correspond with the national scenario in which all crops are extracted within coca paste and refined to produce cocaine hydrochloride.

Region	2005			2006			2007			2008			2009			2010			2011			2012			2013			2014		
	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary			
Amazon	2.497	2.312	2.683	2.266	1.979	2.554	1.853	1.552	2.154	1.840	1.461	2.219	1.810	1.322	2.299	1.503	1.370	1.636	1.396	850	1.942	759	714	803	617	425	899	372	354	390
Catalumbo	1.989	456	3.522	779	532	1.026	1.055	45	2.065	2.006	1.354	2.657	3.290	3.185	3.394	3.213	2.418	4.009	2.945	1.836	4.055	3.959	3.247	4.670	5.604	4.337	6.871	7.658	8.074	
Central	13.332	11.409	15.254	13.880	11.700	16.059	10.394	5.291	15.497	12.731	10.540	14.923	17.491	16.913	18.069	15.785	14.682	16.889	10.237	5.883	14.580	6.643	5.767	7.518	4.543	2.175	6.912	4.615	3.228	6.001
Mela - Guaviere	31.752	29.987	33.517	28.478	24.720	32.235	22.702	22.109	23.294	17.988	12.770	23.207	14.173	13.487	14.848	12.534	9.471	15.597	10.628	9.817	11.439	9.360	7.053	11.666	8.072	7.328	8.815	11.272	13.404	13.404
Orinoco	9.113	6.712	11.514	9.766	7.770	11.762	9.004	7.268	10.740	6.438	2.479	10.397	3.898	3.872	3.924	3.932	3.470	4.395	3.201	2.790	3.613	2.089	1.346	2.833	1.278	903	1.653	860	1.031	
Pacific	18.437	17.158	19.715	19.918	19.105	20.732	19.684	14.728	24.641	25.394	22.652	28.136	25.624	23.617	27.630	25.979	25.051	26.908	26.407	25.640	27.174	20.661	15.243	26.079	16.818	16.535	17.101	21.758	26.896	
Putumayo - Caqueta	12.377	10.253	14.501	17.996	15.730	20.262	19.351	16.642	22.061	16.933	11.964	21.902	13.893	10.883	16.902	10.218	8.655	11.780	11.661	7.562	15.760	14.410	12.029	16.790	13.783	12.296	15.270	19.122	13.466	24.778
Sierra Nevada	945	446	1.444	521	448	594	422	372	472	435	306	563	484	345	622	351	285	418	185	51	319	61	51	72	45	43	48	32	10	54
Total	90.442	78.733	102.150	93.604	81.984	105.224	84.466	68.007	100.924	83.766	63.527	104.005	80.662	73.635	87.689	73.516	65.401	81.632	66.661	54.440	78.882	57.941	45.451	70.432	50.760	44.041	57.479	65.689	50.751	80.628

Table 49. Yearly productive area in hectares, estimated based on the permanence factor, 2005-2014

Note:

¹ The boundaries of the production area during the year are constructed from the variance in cultivated hectares reported in the census.

