



UNITED NATIONS
Office on Drugs and Crime



Government of Colombia

COLOMBIA

Coca Cultivation Survey



June 2005



COLOMBIA
Coca Cultivation Survey

June 2005

UNITED NATIONS *Office on Drugs and Crime*



Government of Colombia

Abbreviations

CICAD	Inter-American Drug Abuse Control Commission
COP	Colombian Pesos
DANE	National Department of Statistics
DEA	US Drugs Enforcement Agency
DIRAN	Colombian Anti-Narcotics Police
DNE	National Narcotics Office
DNP	National Planning Department
ICMP	Illicit Crop Monitoring Programme
INCB	International Narcotics Control Board
IDB	Inter-American Development Bank
IDP	Internally Displaced People
IGAC	Geographic Institute "Agustin Codazzi"
PDA	Alternative Development Programme
PCI	Presidential Programme against Illicit Crops
RSS	Colombian Social Solidarity Net
SIMCI II	Sistema Integrado de Monitoreo de Cultivos Ilícitos II
UIAF	Special Administrative Unit on Information and Financial Analysis
UNODC	United Nations Office on Drugs and Crime.
US\$	United States Dollars

Acknowledgements

The following organizations and individuals contributed to the implementation of the 2004 coca cultivation survey in Colombia, and to the preparation of the present report:

Government of Colombia:

Ministry of Interior and Justice
 National Narcotics Office -DNE
 Colombian Anti-Narcotics Police -DIRAN
 Ministry of Defence
 Colombia Agency for International Cooperation –ACCI
 Presidential Programme against Illicit Crops –PCI

UNODC:

Rodolfo Llinás, SIMCI Project Coordinator
 Orlando González, Digital Processing Expert
 Sandra Rodríguez, Digital Processing Expert
 Zully Sosa, Digital Processing Expert
 Maria Isabel Velandia, Digital Processing Expert
 Martha Paredes, Research and Analysis Expert
 Leonardo Correa, Field Engineer
 Juan Carlos Parra, Editing Engineer
 Martha Luz Gutierrez, Administrative Assistant
 Javier Espejo, Assistant Engineer
 Juan Pablo Ardila, Assistant Engineer

Sandro Calvani, Representative for Colombia
 Guillermo Garcia, National Programme Officer

Coen Bussink, Remote Sensing and GIS expert (UNODC – Research and Analysis Section - ICMP)
 Denis Destrebecq, Regional Illicit Crop Monitoring Expert (UNODC – Research and Analysis Section - ICMP)
 Anja Korenblik, Programme Manager (UNODC – Research and Analysis Section - ICMP)
 Thibault le Pichon, Chief (UNODC – Research and Analysis Section)
 Thomas Pietschmann, Research Officer (UNODC-Research and Analysis Section)
 Javier Teran, Statistician (UNODC – Research and Analysis Section – ICMP)

The implementation of UNODC's Illicit Crop Monitoring Programme in the Andean countries and the Colombia survey in 2004 was made possible thanks to financial contributions from the Governments of The United States of America (USAID), United Kingdom, Spain, Italy, France and Austria.

PREFACE

Coca cultivation in Colombia continued to decline for the fourth straight year in a row, although the results of this year's survey show a less significant decrease than previous years. The results of the survey, conducted jointly by the Government of Colombia and UNODC, show a total of 80,000 ha under coca cultivation, representing a 7% decrease over 2003. Over the past four years, coca cultivation has decreased 51%, one of the highest continued reductions of illicit crops in recent history in the world.

This national trend is carefully examined in this year's survey, which highlights important variations in cultivation at the department level. In particular, the survey results alert us to the significant growth of new coca crops in new areas and/or in areas of previous cultivation. At the national level, the comparison of the location of the coca fields in 2003 and 2004 showed that about 60% of the fields were new, indicating the important mobility of this crop in Colombia.

As in previous years, the decrease in coca cultivation can be attributed to two main factors: aerial spraying and the implementation of alternative development projects. The continued increase of aerial spraying of illicit crops reached a record of 136,000 hectares in 2004. The Government has focused strategic attention on the provision of alternative livelihoods and social services in areas targeted by aerial spraying or manual eradication. Out of a total budget of US\$240 million over the period 1999 – 2007, the annual budget for alternative development activities implemented at the municipal and department levels went up from US\$3 million in 2000 to US\$78 million in 2004. We need to keep in mind that, whereas the effects of aerial spraying are almost immediate, those of development will take longer to appreciate. It will be worth the wait, these programmes are the key to sustaining the recent reductions in cultivation.

The drug issue and the security issue are closely linked in Colombia. The 2004 Survey reveals that the size of armed groups was larger in municipalities where coca cultivation was found than in those free of coca cultivation. In addition, at the department level, the number of displaced persons increased in areas where there were higher numbers of people enrolled in armed groups. The complexities of the relationship between various aspects of security and the drug industry in Colombia prevent us from making over-simplified correlations, however what is clear is that increasing the safety and security of communities is vital for Colombia – and vital for sustainable drug control.

I especially invite the international community to do the utmost to control the illicit trade of chemical precursors into Colombia. Lack of action in this area impedes the control of drug processing and therefore of organized crime in the country. More decisive action to stop precursor chemicals would help to ensure the sustainability of achievements in the control of illicit crops.

The amount of political will it has taken the government of Colombia to achieve a 51% reduction in cultivation over four years should not be underestimated. It should be commended for its efforts. However, vast swathes of the country suffer the effects of the illicit drug industry. The international community needs to support efforts to combat this consistently, in word and deed. We call on donors to continue supporting Colombia in its effort to promote the rule of law and sustainable development, as it eradicates poverty and organized crime from its land.



Antonio Maria Costa
Executive Director
United Nations Office on Drugs and Crime

Index of Maps

Map 1:	Coca cultivation density in Colombia, 2004	10
Map 2:	Coca cultivation density change in Colombia, 2003-2004	14
Map 3:	Coca cultivation density in Colombia, 2001	16
Map 4:	Coca cultivation density in Colombia, 2002	16
Map 5:	Coca cultivation density in Colombia, 2003	17
Map 6:	Coca cultivation density in Colombia, 2004	17
Map 7:	Coca cultivation density in the Andean region, 2004	18
Map 8:	Coca cultivation by region in Colombia, 2001-2004	20
Map 9:	Coca cultivation density in the Meta-Guaviare region, Colombia 2004	22
Map 10:	Coca cultivation density in the Pacific region, Colombia 2004	24
Map 11:	Coca cultivation density in the Central region, Colombia 2004	26
Map 12:	Coca cultivation density in the Putumayo-Caqueta region, Colombia 2004	28
Map 13:	Coca cultivation density in the Orinoco region, Colombia 2004	30
Map 14:	Coca cultivation density in the Amazon region, Colombia 2004	32
Map 15:	Coca cultivation density in the Sierra Nevada region, Colombia 2004	34
Map 16:	Poverty in 2000 by department and coca cultivation in 2004 in Colombia	36
Map 17:	Internal people displaced because of violence between 1995 and 2004	38
Map 18:	Internal people displaced per 100,000 inhabitants because of violence in 2004	38
Map 19:	Illegal armed groups and coca cultivation in Colombia, 2004	40
Map 20:	Forest Warden Families Programme and coca cultivation in Colombia, 2004	42
Map 21:	National Parks and coca cultivation in Colombia, 2004	44
Map 22:	Budget of alternative development programmes 1999-2007 and coca cultivation in Colombia, 2004	46
Map 23:	Aerial spraying and coca cultivation in Colombia, 2004	65
Map 24:	Intensity of aerial spraying 2000-2004	67
Map 25:	Destruction of clandestine laboratories in Colombia, 2004	71
Map 26:	Drug seizures by department and coca cultivation in Colombia, 2004	73
Map 27:	Precursors seizures and coca cultivation in Colombia, 2004	77
Map 28:	Satellite coverage for the Colombia coca cultivation survey 2004	79
Map 29:	Study area distributed by region and Colombia coca cultivation, 2004	83

TABLE OF CONTENT

1	INTRODUCTION	9
2	FINDINGS.....	11
2.1	CULTIVATION	11
2.1.1	<i>Coca Cultivation</i>	<i>11</i>
2.1.1.1	Regional analysis	21
2.1.1.2	Meta-Guaviare region	23
2.1.1.3	Pacific region.....	25
2.1.1.4	Central region.....	27
2.1.1.5	Putumayo-Caqueta region	29
2.1.1.6	Orinoco region.....	31
2.1.1.7	Amazon region	33
2.1.1.8	Sierra Nevada region	35
2.1.1.9	Possible areas of new cultivation	35
2.1.1.10	Coca cultivation and poverty	37
2.1.1.11	Coca cultivation and displacement.....	39
2.1.1.12	Coca cultivation and armed groups.....	41
2.1.1.13	Coca cultivation and the forest warden families programme.....	43
2.1.1.14	Coca cultivation in National Parks.....	45
2.1.1.15	Coca cultivation and alternative development projects	47
2.1.2	<i>Reported Opium Poppy Cultivation</i>	<i>50</i>
2.2	YIELD AND PRODUCTION	52
2.2.1	<i>Coca leaf yield, coca base and Cocaine production</i>	<i>52</i>
2.2.2	<i>opium latex and heroin production</i>	<i>55</i>
PRICES		56
2.2.3	<i>Coca leaf, coca base and cocaine prices.....</i>	<i>56</i>
2.2.4	<i>Opium latex and heroin prices.....</i>	<i>59</i>
2.3	REPORTED AERIAL SPRAYING	63
2.4	REPORTED SEIZURE	69
3	METHODOLOGY	78
3.1	COCA CULTIVATION.....	78
3.2	OPIUM POPPY CULTIVATION	87
3.3	YIELD AND PRODUCTION	88
3.4	PRICES.....	88
4	ANNEX	89

FACT SHEET – COLOMBIA COCA SURVEY FOR 2004

	2003	Variation on 2003	2004
Net coca cultivation (rounded total)	86,000 ha	- 7 %	80,000 ha
Of which			
Meta-Guaviare region	29,000 ha	- 2 %	28,500 ha
Pacific region	19,600 ha	- 19 %	15,800 ha
Central region	15,400 ha	-2%	15,100 ha
Putumayo-Caqueta region	10,900 ha	-26%	10,900 ha
Elsewhere	7,600 ha	+32%	10,100 ha
Reported accumulated aerial spraying and manual eradication of coca cultivation	136,800 ha	+ 3%	139,200 ha
Annual budget for alternative development projects at department level (out of a total of US\$ 240 million for 1999-2007) ¹	US\$ 38 million	+ 105%	US\$ 78 million
Average farm-gate price of coca base	780 US\$ /kg	+ 4 %	810 US\$/kg
Total farm-gate value of coca base production	US\$ 350 million	-10 %	US\$ 315 million
GDP ²	US\$ 78.65 billion	n.a.	US\$ 95.3 billion
Farm-gate value of coca base production in percent of GDP	0.4%		0.3%
Potential production of cocaine	440 mt	- 11 %	390 mt
in percent of world cocaine production	65 %		57 %
Average cocaine price	US\$ 1,565 /kg	+ 9%	US\$ 1,713 /kg
Reported opium poppy cultivation (rounded)	4,030 ha	- 2%	3,950 ha
Average farm-gate price of opium latex	US\$ 154 /kg	+ 6%	US\$ 164 /kg
Potential opium latex production	121 tonnes		119 tonnes
Potential heroin production	5 mt		5 mt
Average heroin price	US\$ 5,700 /kg	+ 33%	US\$ 7,600 /kg
Reported seizure of cocaine	113,142 kg	+ 32 %	149,297 kg
Reported seizure of heroin	629 kg	+ 21%	773 kg
Reported destruction of illegal laboratories ³	1,489	+ 25%	1,865

¹ not including US\$ 350 million for activities of national reach for 1999-2007

² GDP for 2003 from the World Bank, not yet available for 2004. GDP for 2004 estimated from the Economist Intelligence Unit. Sources were not comparable, but the Colombian Government reported a growth rate of 4.21% for 2003 and 4.12% for 2004.

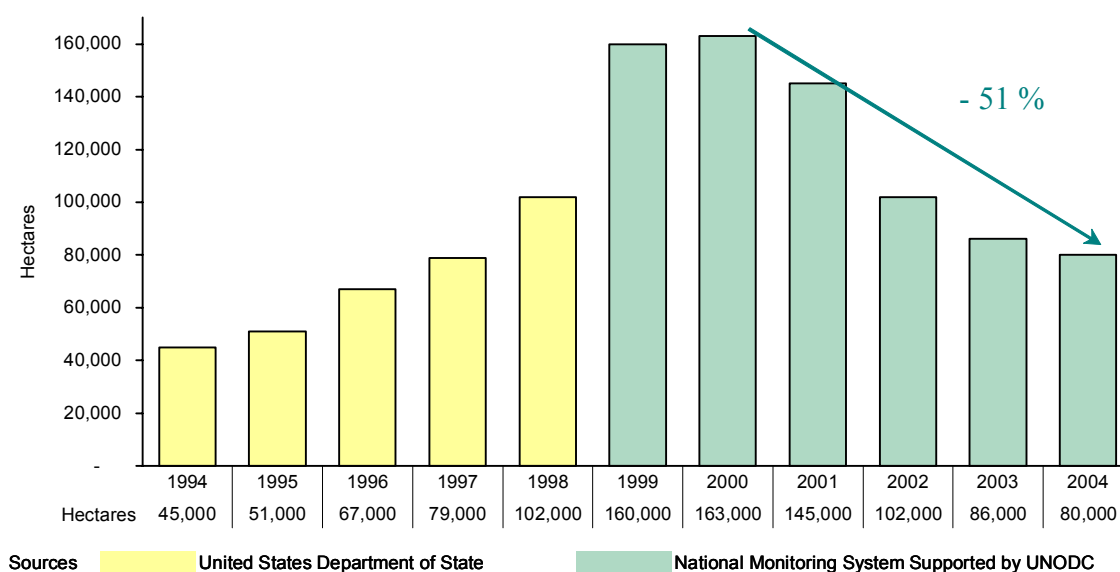
³ Includes laboratories processing coca paste/base (1,582), cocaine hydrochloride (243), heroin (8), morphine (1), Potassium permanganate (19), ammoniac (1) and non-specified (11)

EXECUTIVE SUMMARY

Under its global Illicit Crop Monitoring Programme, UNODC has been assisting the Colombian Government in the implementation and refinement of a national coca monitoring system since 1999. Annual surveys have been produced since then and the present report provides the findings of the coca survey for 2004.