Region	2005			2006			2007			2008			2009			2010			2011			2012			2013			2014		
	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary			
Amazon	13.985	12.945	15.025	12.692	11.081	14.302	12.692	11.081	14.302	7.544	5.990	9.098	7.423	5.420	9.426	6.161	5.615	6.706	5.725	3.486	7.964	2.908	2.643	2.973	2.283	1.571	2.995	1.377	1.310	1.444
Catatumbo	9.150	2.099	16.201	3.584	2.449	4.719	3.584	2.449	4.719	8.424	5.688	11.160	13.817	13.377	14.256	13.496	10.155	16.838	16.200	10.098	22.302	21.772	17.861	25.684	30.823	23.853	37.792	42.122	39.838	44.405
Costa #	87.990	75.303	100.677	91.606	77.222	105.990	91.606	77.222	105.990	72.569	60.080	85.059	99.701	96.406	102.995	89.977	83.688	96.265	40.946	23.572	58.320	26.571	23.070	30.072	18.173	8.699	27.647	18.459	12.913	24.005
Mesa Guariño	314.340	296.867	331.813	281.928	244.724	319.131	281.928	244.724	319.131	91.741	65.125	118.356	72.280	68.834	75.726	63.924	48.303	79.544	54.203	50.068	58.338	47.734	35.971	59.498	35.515	32.244	38.785	49.597	40.215	58.979
Orinoco	64.702	47.654	81.750	69.339	55.170	83.509	69.339	55.170	83.509	45.712	17.803	73.820	27.677	27.495	27.859	19.662	17.348	21.977	16.007	13.949	18.065	10.447	6.730	14.164	6.388	4.513	8.264	4.301	3.449	5.153
Pacífico	47.935	44.611	51.259	51.787	49.672	53.902	51.787	49.672	53.902	66.025	58.896	73.155	97.369	89.746	104.993	98.722	95.193	102.251	100.347	97.432	103.262	78.511	57.922	99.101	63.909	62.835	64.983	121.847	93.074	150.619
Putumayo - Caquetá	69.313	57.419	81.207	100.780	88.090	113.470	100.780	88.090	113.470	69.425	49.054	89.796	56.960	44.621	69.299	41.892	35.485	48.299	47.899	31.004	64.614	53.316	44.508	62.124	50.997	45.493	56.500	70.750	49.822	91.678
Sierra Nevada																														
Total	612.518	539.306	685.730	614.528	530.827	698.228	614.528	530.827	698.228	382.701	263.323	462.078	376.629	346.900	406.358	334.852	296.614	373.091	281.774	229.758	333.790	241.338	188.851	293.824	208.218	179.332	237.104	308.544	240.649	376.440

Table 50. Fresh coca leaf production in metric tonnes, including the permanence factor, 2005-2014

Note:

¹ Productivity studies are not carried out based on the information from the Amazon region, for which the production estimates are carried out considering the results from the Putumayo-Caqueta region.

² Estimates of production of coca leaf is made from the area estimated annual production from the factor of permanence and crop yields.

³ The potential production estimates are calculated based on 95% trusted intervals within the annual coca cultivation area. Based on these intervals and the maintaining the coca leaf, coca paste and cocaine base yield parameters, the market structure determined by the survey and the conversion rate of coca leaf to cocaine base, obtained from efficiency studies into transformation, the production potentials can be estimated using the top and bottom limits of confidence intervals. The aforementioned outlines the minimum and maximum production potential estimates during the different links in the chain associated with the variety of cultivated hectares reported during the coca censuses.

Region	2005			2006			2007			2008			2009			2010			2011			2012			2013			2014		
	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary	Average	Lower boundary	Upper boundary			
Amazon	25	23	26	22	19	25	22	19	25	13	10	16	13	9	16	11	10	12	10	6	14	5	5	4	3	5	2	3		
Catatumbo	15	4	27	6	4	8	6	4	8	14	10	19	23	23	24	23	17	28	30	19	42	41	33	48	45	71	79	83		
Central	139	119	159	145	122	167	145	122	167	98	81	114	134	130	138	121	113	129	71	41	102	46	40	52	32	15	48	32	22	42
Meta - Guaviare	486	459	513	436	378	493	436	378	493	144	102	185	113	108	119	100	76	125	85	78	91	75	56	93	52	47	57	73	59	86
Orinoco	113	83	142	121	96	145	121	96	145	80	31	128	48	48	48	22	19	25	18	16	20	12	8	16	9	6	12	5	7	
Pacific	81	75	87	88	84	91	88	84	91	112	100	124	171	158	184	173	167	180	176	171	181	138	102	174	112	110	114	228	174	282
Putumayo - Caqueta	122	101	143	177	155	200	177	155	200	119	84	154	98	77	119	72	61	83	82	53	111	95	79	110	91	81	100	126	89	163
Sierra Nevada	8	4	13	5	4	5	5	4	5	2	2	3	2	2	3	2	1	2	1	0	2	0	0	0	0	0	0	0	0	0
Total	988	867	1,110	999	863	1,135	999	863	1,135	581	419	744	603	553	653	524	464	583	474	385	563	412	323	500	358	308	408	546	426	666

Table 51. Adjusted Cocaine base production in metric tonnes, 2009-2014

Note:

¹ Productivity studies are not carried out based on the information from the Amazon region, for which the production estimates are carried out considering the results from the Putumayo-Caqueta region.