The results of the survey showed that, at the end of December 2004, about 80,000 ha of coca were cultivated in 23 out of the 32 Colombian departments. This represented a decrease of 6,000 ha (or -7%) since 2003 when coca cultivation was estimated at about 86,000 ha. It is the fourth consecutive annual decrease bringing the total decrease in coca cultivation in Colombia since 2000 to impressive 51%.

Coca cultivation in Colombia 1994 - 2004 (in ha)



The decrease of 6,000 ha of coca cultivation resulted from a sustained level of aerial spraying and manual eradication that peaked at 139,200 ha, an increase of 3% compared to 2003. The alternative development projects and the Forest Warden Families Programme contributed also in this reduction. The budget for the ongoing alternative development projects amounts a total of US\$590 million that includes projects implemented at the municipal and departmental levels as well as at the national level.

The overall decrease in cultivation at the national level was not borne out evenly at the department level, where important variations were recorded. While decreasing significantly between 2003 and 2004 in Guaviare (-6,400 ha), Nariño (-3,500 ha), Putumayo (-3,200 ha), coca cultivation increased in others departments, in particular in Meta (+5,900 ha) and Arauca (+1,000 ha). In 2004 the department with the highest level of coca cultivation was Meta (18,700 ha), followed by Nariño (14,200 ha), Guaviare (9,800 ha), Caqueta (6,500 ha). At the national level, the comparison of the location of the coca fields in 2003 and 2004 showed that about 62% of the fields were new. It revealed the important mobility of coca cultivation in Colombia and the strong motivation of the farmers to continue planting coca bush.

The present report also looks at possible links between coca cultivation and poverty, internal displacement of people, and the presence of illegal armed groups. Although none of them seem decisive in themselves, these factors created a fertile ground for coca cultivation to proliferate in Colombia.

Out of the 50 National Parks in Colombia, coca cultivation in 2004 was found in 13 of them. With 5,400 ha in 2004, coca cultivation represented 0.05% of the total area covered by National Parks, and coca cultivation in National Parks represented 7% of the total level of coca cultivation in 2004.

In October 2004, UNODC developed a pilot survey in Guaviare to gather information on coca cultivation practices and coca leaf yield. The results of this pilot survey are presented in the report and will facilitate the implementation of a larger survey across 6 regions in 2005.

Information gathered from other sources led to an estimation of the potential cocaine production in Colombia at about 390 metric tons – 50 metric tons less than in the previous year. This represented 57% of global potential cocaine production which reached 687 metric tons in 2004.

Contrary to Bolivia and Peru, there is no market for coca leaf in Colombia. Most peasants sell the coca base that they themselves produce on the farm. Using the average price for coca base of US\$ 810/kg in 2003, and assuming a one to one conversion rate between cocaine and coca base, the total farm gate value of the 390 metric tons of coca base produced in Colombia in 2004 would amount to about US\$ 315 million, compared to US\$ 350 million in 2003.

The trend of increasing coca base price, over the 2000-2003 period, did not continue in 2004. At the same time, the share of coca base in overall cocaine prices declined, suggesting that the risk premium of cocaine production in Colombia increased over the last few years, possibly a consequence of increased enforcement efforts by the authorities.

Based on reconnaissance flights and spray operations conducted in 2004, DIRAN identified approximately 4,000 hectares of opium poppy under cultivation, a similar level compared to 2003. The total potential heroin production in Colombia would amount to about 5 metric tons of heroin in 2004. With an average price of opium latex for 2004 of US\$164/kg, the total farm-gate value of opium latex production in Colombia was about US\$ 19 million.

1 INTRODUCTION

The objectives of UNODC's Illicit Crop Monitoring Programme (ICMP) are to establish methodologies for data collection and analysis, to increase the governments' capacity to monitor illicit crops on their territories and to assist the international community in monitoring the extent and evolution of illicit crops in the context of the elimination strategy adopted by the Member States at the U.N. General Assembly Special Session on Drugs in June 1998. ICMP presently covers seven countries: Colombia, Bolivia and Peru for coca; Afghanistan, Laos and Myanmar for opium and Morocco for cannabis.

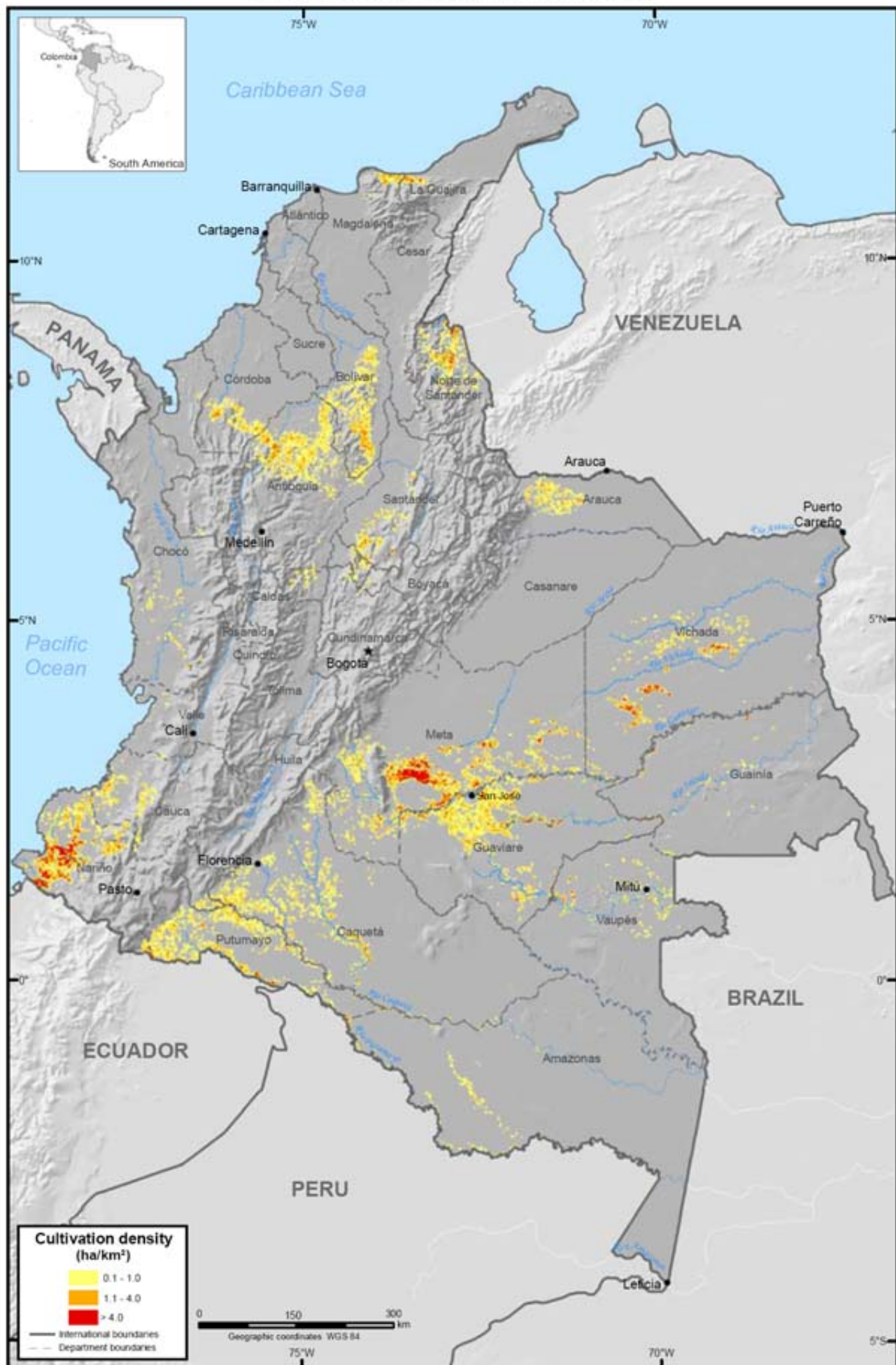
During the 1980's and 1990's, Colombia became the country with the largest illicit coca growing area and cocaine production in the world. Illicit coca cultivation in the country expanded steadily throughout this period, in particular in remote areas of the Amazon basin. Although, coca cultivation started to decrease in 2001, Colombia still remains the largest coca-growing country in the world.

UNODC has supported the monitoring of illicit crops since 1999, and has produced six annual surveys. In October 2003, UNODC signed a new agreement with the Colombian government to continue and expand monitoring and analysis work. In this context, the SIMCI II project has established to facilitate the implementation of additional tasks in the framework of an integrated approach to the analysis of the drug problem in Colombia. The project also supports the monitoring of related problems such as fragile ecosystems, natural parks, indigenous territories, the expansion of the agricultural frontier and deforestation. It provides concrete support to the government's alternative development projects and its Family Forest Warden Programme.

The new project foresees the creation of an Inter-Institutional Committee permanently assigned to the project in order to ensuring the transfer of know how to the national beneficiary institutions. SIMCI II is a joint project between UNODC and the Colombian government, represented by Ministry of Interior and Justice and the International Cooperation Agency. The national counterpart and director of the project is the head of the Ministry of Interior and Justice.

The project is managed by a technical coordinator and composed of engineers and technicians: four digital image processing specialists, one field engineer, a cartographic technician, a research and analysis specialist, two assistant engineers and an administrative assistant. The team is integrated by the Inter-Institutional Committee assigned on a permanent basis to participate in the activities of SIMCI, and composed of technicians and specialists of the following government and state entities: Ministry of Interior and Justice, its National Narcotics Bureau – DNE, Ministry of Environment and their specialized units IDEAM and Natural Parks, Ministry of Agriculture, Ministry of Social Protection (Welfare), UIAF (Ministry of Finance), Anti-Narcotics Police - DIRAN and the Geographical Institute – IGAC.

Coca cultivation density in Colombia, 2004



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

2 FINDINGS

2.1 CULTIVATION

2.1.1 COCA CULTIVATION

In 2004, the total area under coca cultivation in Colombia decreased by 6,000 ha to 80,000 ha, a 7% decrease compared to last year's estimate of 86,000 ha. It was the fourth consecutive annual decrease of coca cultivation in Colombia, representing a reduction of 51% compared to the peak annual estimate of 163,000 ha in 2000.

Similarly to the previous two surveys, the 2004 survey represented the situation as of the end of the year, in this case as of December 2004. As was the case last year, it covered the whole country and detected coca cultivation in 23 departments out of 32. In 2004, was detected on 0.07% of the total territory.

Figure 1. Coca cultivation in Colombia, 1994 – 2004 (in ha)

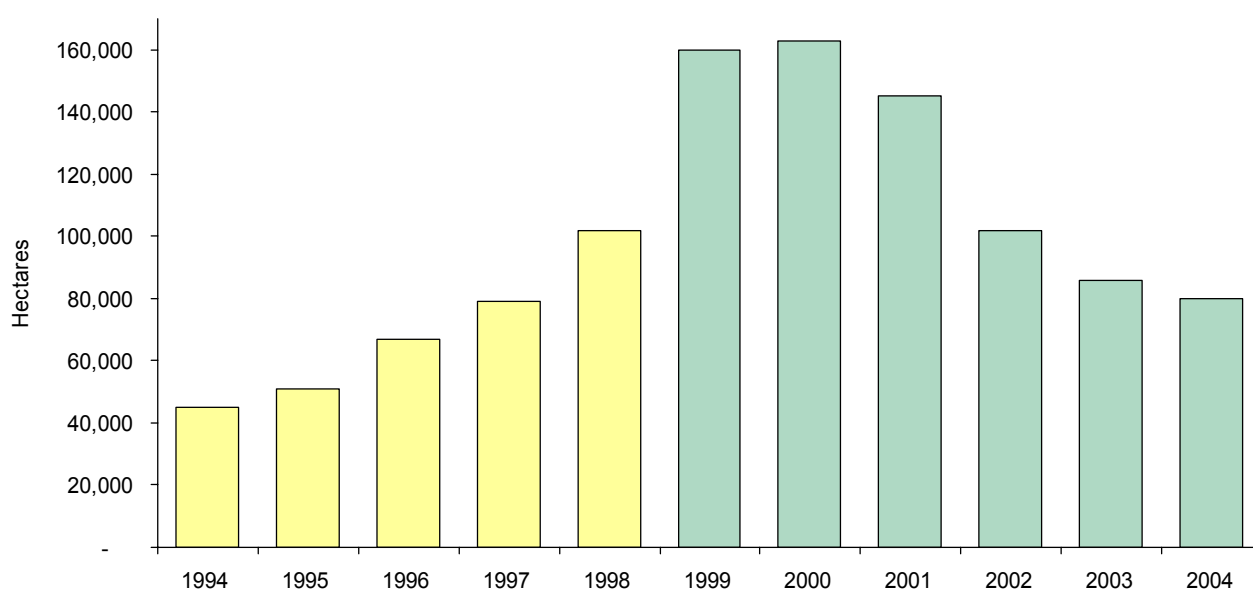


Table 1: Coca cultivation in Colombia, 1994 – 2004 (in ha)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Rounded total	45,000	51,000	67,000	79,000	102,000	160,000	163,000	145,000	102,000	86,000	80,000