² Cocaine base production estimates are carried out based on the estimated annual production area in relation to permanence factor, labour distribution during the sales process and coca leaf transformation and the crop yields and extraction process for each one of the regions studied under controlled conditions.

³ The potential production estimates are calculated based on 95% trusted intervals within the annual coca cultivation area. Based on these intervals and the maintaining the coca leaf, coca paste and cocaine base yield parameters, the market structure determined by the survey and the conversion rate of coca leaf to cocaine base, obtained from efficiency studies into transformation, the production potentials can be estimated using the top and bottom limits of confidence intervals. The aforementioned outlines the minimum and maximum production potential estimates during the different links in the chain associated with the variety of cultivated hectares reported during the coca censuses.

ATTACHMENT 4: COCA CULTIVATION IN INDIGENOUS RESERVES, 2013 - 2014 (HECTARES)

REGION	INDIGENOUS RESERVES	2013 (ha)	2014 (ha)
Amazon	ARARA, BACATI, CARURU Y MIRAFLORES	34.7	20.4
	ARRECIFAL	0.0	0.8
	BACHACO BUENAVISTA	6.4	0.0
	CARANACOA YURI-LAGUNA MOROCOTO	6.7	3.7
	CARPINTERO PALOMAS	0.0	4.7
	CUENCA MEDIA Y ALTA DEL RIO INIRIDA	12.2	13.5
	CUMARAL-GUAMUCO	1.9	0.9
	GUACO BAJO Y GUACO ALTO	0.0	3.2
	LAGUNA NIÑAL, COCUI, LOMA BAJA Y LOMA ALTA DEL CAÑO GUARIBEN	5.9	3.0
	LAGUNA-CURVINA SAPUARA	0.6	0.0
	MINITAS-MIRALINDO	7.8	2.5
	MORICHAL VIEJO, SANTA ROSA, CERRO CUCUI, SANTA CRUZ, CAÑO DANTA- OTROS	0.0	1.3
	MURCIELAGO ALTAMIRA	2.7	0.0
	PARTE ALTA DEL RIO GUAINIA	0.0	0.8
	PREDIO PUTUMAYO	113.0	175.9
	PUEBLO NUEVO-LAGUNA COLORADA	6.5	4.6
	PUERTO ZABALO Y LOS MONOS	0.0	1.0
	REMANSO - CHORRO BOCON	3.0	0.0
	RIOS CUIARI E ISANA	2.3	3.1
	TONINA, SEJAL, SAN JOSE Y OTRAS	0.0	2.4
	VAUPES	60.6	18.6
Catalumbo	GABARRA-CATALAURA	11.6	13.7
	MOTILON - BARI	89.1	53.4
Central	ALTO SINU, ESMERALDA CRUZ GRANDE E IWAGADO	114.8	123.6
	ANDABU	1.0	0.0
	CAIMAN NUEVO	1.6	1.0
	CHONTADURAL CAÑERO	0.7	0.0
	JAIDEZAVI	5.6	7.2
	JAI-DUKAMA	0.7	3.7
	JAIKERAZAVI	1.7	
	MAJORE-AMBURA	3.5	0.0
	PABLO MUERA	0.0	1.0
	RIO CHAJERADO	1.0	0.4
	UNIDO UWA		0.9
	YABERARADO	2.9	1.0