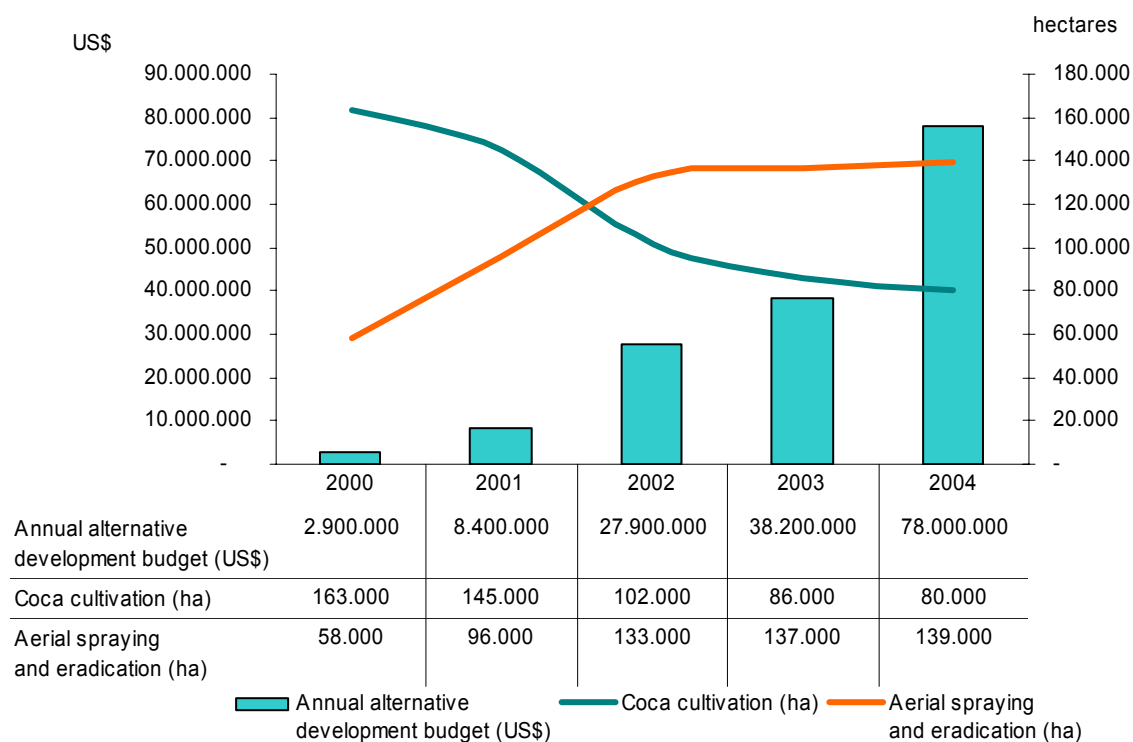
Sources United States Department of State National monitoring system supported by UNODC

The reduction of the coca cultivation area by 6,000 ha in 2004 was the fourth consecutive year of decrease. Between 2000 and 2004, coca cultivation in Colombia has declined by an impressive 51%. In 2004, aerial spraying of coca cultivation reached a record level of 136,000 ha in 2004, an increase of 3% compared to 2003. For the last three years, the level of aerial spraying remained above 130,000 ha.

The decrease in coca cultivation in Colombia can be attributed to two main factors: aerial spraying and implementation of alternative development projects. On the one hand, aerial spraying increased tremendously between 2000 and 2002, from 58,000 ha to 133,000 ha (+ 130%), and remained above 130,000 ha in 2003 and 2004. At the same time, several departments received increasing support from alternative development programmes. Out of total budget of US\$240 million for the period 1999 – 2007 for on-going alternative development activities implemented at the municipal and department levels, annual budgets went up from US\$ 3 million in 2000 to

US\$ 78 million in 2004. It should be emphasised that whereas the effects of aerial spraying are almost immediate, the effects of the implementation of the annual budgets of alternative development projects will take time. The municipal and departmental budgets do not take into account a package of US\$ 350 million, for the period 1999 – 2007, affected for activities having a national reach.

Table 2: Coca cultivation, alternative development and aerial spraying in Colombia, 2000 – 2004



Alternative development and aerial spraying have varied impacts at the department level. Aerial spraying and alternative development interventions were intense in Putumayo and Caqueta between 2000 and 2004, resulting in a decrease of about 82,000 ha of coca cultivation. However, between 2000 and 2004, coca cultivation increased in Nariño by about 5,000 ha, despite intense aerial spraying and investment in alternative development amounting to only US\$ 11 million. In Meta, coca cultivation increased by about 7,600 ha during the same period in the absence of alternative development initiatives and low level aerial spraying of coca cultivation.



Products of the alternative development programme in Colombia

The comparison of the location of the coca fields in 2003 and 2004 revealed that about 60% of the fields were detected for the first time using satellite imagery of 2004. This proportion included new coca fields planted in late 2003 or early 2004 which had developed enough vegetation cover to be detected on satellite imagery acquired in 2004. This showed the important mobility of coca cultivation in Colombia.

In contrast to last year's trend, the 2004 census also showed a slight increase of 8% in the mean size of coca fields interpreted in the satellite image at the national level (from 1.3 ha in 2003 to 1.4 ha in 2004). The most important increase in mean coca field size was in Norte de Santander and Magdalena, from 0.7 ha in 2003 to about 1.0 ha in 2004. Coca fields size also increased significantly in Meta, from 1.5 ha to 1.9 ha (+ 27%). At the same time, mean coca field size decreased in Caqueta and Guaviare, from about 1.5 ha to 1.3 ha. In Vichada, the department with the largest mean coca field size, size decreased from an average 2.5 ha in 2003 to 2.2 ha in 2004.

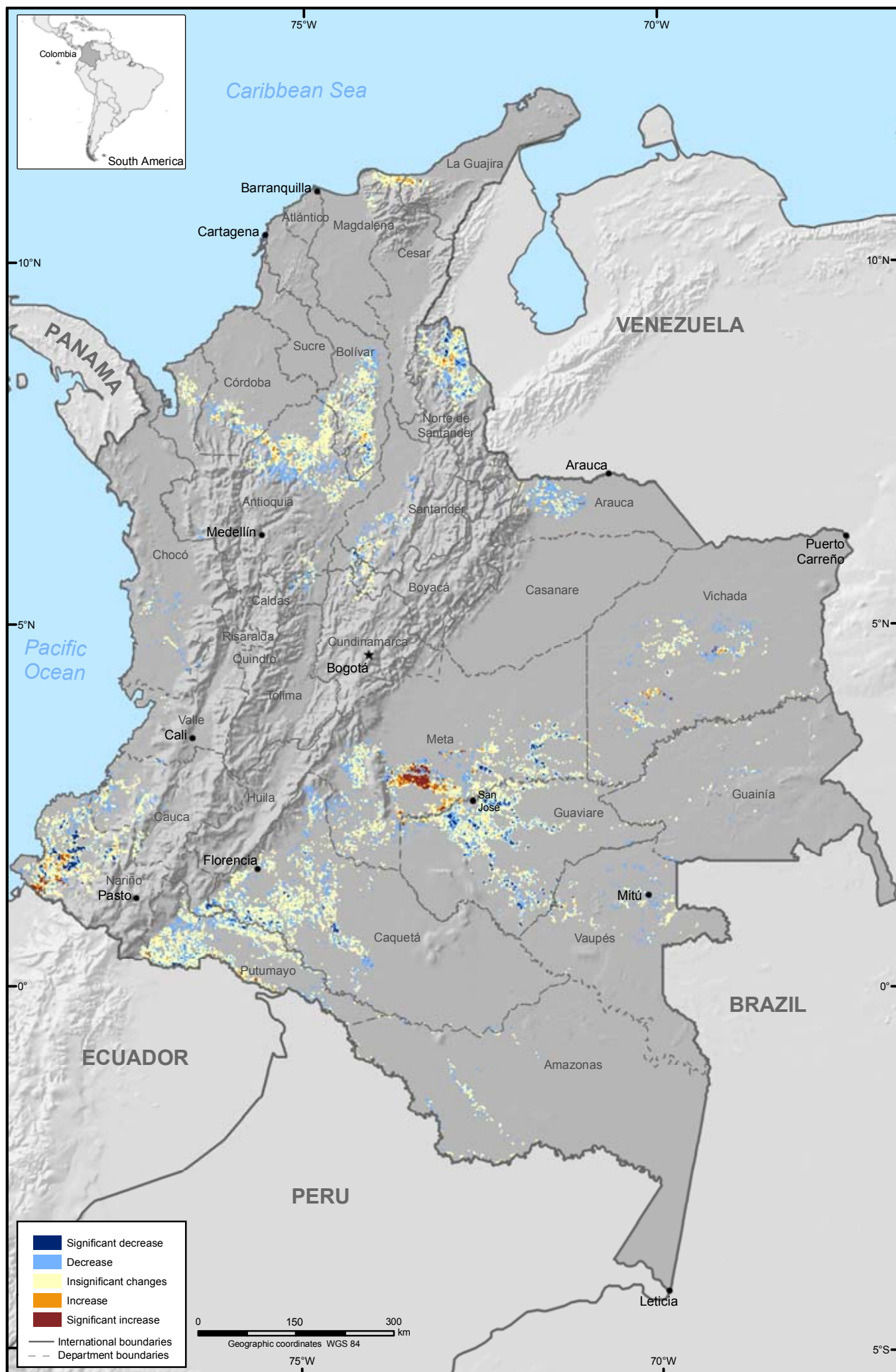
Table 3: Stable and new fields of coca bush in 2004

Region	Stable 2003-2004				New in 2004				Total 2004	
	Number of fields	% of total fields	Area (ha)	% of total area	Number of fields	% of total fields	Area (ha)	% of total area	Total Fields	Total Area (ha)
Amazonia	573	38	1,216	45	935	62	1,457	55	1,508	2,673
Pacific	4,694	41	8,276	49	6,862	59	8,768	51	11,556	17,044
Meta-Guaviare	7,722	46	14,123	47	9,134	54	15,827	53	16,856	29,950
Orinoco	1,133	37	2,628	38	1,902	63	4,265	62	3,035	6,893
Putumayo-Caqueta	1,459	23	2,474	28	4,820	77	6,457	72	6,279	8,931
Sierra Nevada	195	36	166	28	347	64	427	72	542	593
Central	4,094	34	4,398	31	7,787	66	9,867	69	11,881	14,265
TOTAL	19,870	38	33,281	41	31,787	62	47,068	59	51,657	80,349



Newly established coca fields, Arauca department, February 2005

Coca cultivation density change in Colombia, 2003 - 2004



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

While decreasing significantly between 2003 and 2004 in Guaviare (-6,400 ha), Nariño (-3,500 ha), Putumayo (- 3,200 ha), coca cultivation increased in other departments, in particular in Meta (+5,900 ha) and Arauca (+ 1,000 ha). In 2004 the department with the highest level of coca cultivation was Meta (18,700 ha), followed by Nariño (14,200 ha), Guaviare (9,800 ha), Caqueta (6,500 ha).

The department of Nariño which ranked first in 2003 in terms of coca cultivation, moved to the second place in 2004, owing to a decrease of 3,500 ha between 2003 and 2004. Spraying of about 31,000 ha took place in the first semester of 2004. Field reconnaissance at the end of the year mentioned significant replanting of coca bush. This replanting would have generated young fields not yet productive as of December 2004 and therefore not accounted for in the present census. Heavy spraying resumed in Nariño department early 2005, totaling 37,000 ha between January and March 2005.

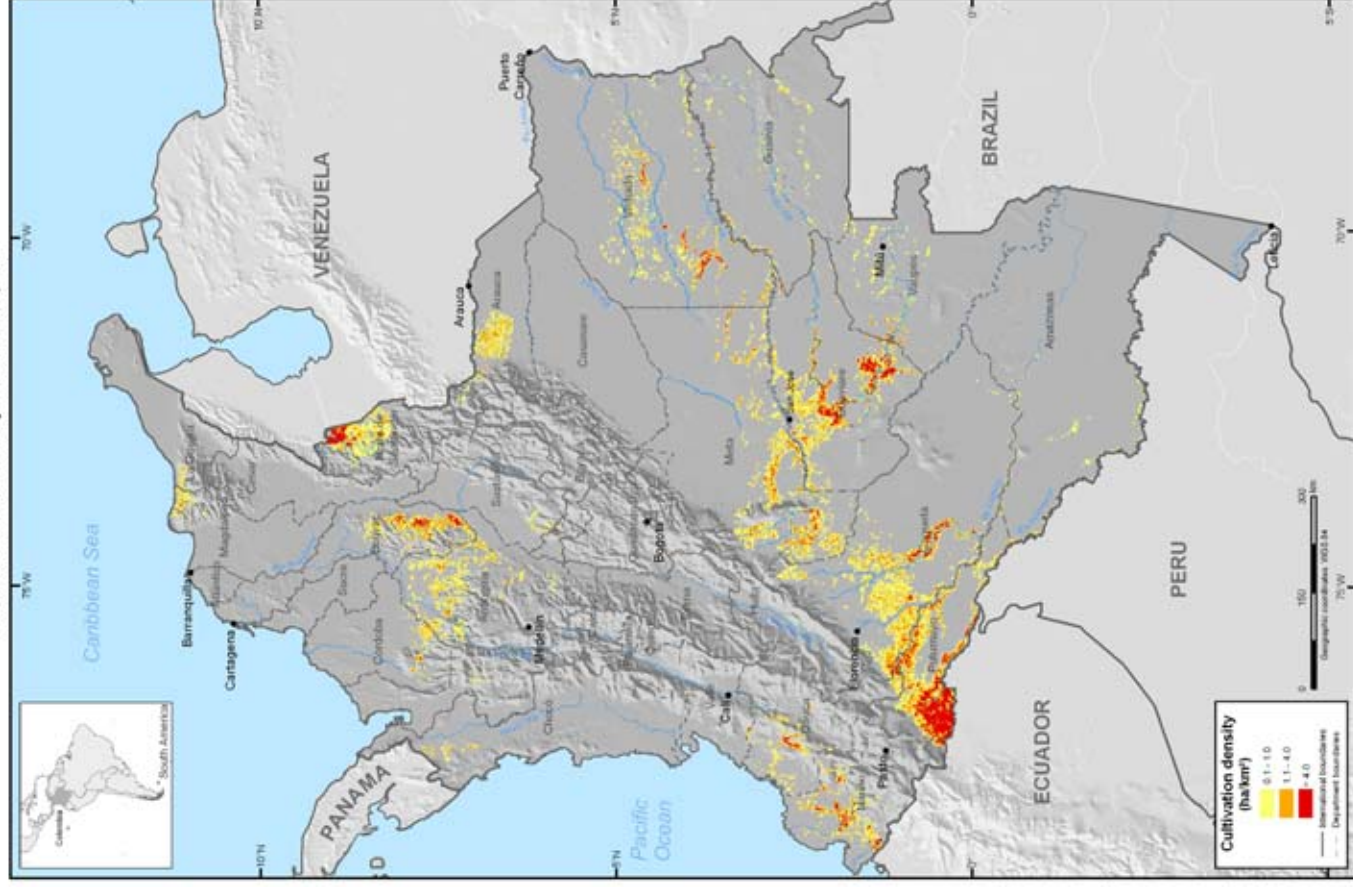
With 9,800 ha, coca cultivation in Guaviare represented 12% of the national total in 2004. The decrease of 6,400 ha between 2003 and 2004 reflected the heavy spraying in the second semester of 2004. However that decrease matched a cultivation increase of 5,900 ha in neighbouring Meta.

Putumayo department, which ranked first and accounted for 41% of the total coca cultivation in 2000, only accounted for 5% of the national total and ranked sixth in 2004.

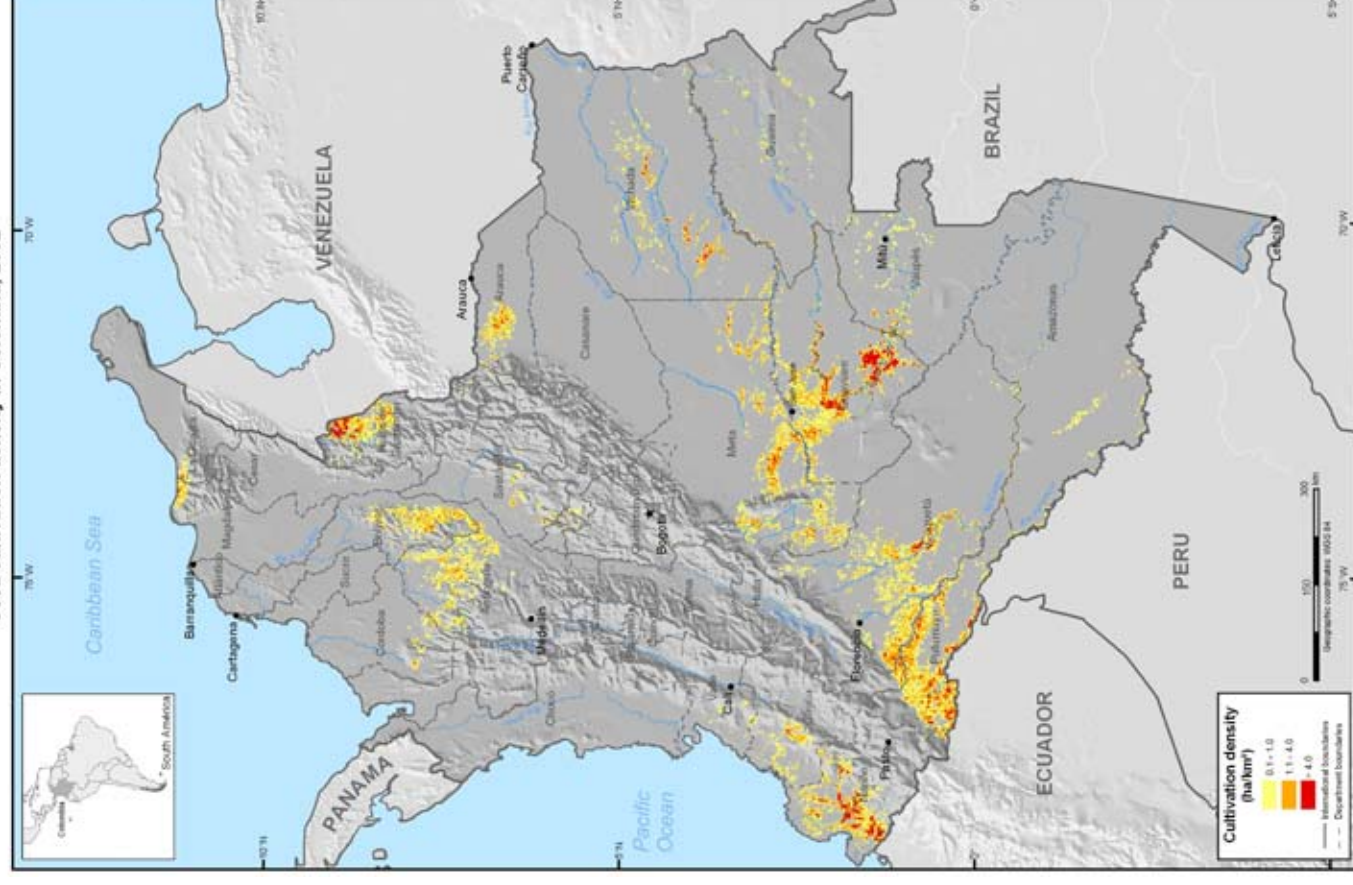
Table 4: Coca cultivation by department in Colombia, 1999 – 2004 (ha)

Department	Mar-1999	Aug-2000	Nov-2001	Dec-2002	Dec-2003	Dec-2004	% Change 2003-2004	% of 2004 total
Meta	11,384	11,123	11,425	9,222	12,814	18,740	46%	23%
Nariño	3,959	9,343	7,494	15,131	17,628	14,154	-20%	18%
Guaviare	28,435	17,619	25,553	27,381	16,163	9,769	-40%	12%
Caquetá	23,718	26,603	14,516	8,412	7,230	6,500	-10%	8%
Antioquia	3,644	2,547	3,171	3,030	4,273	5,168	21%	6%
Vichada		4,935	9,166	4,910	3,818	4,692	23%	6%
Putumayo	58,297	66,022	47,120	13,725	7,559	4,386	-42%	5%
Bolívar	5,897	5,960	4,824	2,735	4,470	3,402	-24%	4%
N. de Santander	15,039	6,280	9,145	8,041	4,471	3,055	-32%	4%
Arauca		978	2,749	2,214	539	1,552	188%	2%
Córdoba	1,920	117	652	385	838	1,536	83%	2%
Cauca	6,291	4,576	3,139	2,120	1,443	1,266	-12%	2%
Santander		2,826	415	463	632	1,124	78%	1%
Vaupés	1,014	1,493	1,918	1,485	1,157	1,084	-6%	1%
Amazonas			532	784	625	783	25%	1%
Guainía		853	1,318	749	726	721	-1%	1%
Magdalena	521	200	480	644	484	706	46%	1%
Guajira		321	385	354	275	556	102%	1%
Boyacá		322	245	118	594	359	-40%	0.4%
Caldas					54	358	563%	0.4%
Chocó		250	354		453	323	-29%	0.4%
Cundinamarca		66	22	57	57	71	25%	0.1%
Valle del Cauca		76	184	111	37	45	22%	0.1%
TOTAL	160,119	162,510	144,807	102,071	86,340	80,350	-7%	
Rounded Total	160,000	163,000	145,000	102,000	86,000	80,000	-7%	
Number of department affected	12	21	22	21	23	23		
Country coverage	12%	41%	100%	100%	100%	100%		

Coca cultivation density in Colombia, 2001



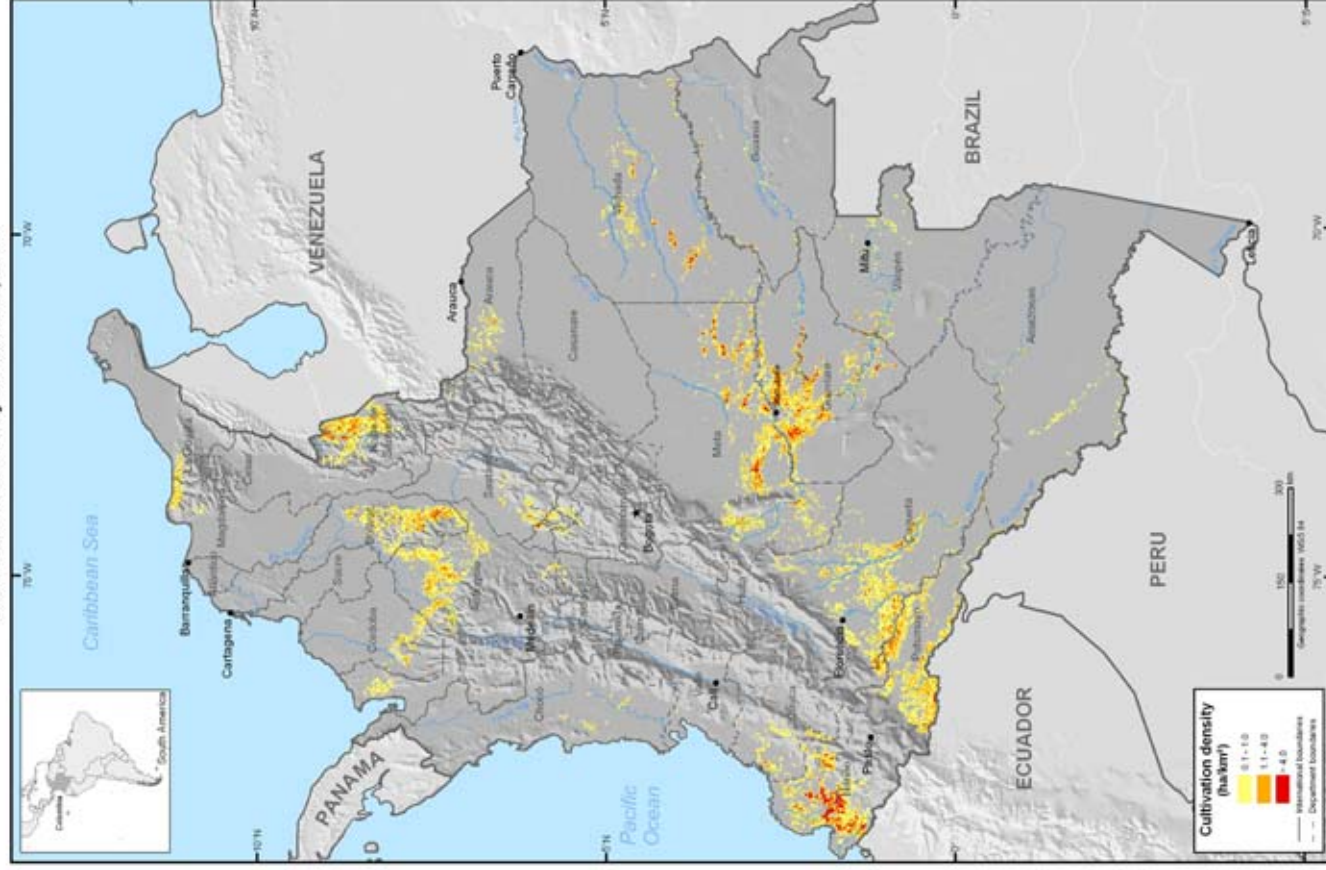
Coca cultivation density in Colombia, 2002



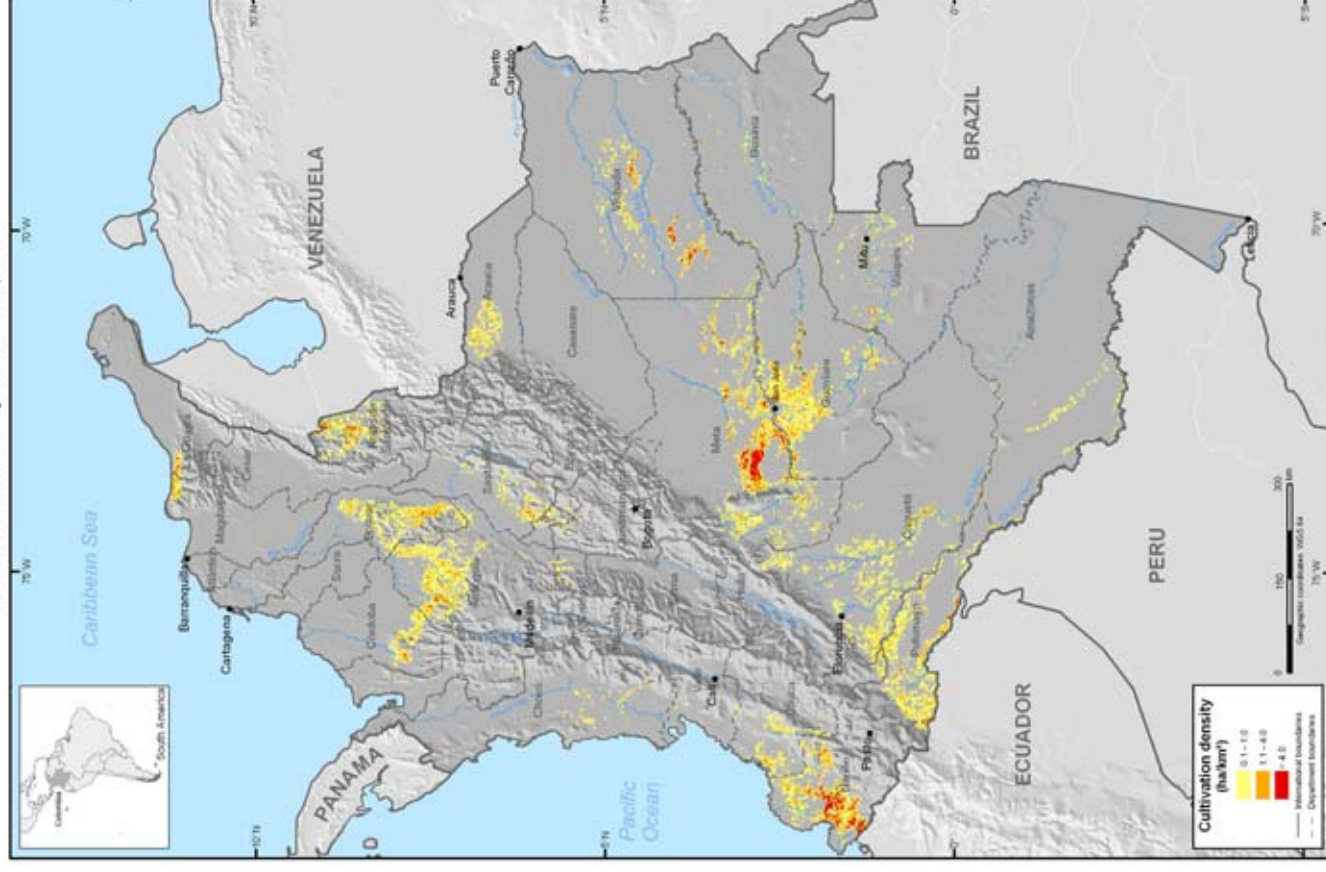
Sources: for coca cultivation 2004. Government of Colombia - National monitoring system supported by UNODC.