Meta Guaviare	ALTO UNUMA	1.4	1.2
	ARARA, BACATI, CARURU Y MIRAFLORES	9.8	16.1
	BARRANCO CEIBA y LAGUNA ARAGUATO	29.2	18.5
	BARRANCO COLORADO	12.7	10.0
	BARRANQUILLITA	21.3	33.7
	CAÑO JABON	6.8	0.0
	CAÑO NEGRO	0.0	0.0
	CHARCO CAIMAN	7.62	2.5
	COROCORO	0.0	1.2
	EL ITILLA		3.9
	LA ASUNCION	0.6	4.9
	LA FUGA	11.4	2.1
	LA YUQUERA	53.2	104.9
	LAGOS DEL DORADO, LAGOS DEL PASO Y EL REMAN- SO	285.1	251.9
	MACUARE	11.7	9.7
	MORICHAL VIEJO, SANTA ROSA, CERRO CUCUY, SANTA CRUZ, CAÑO DANTA- OTROS	155.8	140.7
	NUKAK - MAKU	453.0	550.2
	PUERTO NARE	21.4	34.3
	PUERTO VIEJO Y PUERTO ESPERANZA	4.6	5.4
	SIKUANI DE DOMO PLANAS	0.9	1.1
	TUCAN DE CAÑO GIRIZA Y PUERTO LA PALMA	23.3	33.5
	VUELTA DEL ALIVIO	19.2	28.6
	YAVILLA II	78.7	153.3
Orinoco	ALTO UNUMA	87.1	45.3
	CALI-BARRANQUILLA	0.0	0.5
	CARPINTERO PALOMAS	1.4	0.8
	CHOCON	1.6	0.3
	CIBARIZA		0.5
	CONCORDIA	1.5	1.7
	EGUA-GUARIACANA	2.3	1.3
	FLORES SOMBRERO	0.0	0.6
	GUACAMAYAS MAMIYARE	1.0	0.0
	GUACO BAJO Y GUACO ALTO	3.2	4.8
	LA LLANURA	3.0	1.5
	LA PASCUA	0.0	0.4
	LAGUNA TRANQUILA		0.2
	LOS IGUANITOS		0.4
	RIO SIARE	3.9	3.0
	RIOS MUCO Y GUARROJO	1.0	2.8
	RIOS TOMO Y WEBERI	0.7	0.2
	SAN JOSE DE LIPA O CAÑO COLORADO	0.8	0.7
	SAN LUIS DEL TOMO	0.3	0.0
Orinoco	SANTA TERESITA DEL TUPARRO	26.7	28.5
	SARACURE-CADA	45.7	30.7
	SELVA DE MATAVEN	22.9	21.9
	VALDIVIA	1.5	2.2