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

Coca cultivation density in Colombia, 2003

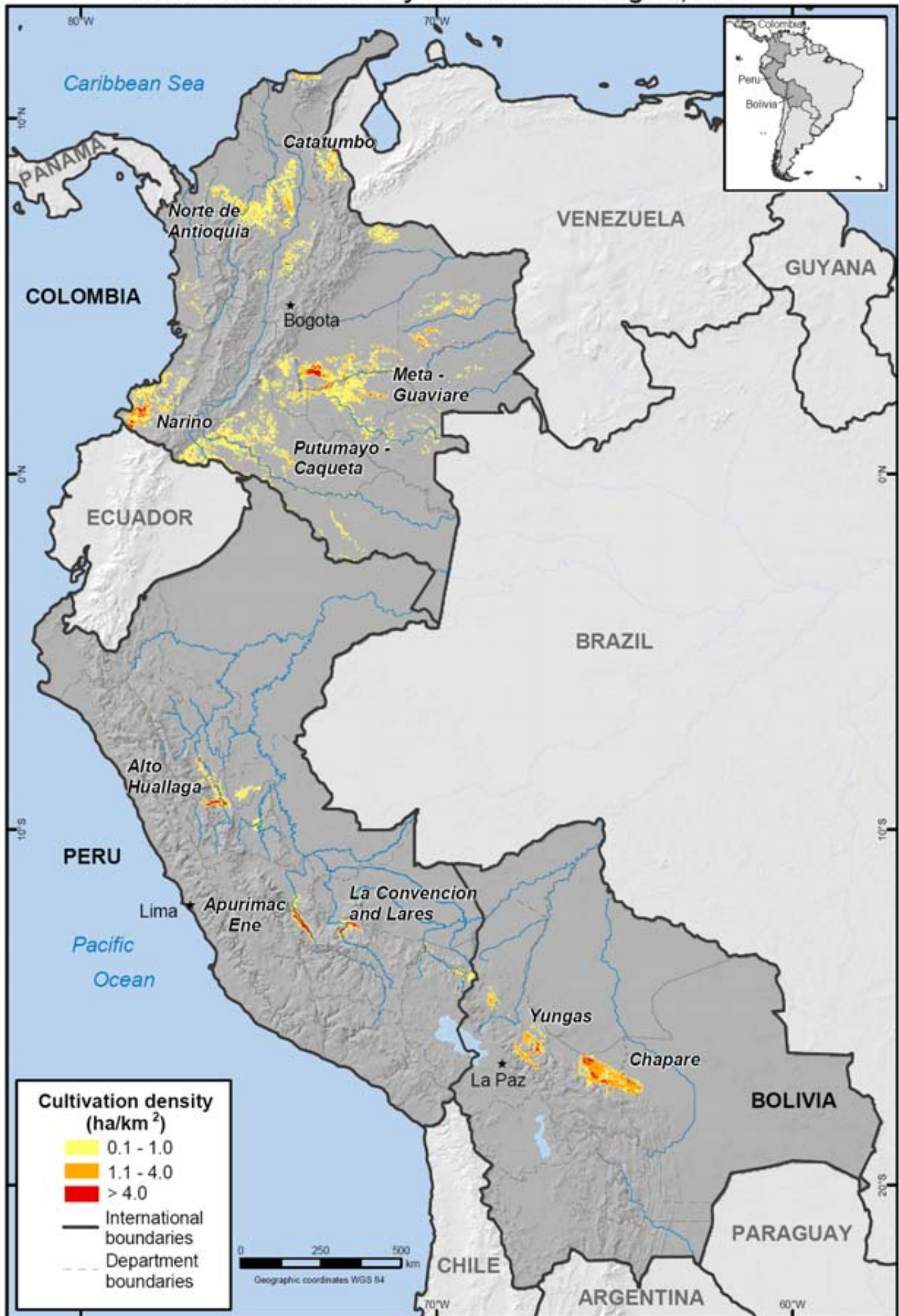


Coca cultivation density in Colombia, 2004



Sources: for coca cultivation 2004 - 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

Coca cultivation density in the Andean Region, 2004



Sources: Governments of Bolivia, Colombia y Peru, National monitoring systems supported by UNODC

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

The decrease in coca cultivation in Colombia was offset by increases in Peru and Bolivia. The global level of coca cultivation in 2004 therefore remained relatively stable at around 158,000 ha, or +3% compared to 2003. In 2004, Colombia remained the country with the highest level of coca cultivation, ahead of Peru and Bolivia. However, Colombia's share in the total level of coca cultivation has fallen from 74% in 2000 to 51% in 2004.

Figure 2. Coca cultivation in the Andean region 1994 - 2004 (in ha)

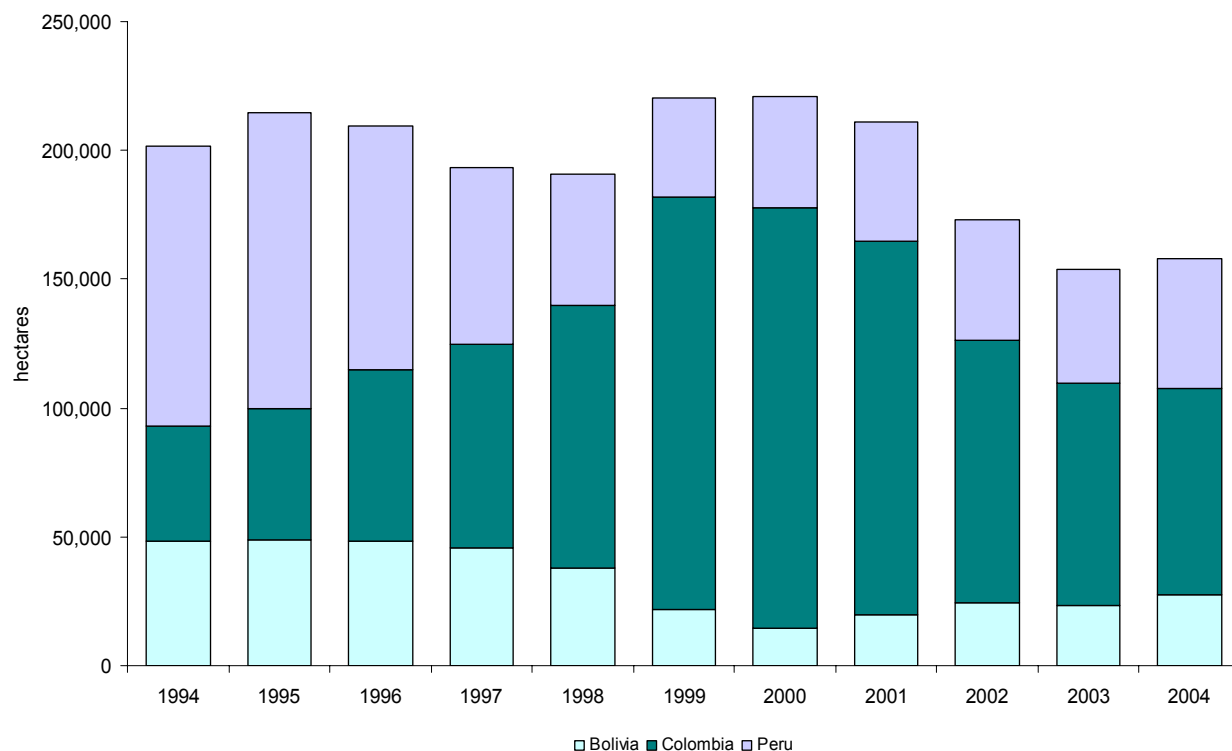


Table 5: Coca cultivation in the Andean region 1994 - 2004 (in ha)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	% change 2003-2004
Bolivia	48,100	48,600	48,100	45,800	38,000	21,800	14,600	19,900	24,400	23,600	27,700	17%
Peru	108,600	115,300	94,400	68,800	51,000	38,700	43,400	46,200	46,700	44,200	50,300	14%
Colombia	45,000	51,000	67,000	79,000	102,000	160,000	163,000	145,000	102,000	86,000	80,000	-7%
Total	201,700	214,900	209,500	193,600	191,000	220,500	221,000	211,100	173,100	153,800	158,000	3%

Sources  United States Department of State

 National Monitoring System Supported by UNODC



Coca fields in Colombia in mountain areas.

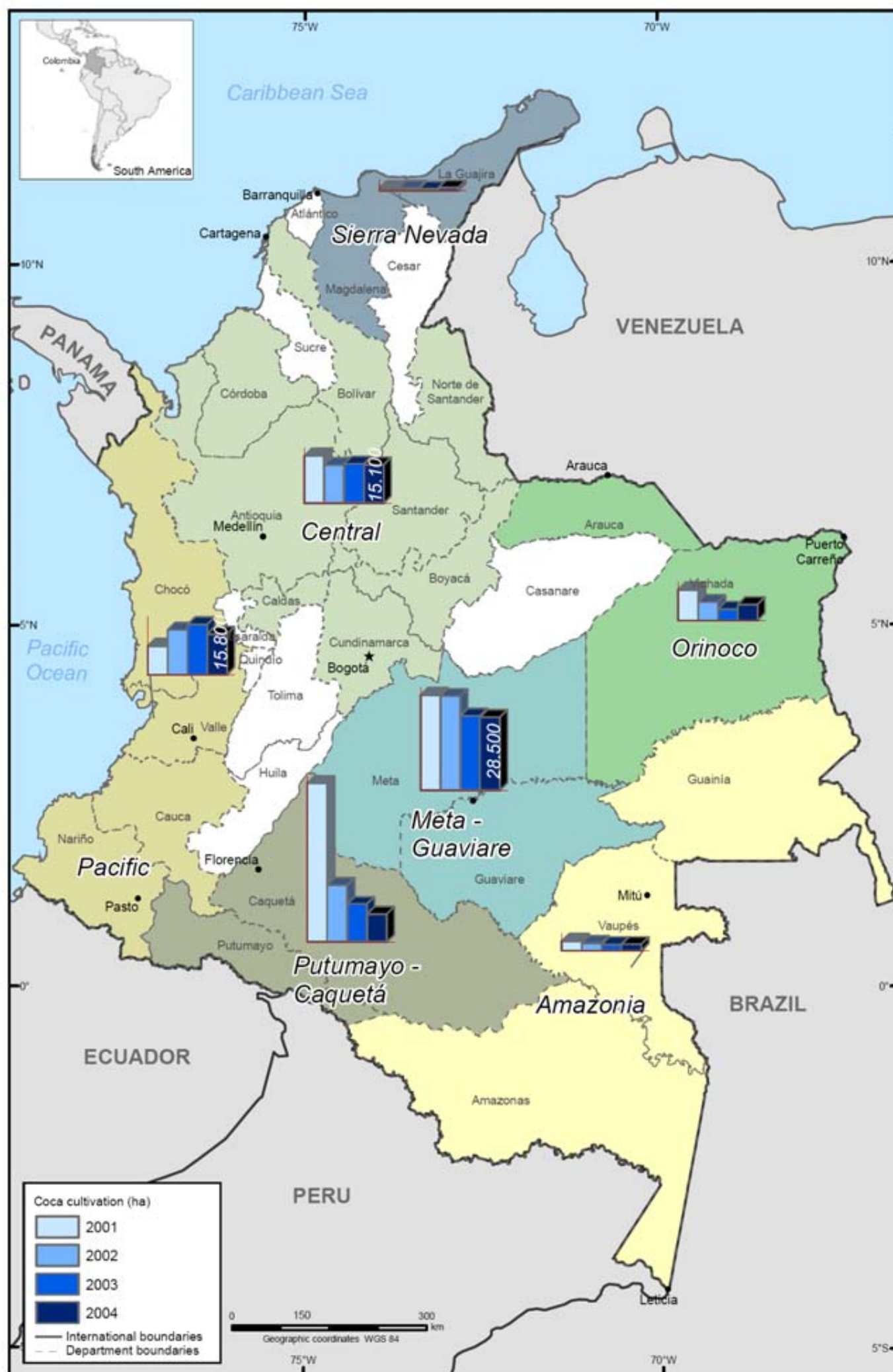


Coca fields of high plant density in Peru.



Coca fields with mechanised irrigation in Bolivia.