REGION	INDIGENOUS RESERVES	2013 (ha)	2014 (ha)
Pacific	AGUA NEGRA		1.1
	AGUACLARA Y BELLA LUZ DEL RIO AMPORA	2.5	1.3
	ALMORZADERO, SAN ISIDRO Y LA NUEVA UNION	7.6	9.0
	ALTO BONITO VIRA VIRA	0.8	0.4
	ALTO DEL RIO MUNGUIDO	1.0	0.0
	BAJO GRANDE	2.3	3.7
	BELLAVISTA-UNION PITALITO	4.5	28.5
	CALLE SANTA ROSA RIO SAIJA	101.1	127.4
	CAÑON DEL RIO SANQUININI	2.2	0.9
	CHAGPIEN	0.7	28.2
	CHAGUI CHIMBUZA VEGAS Y OTROS	40.3	31.3
	CHIGORODO MEMBA	1.0	0.0
	CHINGUIRITO MIRA	90.9	106.6
	CHONARA HUENA	0.0	0.7
	CHONTADURAL CAÑERO	2.0	0.1
	CUAIQUER INTEGRADO LA MILAGROSA	34.0	40.8
	CUASBIL-LA FALDADA	10.8	3.9
	CUASCUABI-PALDUBI	0.4	0.7
	CUAYQUER DEL ALTO ALBI	169.6	182.4
	CUCHILLA-PALMAR	3.1	3.1
	DEARADE BIAKIRUDE	1.4	0.0
	DOMINICO, LONDOÑO Y APARTADO	2.3	1.8
	EL CEDRO, LAS PEÑAS, LA BRAVA, PILVI Y LA PINTADA	151.8	188.6
	EL GRAN SABALO	319.9	226.4
	EL SANDE	133.2	132.1
	GRAN ROSARIO	534.0	715.0
	GUALCALA	9.6	10.1
	GUELNAMBI-CARAÑO	22.7	4.1
	HONDA RIO GUIZA	7.3	1.4
	INDA ZABALETA	794.6	943.6
	INFI	25.3	41.2
	INGA DE APONTE	1.3	
	INTEGRADO EL CHARCO	42.4	84.8
	ISLA DEL MONO	3.0	1.8
	JAGUAL RIO CHINTADO	1.4	0.0
	JURADO	7.0	0.0
	LA FLORESTA - LA ESPAÑOLA	8.6	11.7
	LA FLORESTA, SANTA ROSA Y SAN FRANCISCO	140.4	467.8
	LA IGUANA	14.5	7.0
	LA RAYA	5.5	1.5
	LA TURBIA	399.4	584.5
	LA UNION CHOCO - SAN CRISTOBAL	2.2	3.1
	MAIZ BLANCO	0.3	0.7

Pacific	NUNALBI ALTO ULBI	11.1	6.9
	NUSSI PURRU	0.7	0.0
	PATIO BONITO	0.8	0.1
	PIALAPI-PUEBLO VIEJO-SAN MIGUEL-YARE	0.0	0.8
	PIEDRA SELLADA-QUEBRADA TRONQUERIA	17.9	14.2
	PIGUAMBI PALANGALA	15.0	29.0
	PIPALTA-PALBI-YAGUAPI	13.1	4.8
	PLANADAS TELEMBI	21.6	29.0
	PLAYA BENDITA	14.7	8.3
	PLAYITA SAN FRANCISCO	1.2	2.4
	PUADO, LA LERMA, MATARE, Y TERDO	10.4	7.6
	PUERTO ALEGRE Y LA DIVISA	1.9	1.6
	PUERTO LIBIA TRIPICAY	1.9	1.6
	PULGANDE CAMPOALEGRE	54.2	102.8
	QUEBRADA GRANDE	1.8	3.9
	QUEBRADA QUERA	6.8	1.9
	RAMOS-MONGON-MANCHURIA	1.3	2.0
	RIO GARRAPATAS	9.0	1.8
	RIO GUANGÜI	48.2	41.0
	RIO NAYA	1.9	5.6
	RIO NUQUI	0.5	0.0
	RIO PAVASA Y QUEBRADA JELLA	0.1	
	RIO PURRICHA	10.7	8,2
	RIO SATINGA	13.6	29.1
	RIO TAPARAL		1.6
	RIOS CATRU-DUBASA Y ANCOSO	33.7	14.1
	RIOS JURUBIDA-CHORI Y ALTO BAUDO	12.6	5.8
	RIOS PATO Y JENGADO	1.0	0.0
	RIOS TORREIDO Y CHIMANI	26.2	4.0
	SALAQUI Y PAVARANDO	2.7	0.0
	SAN ANTONIO DEL FRAGUA	2.7	2.8
	SAN JOSE AMIA DE PATO	0.7	0.0
	SAN MIGUEL	3.5	17.8
	SANANDOCITO	9.6	2.7
	SANQUIANGUITA	1.3	8.4
	SANTA CECILIA DE LA QUEBRADA ORO CHOCO	2.5	3.1
	SANTA MARIA DE PANGALA	1.4	2.3
	SANTA ROSA DE IJUA		1.1
	SANTA ROSA SUCUMBOS EL DIVISO	11.0	22.3
	SAUNDE GUIGUAY	87.8	142.8
	SIRENA BERRECUY	0.1	2.3
	TOGOROMA	0.1	
	TOKOLLORO	0.3	
	TORTUGAÑA, TELEMBI, PUNDE, PITADERO, BRAVO, TRONQUERIA Y ZABALETA	51.6	44.3
	TRONQUERIA, PULGANDE-PALICITO	1.5	9.0
	URADA JIGUAMIANDO	4.4	0.1
	WASIPANGA	1.9	0.6
	YARUMAL Y EL BARRANCO		0.4