Coca cultivation by region in Colombia, 2001 - 2004



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

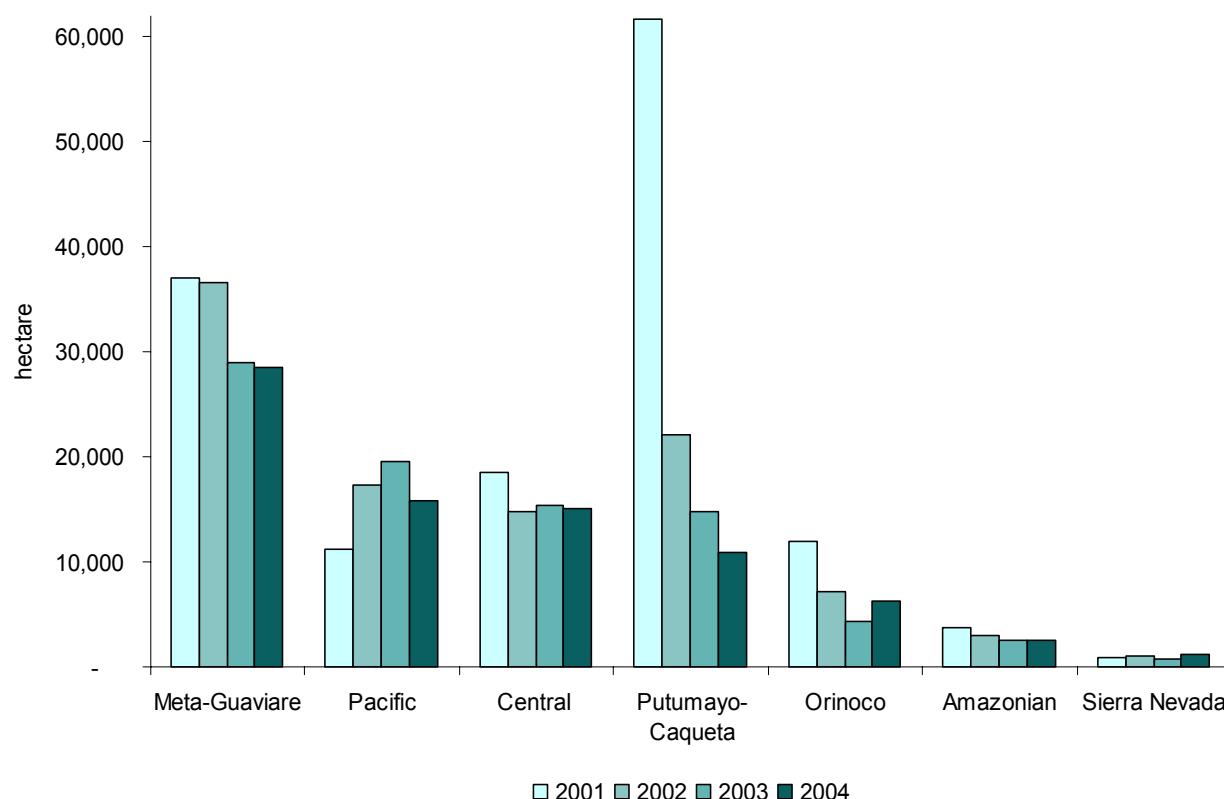
2.1.1.1 Regional analysis

In 2004, half of the coca cultivation in Colombia took place in the two traditional coca growing regions of Meta-Guaviare and Putumayo-Caqueta, both situated in the south-eastern part of the country. Between 2003 and 2004, coca cultivation remained relatively stable in Meta-Guaviare as a decrease of 6,400 ha in Guaviare offset an increase of 5,900 ha in Meta. In the region of Putumayo-Caqueta, cultivation decreased by 3,900 ha, or 26%. An important increase of 66% was noted in the northern region of Sierra Nevada, but with 1,300 ha of coca cultivation in 2004 the region represented only 2% of the national total. Coca cultivation also increased by 43% in the Orinoco region, to a total of 6,300 ha or 8% of the national total. Coca cultivation remained relatively stable in the Amazonian (+3%) and Central region (-2%). It decreased by 19% in the Pacific region, owing to the large decrease of 3,500 ha in Nariño department between 2003 and 2004.

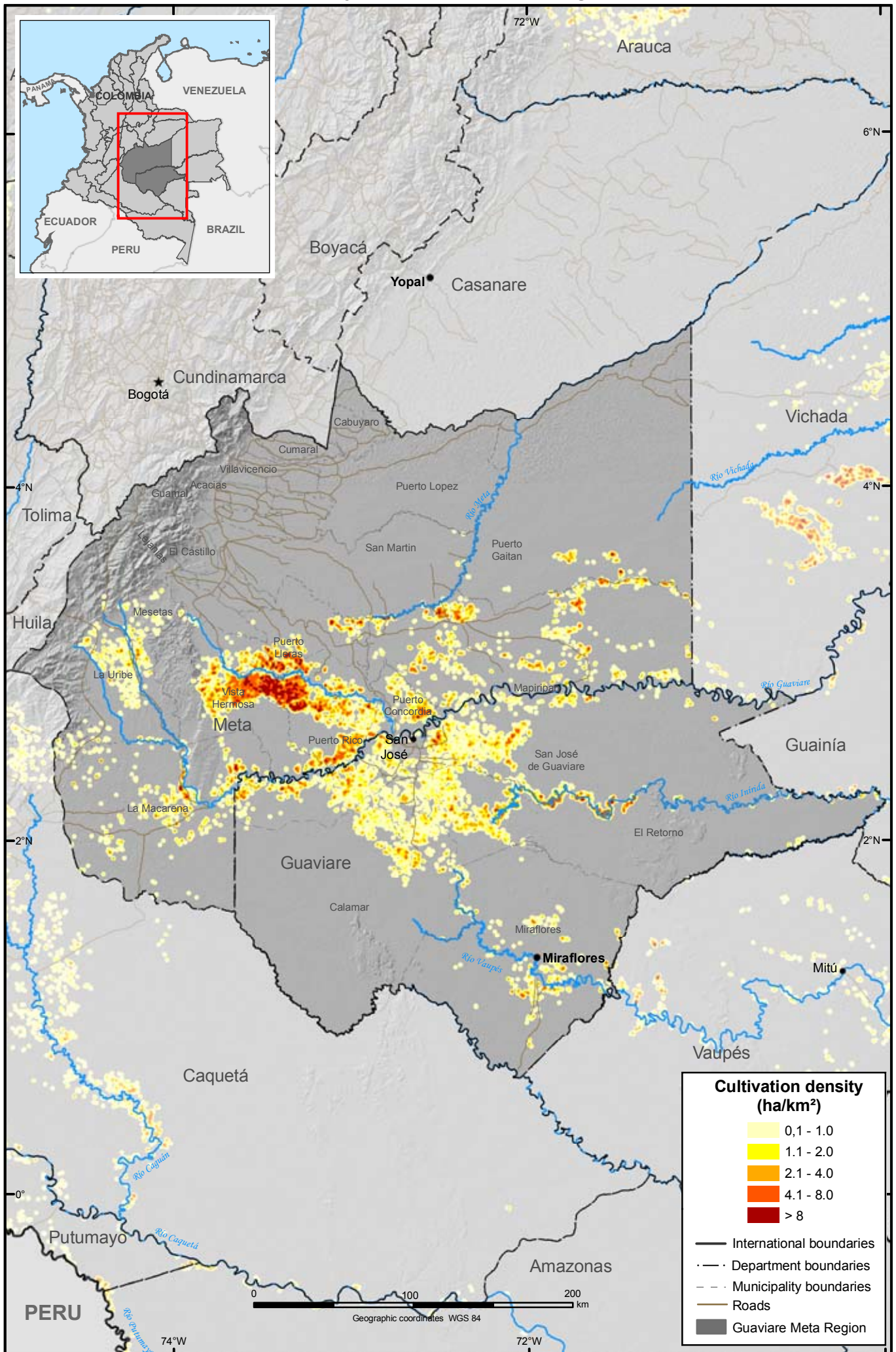
Table 6: Coca cultivation in Colombia by region 2001 - 2004 (in ha)

Region	2001	2002	2003	2004	% change 2003 - 2004	% of 2004 total
Meta-Guaviare	36,978	36,603	28,977	28,507	-2%	36%
Pacific	11,171	17,362	19,561	15,789	-19%	20%
Central	18,474	14,829	15,389	15,081	-2%	19%
Putumayo-Caqueta	61,636	22,137	14,789	10,888	-26%	14%
Orinoco	11,915	7,124	4,357	6,250	43%	8%
Amazonian	3,768	3,018	2,508	2,588	3%	3%
Sierra Nevada	865	998	759	1,262	66%	2%
Rounded Total	145,000	102,000	86,000	80,000	-7%	100%

Figure 3. Coca cultivation in Colombia by region 2001 - 2004 (in ha)



Coca cultivation density in the Meta-Guaviare region, Colombia 2004



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

2.1.1.2 Meta-Guaviare region

Table 7: Coca cultivation in Meta-Guaviare, 1999 – 2004

Department	1999	2000	2001	2002	2003	2004	% Change 2003-2004
Meta	11,384	11,123	11,425	9,222	12,814	18,740	46%
Guaviare	28,435	17,619	25,553	27,381	16,163	9,769	-40%
Total	39,819	28,742	36,978	36,603	28,977	28,509	-2%
Annual trend		-28%	29%	-1%	-21%	-2%	

In 2004, the department of Meta was the department with the largest level of coca cultivation with 18,800 ha. Alone it represented 23% of the national total. Between 2003 and 2004, coca cultivation increased by 5,900 ha (or 46%), matching a decrease of 6,400 ha in the neighboring department of Guaviare.

Aerial spraying started in 1994 in Meta department, but remained relatively low (2,500 ha per year) with respect to the amount of coca cultivation, except in 1997, 1998 and 2003 when aerial spraying exceeded 6,000 ha. The department received little alternative development assistance.

Among the thirteen national parks surveyed, the National Park of Sierra de la Macarena, located within Meta department, experienced the largest level of coca cultivation within a protected area in 2004 (2,742 ha).

Guaviare department was where coca cultivation first appeared in Colombia at the end of the seventies. Since then coca cultivation remained important in the department. However an encouraging decrease was noted between 2003 and 2004, mainly owing to an important aerial spraying campaign in the second semester of 2004. This was the second consecutive decrease of about 40%. In 2004, Guaviare accounted for 12% of the total coca cultivation in the country.

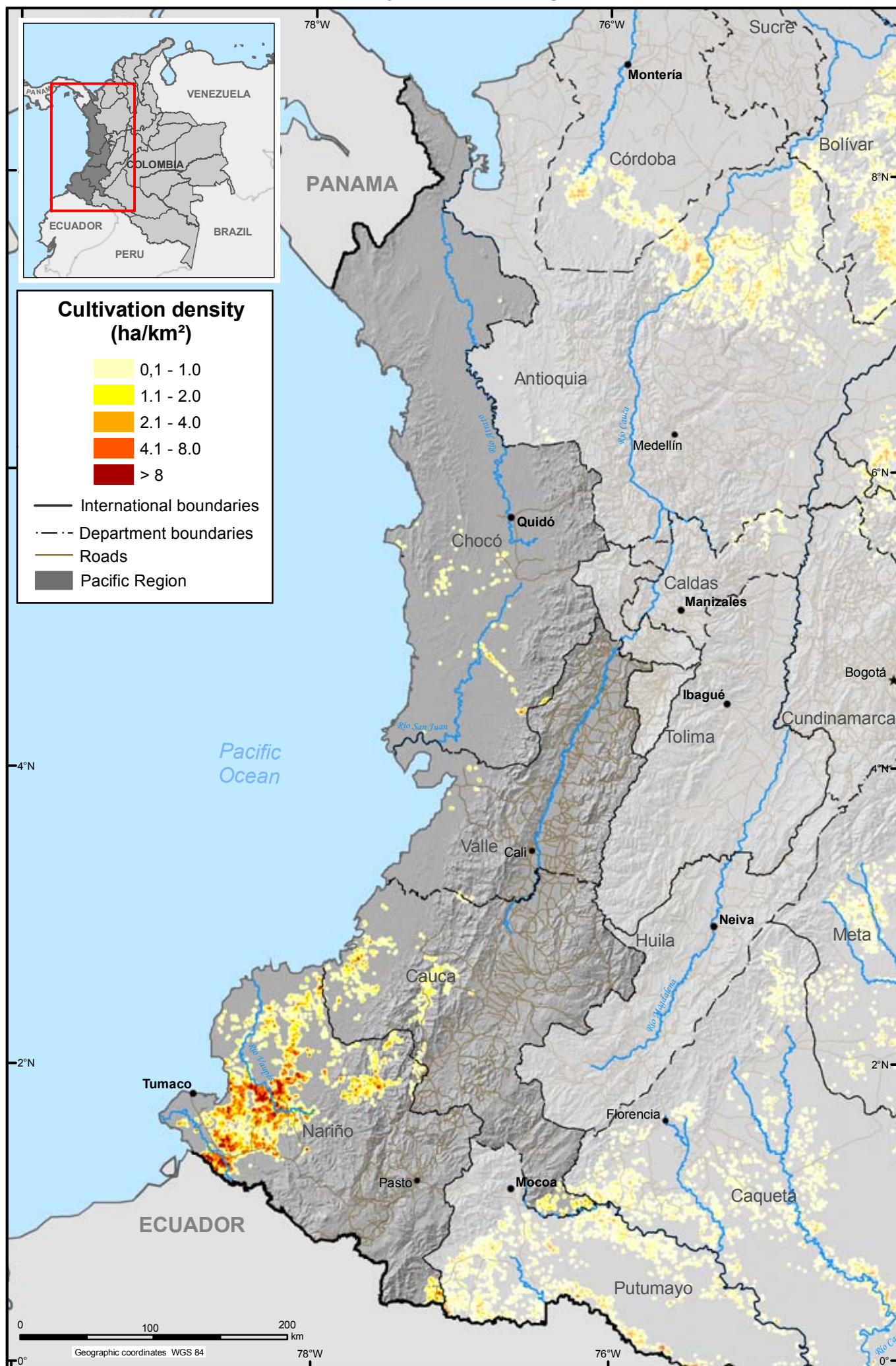


Coca field in Guaviare department, March 2005



Coca fields in Guaviare department, March 2005

Coca cultivation density in the Pacific region, Colombia 2004



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

2.1.1.3 Pacific region

Table 8: *Coca cultivation in the Pacific Region, 1999-2004 (ha)*

Department	1999	2000	2001	2002	2003	2004	% Change 2003-2004
Nariño	3,959	9,343	7,494	15,131	17,628	14,154	-20%
Cauca	6,291	4,576	3,139	2,120	1,443	1,266	-12%
Chocó		250	354		453	323	-29%
Valle del Cauca		76	184	111	37	45	22%
Total	10,250	14,245	11,171	17,362	19,561	15,788	
Annual trend		39%	-22%	55%	13%	-19%	

Nariño is located in the south-western part of the country, at the border with Ecuador. The geographic features of the region include high altitudes, as well as coastline, contributed to the spread of cultivation of coca bush and opium poppy, as well as the maritime smuggling of illegal drugs and precursors through the department.

In 2004, coca cultivation was found in 16 municipalities out of 64. With a total of 14,200 ha of coca cultivation, Nariño has the second highest amount of land under illicit cultivation and 18% of the total coca cultivation in the country. Coca cultivation in Nariño became significant in 2002, at a time when coca cultivation decreased in the neighbouring departments of Putumayo and Caqueta. Between 2001 and 2002, coca cultivation decreased by 40,000 ha in Caqueta and Putumayo, while increasing by 7,600 ha in Nariño. Aerial spraying has been intense in Nariño department since 2000, exceeding 30,000 ha in 2003 and 2004.

Like neighbouring Nariño department, Cauca has a long coastline, high mountain ranges and a mainly rural economy. However, these two departments showed inverse trends in coca cultivation. Between 2000 and 2004, coca cultivation decreased from 6,300 ha to 1,300 ha in Cauca department, without aerial spraying exceeding 3,000 ha per year. Several alternative development projects have been implemented in Cauca, the first one starting in 1985.

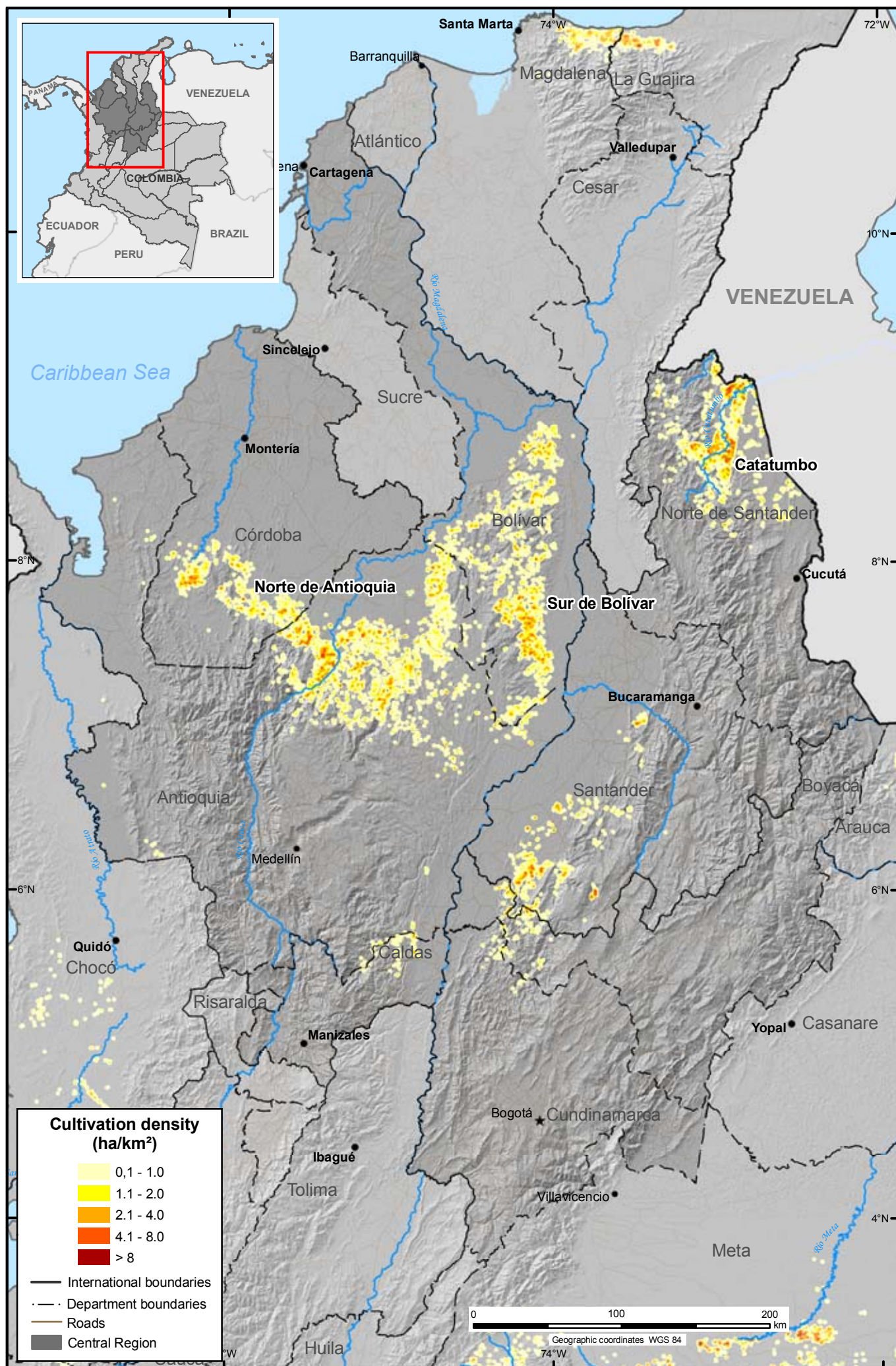
In 2004, opium poppy cultivation was also reported in Cauca department at 450 ha and a similar amount was reported for Nariño department.

Although its capital, Cali, was an important centre for narco-trafficking in the nineties, the department of Valle del Cauca never recorded more than 200 ha under coca cultivation.



Coca fields in Nariño department (surrounded by edge rows)

Coca cultivation density in the Central region, Colombia 2004



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

2.1.1.4 Central region

Table 9: Coca cultivation in the Central Region, 1999-2004 (ha)

Department	1999	2000	2001	2002	2003	2004	% Change 2003-2004
Antioquia	3,644	2,547	3,171	3,030	4,273	5,168	21%
Bolívar	5,897	5,960	4,824	2,735	4,470	3,402	-24%
Norte de Santander	15,039	6,280	9,145	8,041	4,471	3,055	-32%
Córdoba	1,920	117	652	385	838	1,536	83%
Santander		2,826	415	463	632	1,124	78%
Boyacá		322	245	118	594	359	-40%
Caldas					54	358	563%
Cundinamarca		66	22	57	57	71	25%
Total	26,500	18,118	18,474	14,829	15,389	15,073	
Annual trend		-32%	2%	-20%	4%	-2%	

Since 2002, coca cultivation stabilized at around 15,000 ha in the Central region of Colombia.

At the end of the nineties, Norte de Santander department was one of the most important centres of coca cultivation in the country, accounting for 10% of the country total in 1999. Today, coca cultivation remains concentrated in the area of La Gabarra. Between 2000 and 2003, aerial spraying averaged 10,000 ha per year over this area. At the same time, important alternative development projects have been implemented. Consequently, between 1999 and 2004, the Government has been able to reduce cultivation by two third in the area.

In the department of Bolivar, coca cultivation is concentrated in the south, in an area known as Sur de Bolivar. Coca cultivation in the department has never reached important level, amounting to 3,400 ha in 2004, representing 4% of the country total. This relatively low level of coca cultivation in the area might be attributed to a combination of aerial spraying and implementation of alternative development projects.

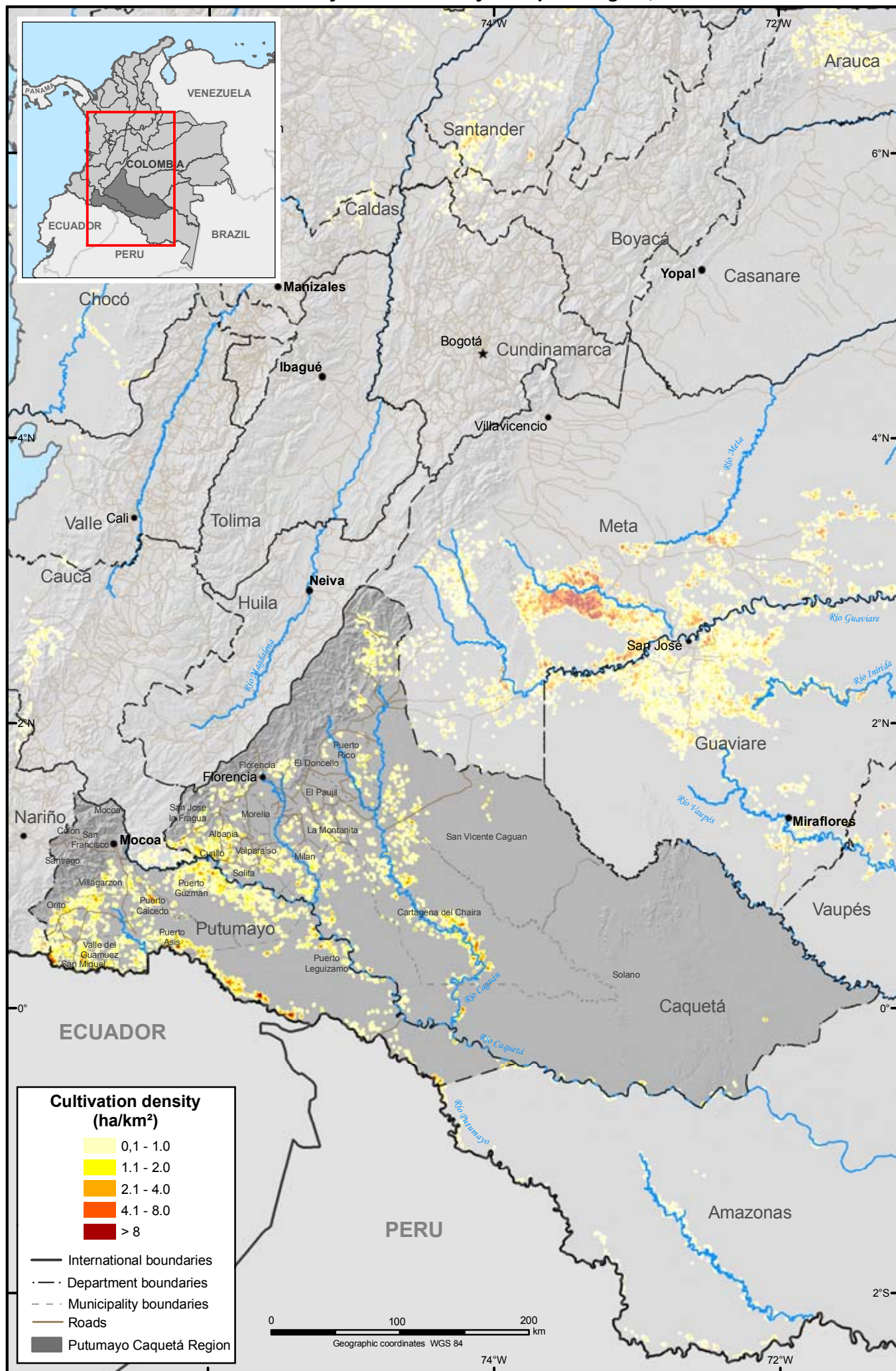
In Antioquia, coca cultivation averaged 3,000 ha between 1999 and 2002. It increased in 2003 by 41% and in 2004 by 21%, reaching 5,200 ha or 6% of the country total. The increase over the past two years occurred despite the intensification of aerial spraying, from 3,300 ha in 2002 to 11,000 ha in 2004.

In the department of Caldas, the most important coffee growing area in Colombia, 54 hectares of coca cultivation were detected for the first time in 2003. In 2004, coca cultivation amounted to 358 ha. This sudden increase might indicate a general tendency of farmers in the department to find new illicit incomes to top their coffee based profits.



Coca fields in Bolivar Department, April 2005

Coca cultivation density in the Putumayo-Caqueta region, Colombia 2004



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

2.1.1.5 Putumayo-Caqueta region

Table 10: Coca cultivation in the Putumayo-Caqueta Region, 1999-2004 (ha)

Department	1999	2000	2001	2002	2003	2004	% Change 2003-2004
Caquetá	23,718	26,603	14,516	8,412	7,230	6,500	-10%
Putumayo	58,297	66,022	47,120	13,725	7,559	4,386	-42%
Total	82,015	92,625	61,636	22,137	14,789	10,886	
Annual trend		13%	-33%	-64%	-33%	-26%	-100%