REGION	INDIGENOUS RESERVES	2013 (ha)	2014 (ha)
Pacific	YU YIC KWE	2.1	0.9
Sierra Nevada	ARHUACO DE LA SIERRA NEVADA	1.9	0.9
	KOGUI-MALAYO ARHUACO	26.0	4.7
Putumayo - Caqueta	AGUA NEGRA	10.0	14.0
	AGUANEGRA	52.2	58.1
	AGUAS NEGRAS	0.0	1.9
	ALTO LORENZO	14.7	52.7
	ALTO ORITO	7.5	7.8
	BELLA VISTA	11.9	17.6
	BUENAVISTA	50.9	158.9
	CAICEDONIA	22.9	40.0
	CALARCA	33.4	55.5
	CALENTURAS	3.6	10.4
	CAMPO ALEGRE DEL AFILADOR	8.0	14.9
	CAÑAVERAL	24.7	46.5
	CECILIA COCHA		2.4
	CHALUAYACO	1.0	1.9
	CONSARA-MECAYA	1.7	6.1
	COROPOYA	2.2	5.6
	CUSUMBE-AGUA BLANCA	0.6	0.6
	DAMASCO VIDES	37.0	52.9
	EL CEDRITO	9.1	6.6
	EL DESCANSO		0.0
	EL ESPINGO	29.9	53.6
	EL GUAYABAL	14.9	5.5
	EL HACHA	36.7	54.9
	EL PORTAL	0.4	2.7
	EL PORVENIR - LA BARRIALOSA	4.1	1.1
	EL QUINCE		0.6
	EL TABLERO	0.8	2.6
	EL TRIUNFO	0.4	0.7
	HERICHA	6.9	4.2
	JACOME	2.8	3.5
	JERICO-CONSAYA	1.4	2.2
	JERUSALEN-SAN LUIS ALTO PICUDITO	32.7	58.4
	LA AGUADITA	17.5	47.5
	LA ITALIA	10.8	15.0
	LA PAYA	4.7	5.7
	LA SIBERIA	3.8	0.0
	LA TEOFILA	1.8	1.3
	LOS GUADUALES	4.3	7.2
	MATICURU	13.1	12.8
	NIÑERAS	10.8	15.0
	PLAYA LARGA	8.2	22.7
	PREDIO PUTUMAYO	14.8	19.3

Putumayo - Caqueta	PUERTO NARANJO, PEÑAS ROJAS, CUERAZO Y EL DIAMANTE	5.4	6.7
	PUERTO ZABALO Y LOS MONOS	1.1	2.8
	SAN ANDRES - LAS VEGAS - VILLA UNION	34.3	64.4
	SAN ANTONIO DEL FRAGUA	2.3	2.2
	SAN LUIS	10.0	12.4
	SAN MIGUEL	0.7	2.8
	SAN MIGUEL DE LA CASTELLANA	0.8	4.4
	SANTA CRUZ DE PIÑUÑA BLANCO	1.2	1.0
	SANTA ROSA DE JUANAMBU, CAMPO ALEGRE, ALPES ORIENTALES Y LA FLORESTA	20.3	39.8
	SANTA ROSA DEL GUAMUEZ	3.3	13.1
	SELVA VERDE	14.8	17.4
	SIMORNA	2.5	1.4
	TUKUNARE		1.4
	VEGAS DE SANTANA	2.2	3.1
	VILLA CATALINA-DE PUERTO ROSARIO	67.3	91.8
	WASIPANGA	0.0	2.4
	WASIPUNGO	1.5	3.1
	WITORA O HUITORA		0.8
	YARINAL (SAN MARCELINO)	13.8	20.0
	YURAYACO	1.2	1.8
	ZIT-SET DEL QUECAL	0.7	1.3

ATTACHMENT 5: HISTORICAL SERIES OF COCA CROPS, AERIAL SPRAYING AND MANUAL ERADICATION BY GME

Department	2001	2002	2003	2004	2005	2006	2007	2008	2009*	2010	2011	2012	2013	2014
Amazonas	532	783	625	783	897	692	541	836	312	338	122	98	110	173
Antioquia	3,171	3,029	4,273	5,168	6,414	6,156	9,926	6,096	5,096	5,350	3,104	2,725	991	2,293
Arauca	2,749	2,215	539	1,552	1,883	1,306	2,116	447	430	247	132	82	69	25
Bolivar	4,824	2,735	4,470	3,401	3,670	2,382	5,632	5,847	5,346	3,324	2,207	1,968	925	1,565
Boyaca	245	118	594	359	342	441	79	197	204	105	93	10	17	14
Caldas			54	358	189	461	56	187	186	46	46	16	8	0
Caqueta	14,516	8,412	7,230	6,500	4,988	4,967	6,318	4,303	3,985	2,578	3,327	3,694	4,322	6,542
Cauca	3,139	2,121	1,443	1,265	2,705	2,105	4,168	5,422	6,597	5,908	6,066	4,327	3,326	6,389
Cesar								5				12	13	10
Choco	354		453	323	1,025	816	1,080	2,794	1,789	3,158	2,511	3,429	1,661	1,741
Cordoba	652	385	838	1,535	3,136	1,216	1,858	1,710	3,113	3,889	1,088	1,046	439	560
Cundinamarca	22	57	57	72	56	120	131	12		32	18			0
Guainia	1,318	748	726	721	752	753	623	625	606	446	318	301	81	66
Guaviare	25,553	27,380	16,163	9,770	8,658	9,477	9,299	6,629	8,660	5,701	6,839	3,851	4,725	5,658
La Guajira	385	354	275	556	329	166	87	160	182	134	16	10	6	0
Magdalena	480	644	484	706	213	271	278	391	169	121	46	37	37	9
Meta	11,425	9,219	12,814	18,740	17,305	11,063	10,386	5,525	4,469	3,008	3,040	2,699	2,898	5,042
Nariño	7,494	15,132	17,628	14,154	13,875	15,607	20,259	19,612	17,639	15,951	17,231	10,733	13,177	17,285
Norte de Santander	9,145	8,042	4,471	3,056	844	488	1,946	2,886	3,037	1,889	3,490	4,516	6,345	6,944
Putumayo	47,120	13,726	7,559	4,386	8,963	12,253	14,813	9,658	5,633	4,785	9,951	6,148	7,667	13,609
Santander	415	465	632	1,124	981	866	1,325	1,791	1,066	673	595	110	77	26
Valle del Cauca	184	111	37	45	28	281	453	2,089	997	665	981	482	398	561
Vaupes	1,918	1,486	1,157	1,084	671	460	307	557	395	721	277	254	184	109
Vichada	9,166	4,909	3,818	4,692	7,826	5,523	7,218	3,174	3,228	2,743	2,264	1,242	713	511
Total	144,807	102,071	86,340	80,350	85,750	77,870	98,899	80,953	73,139	61,812	63,762	47,790	48,189	69,132

Table 52. Historical series of coca crops 2001 - 2014 (hectares)

* Data set with small batches, made for Monitoring for 2010

Department	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Nariño	8,216	17,962	36,911	31,307	57,630	59,865	36,275	54,050	39,992	25,940	34,988	37,831	8,101	15,206
Putumayo	32,506	71,891	8,343	17,524	11,763	26,491	26,766	11,898	3,777	11,434	9,480	6,504	8,755	11,052
Guaviare	7,477	7,207	37,493	30,892	11,865	14,714	10,950	13,061	12,584	17,633	8,917	11,088	6,796	8,485
Choco	-	-	-	-	425	-	-	-	-	-	4,287	13,259	7,464	7,474
Caqueta	17,252	18,567	1,060	16,276	5,452	4,575	5,084	11,085	6,652	16,947	12,888	5,638	5,784	5,393
Cauca	741	-	1,308	1,811	3,292	1,536	3,557	6,891	11,136	14,450	11,834	10,697	3,409	2,982
Antioquia	-	3,321	9,835	11,048	16,799	18,022	27,058	10,028	9,281	3,026	9,847	6,971	944	2,063
Meta	3,251	1,496	6,974	3,888	14,453	25,915	15,527	9,057	6,756	5,825	2,545	3,152	423	1,821
Valle del cauca	-	-	-	-	5	-	-	-	-	-	719	986	2,269	511
Bolivar	11,581	-	4,783	6,456	6,443	2,662	7,050	2,214	8,715	4,412	3,564	2,740	1,925	411
Cordoba	-	734	550	-	1,767	5,588	6,259	3,561	742	546	3,128	1,632	1,183	156
Vichada	2,820	-	-	1,446	-	5,485	7,193	5,901	1,699	1,425	1,014	51	-	-
Santander	-	-	5	1,855	2,042	2,146	1,754	422	1,269	153	92	-	-	-
Norte de Santander	10,308	9,186	13,822	5,686	899	1,687	2,683	2,864	1,883	149	-	-	-	-
Caldas	-	-	-	190	1,090	1,068	284	-	169	-	-	-	-	-
Boyaca	-	-	-	-	925	831	-	166	117	-	-	-	-	-
Arauca	-	-	11,734	5,336	2,584	1,400	2,695	2,296	-	-	-	-	-	-
Cundinamarca	-	-	-	-	43	41	-	-	-	-	-	-	-	-
La Guajira	-	-	-	449	572	-	-	-	-	-	-	-	-	-
Magdalena	-	-	-	1,632	383	-	-	-	-	-	-	-	-	-
Vaupes	-	-	-	756	340	-	-	-	-	-	-	-	-	-
Total	94,152	130,364	132,817	136,551	138,775	172,025	153,134	133,496	104,772	101,940	103,303	100,549	47,053	55,554

Table 53. Historical series of aerial spraying 2001 - 2014 (hectares)

Department	2007	2008	2009	2010	2011	2012	2013	2014
Amazonas			147					
Antioquia	4,390	16,473	4,416	3,774	2,507	1,461	891	783
Arauca	90							
Bolivar		3,726	1,193	1,419	682	77	124	577
Boyaca		228	107	15	52	74	60	2
Caldas	160	101		12	193	64	37	
Caqueta	283	2,310	2,971	1,047	1,236	253	98	181
Cauca	833	1,693	1,562	1,557	88	10		3
Cesar	92					9	26	23
Choco	414	253	1,180		64	668	341	638
Cordoba	3,071	7,174	2,036	2,081	1,581	2,498	167	2
Cundinamarca					1			
Guaviare	611		1,818	759	735	325	870	686
La Guajira		99	30	14	49	15	1	9
Magdalena	163	117	47	53	167	10	19	9
Meta	2,703	5,994	4,674	900	748	517	119	
Nariño	14,059	7,557	14,772	13,706	12,822	2,488	4,026	1,880
Norte de Santander	339	2,384	2,179	1,394	324	843	1,894	179
Putumayo	23,886	28,571	4,031	1,459	1,815	3,603	610	82
Santander	604	779	1,550	733	137	228	186	6
Valle del Cauca		167	616	566	412	528	229	121
Vaupes								135
Vichada	326	6,801	4,328	1,030	1,229	689	129	10
Total	52,024	84,427	47,657	30,519	24,842	14,360	9,827	5,326

Table 54. Historical series of manual eradication by GME 2007 - 2014 (hectares)

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