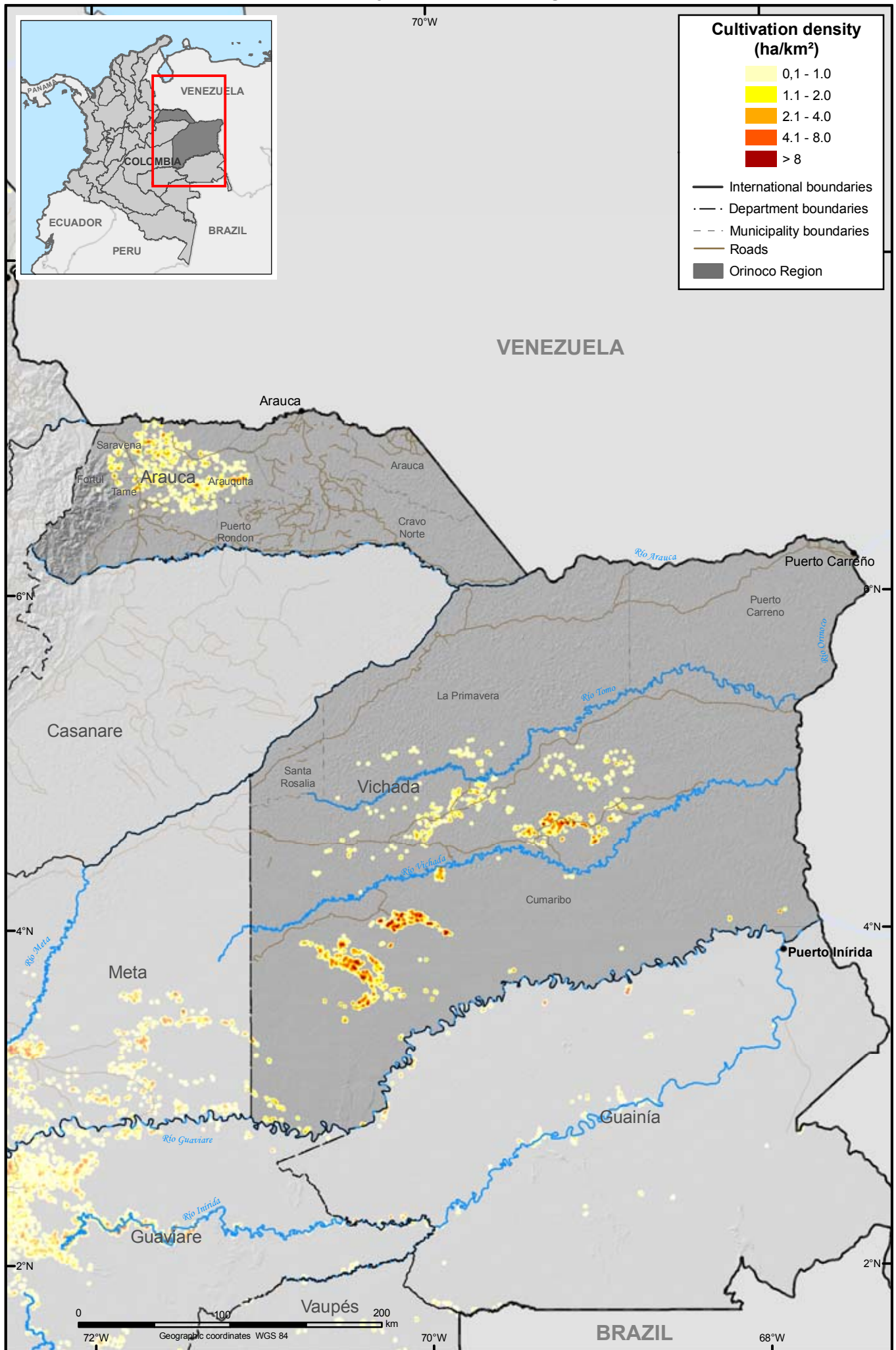
In 2000, coca cultivation peaked in Putumayo department at 66,000 ha, representing 40% of the national total. Following four years of consecutive decreases, coca cultivation in Putumayo was estimated at 4,400 ha or 5% of the national total in 2004. Aerial spraying started in 1997 with 574 ha and increased annually to reach a peak of 71,900 ha in 2002. At the same time, important alternative development initiatives started and were gradually expanded in the department. Since 2000, the department has been absorbing the largest share of funds for alternative development in the country.

A similar pattern could be observed in Caqueta department, although in smaller proportion. Coca cultivation peaked at 26,000 ha in 2000 or 16 % of the country total in 2000. Following intense aerial spraying that started in 1996 with 537 ha and peaked in 2002 at 18,600 ha, coca cultivation decreased. In 2004, coca cultivation was at its lowest level at 6,500 ha, or 8% of the country total. Several alternative development projects have been implemented, although to a lesser extent than in neighbouring Putumayo.



Coca cultivation in Putumayo department, March 2005

Coca cultivation density in the Orinoco region, Colombia 2004



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

2.1.1.6 Orinoco region

Table 11: Coca cultivation in the Orinoco Region, 1999-2004 (ha)

Department	1999	2000	2001	2002	2003	2004	% Change 2003-2004
Vichada		4,935	9,166	4,910	3,818	4,692	23%
Arauca		978	2,749	2,214	539	1,552	188%
Total		5,913	11,915	7,124	4,357	6,244	
Annual trend			102%	-40%	-39%	43%	

In Vichada, on the Venezuela border, coca cultivation peaked at 9,200 ha in 2001. It decreased by 46% between 2001 and 2002, and since then has remained relatively stable, ranging between 4,000 and 5,000 ha. Spraying activity has not been important in the department,

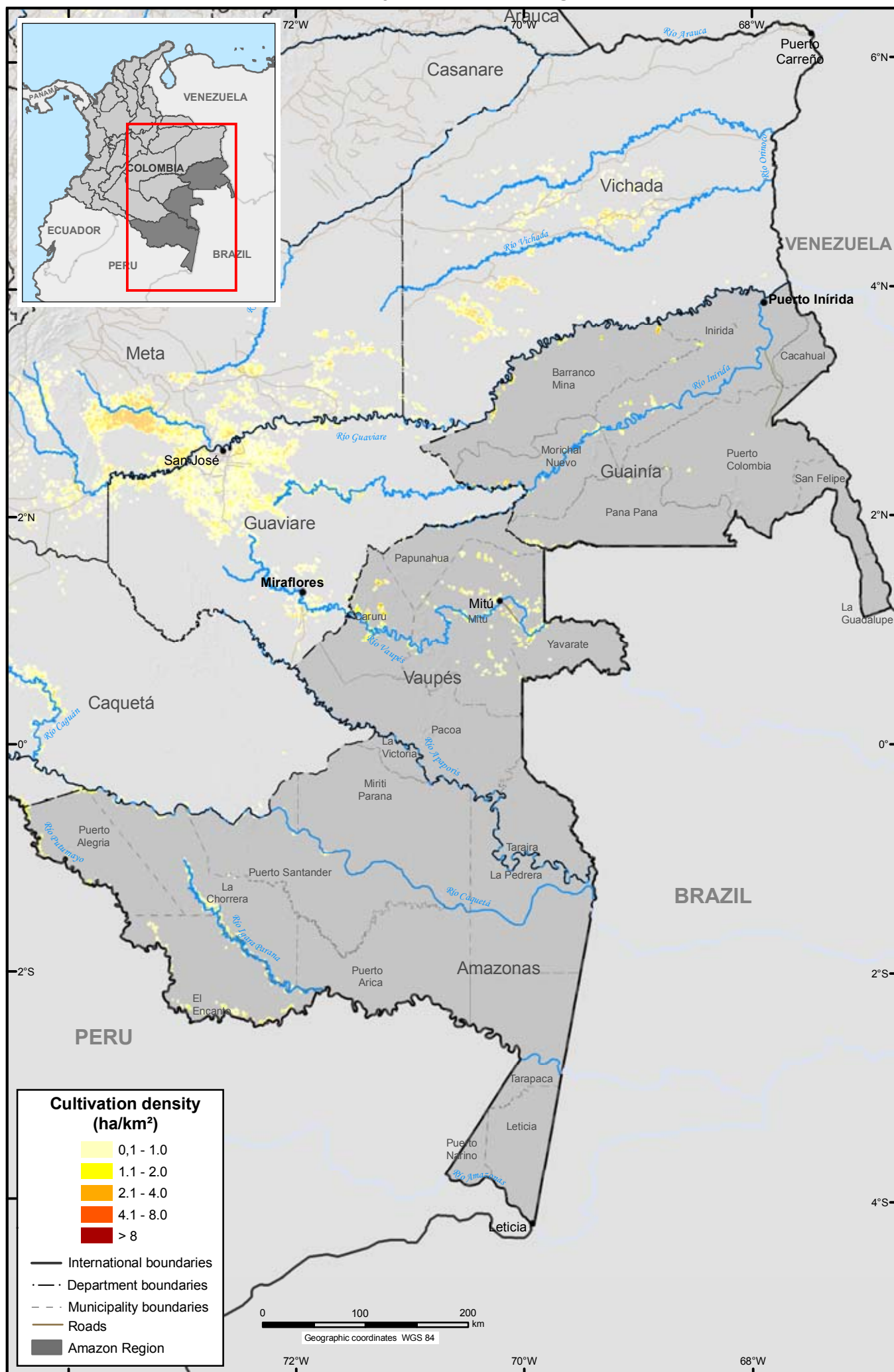
In Vichada, the most important concentration of coca cultivation can be found along the Uva river. However, in the past three years, coca cultivation has tended to spread to the Eastern part of the department, towards the Venezuelan border. Among other causes, the dispersion of coca cultivation in remote parts of the department increases the cost of aerial spraying.

Coca cultivation in Arauca was detected for the first time in 2000 with about 1,000 ha. It went over 2,000 ha in 2001 and 2002. In 2003, aerial spraying amounted to 12,000 ha and coca cultivation dropped to 500 ha in December of that year. However, it increased again in 2004 to about 1,600 ha in 2004, despite aerial spraying of 5,300 ha.



Coca cultivation interspersed with licit crop, Arauca, 2004

Coca cultivation density in the Amazon region, Colombia 2004



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

2.1.1.7 Amazon region

Table 12: Coca cultivation in the Amazon Region, 1999-2004 (ha)

Department	1999	2000	2001	2002	2003	2004	% Change 2003-2004
Vaupes	1,014	1,493	1,918	1,485	1,157	1,084	-6%
Amazonas			532	784	625	783	25%
Guainia		853	1,318	749	726	721	-1%
Total	1,014	2,346	3,768	3,018	2,508	2,588	
Annual trend			61%	-20%	-17%	3%	

Like Putumayo-Caqueta region, the departments of Vaupes, Amazonas and Guainia belong to the Amazon basin. Although sharing important similarities with Putumayo and Caqueta, these three departments, referred to as the Amazon region, have never been important areas for coca cultivation. This is due to the remoteness of the area and the lack of air fields and roads. Consequently, aerial spraying of coca cultivation was almost non-existent, except in Vaupes with 1,100 ha in 2004.

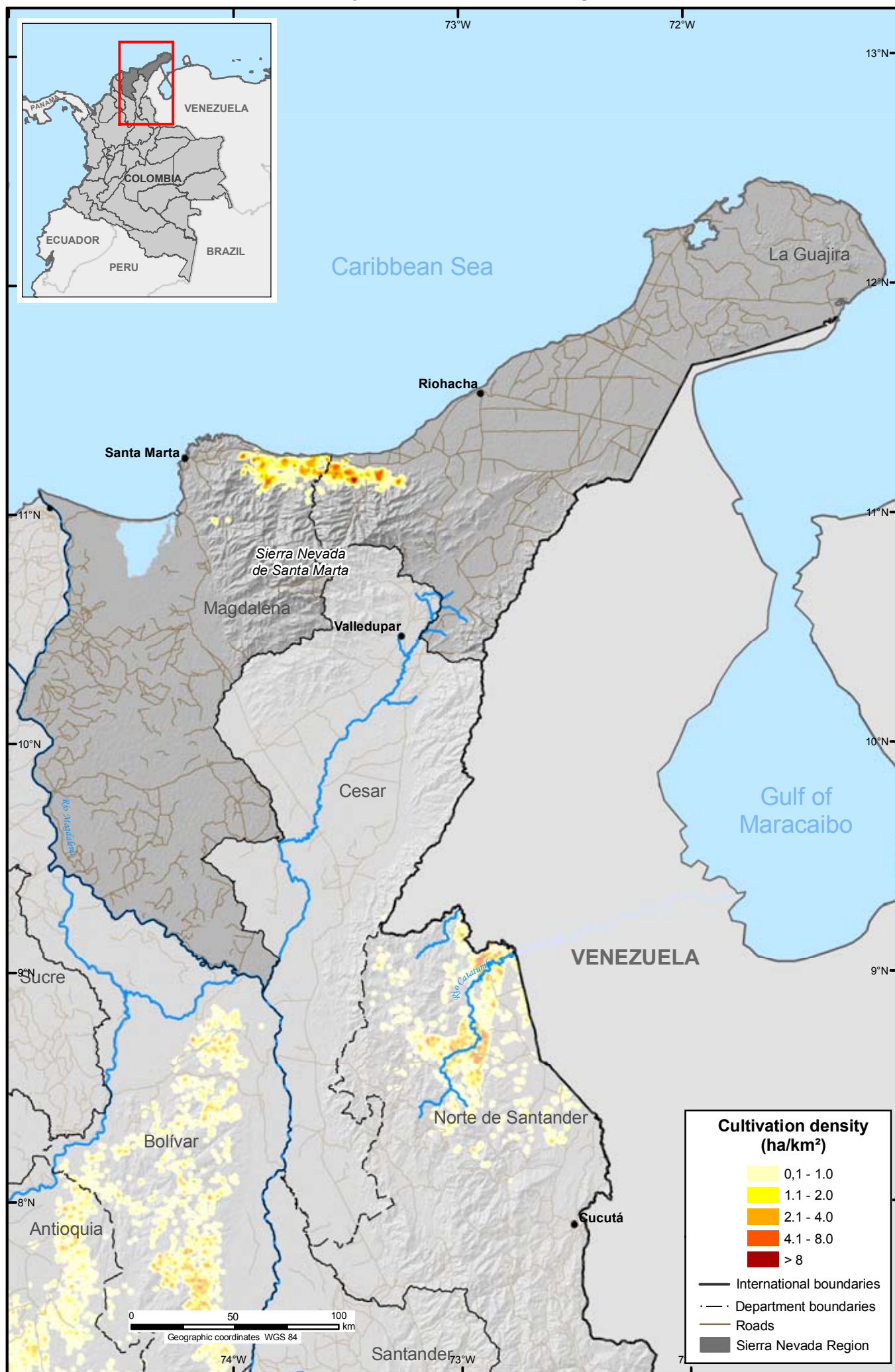


Coca fields in the Amazon region



Coca fields in the Amazon region

Coca cultivation density in the Sierra Nevada region, Colombia 2004



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

2.1.1.8 Sierra Nevada region

Table 13: Coca cultivation in the Sierra Nevada region, Colombia, 1999 - 2004

Department	1999	2000	2001	2002	2003	2004	% Change 2003-2004
Magdalena	521	200	480	644	484	706	46%
Guajira		321	385	354	275	556	102%
Total	521	521	865	998	759	1,262	
Annual trend		0%	66%	15%	-24%	66%	



Coca fields in Sierra Nevada de Santa Marta

The Sierra Nevada region, with the departments of Magdalena and Guajira, has never been an important centre of coca cultivation in Colombia. Coca cultivation has remained between 500 and 1,300 ha over the last six years. Coca cultivation takes place mainly in the fringe of lowlands between the high mountains of the Sierra Nevada and the sea shore.

However, the region is an important area for narco-trafficking activities, in particular for the shipping of drugs to the Caribbean Islands and the United States.

The region is also an important tourist centre and hosts the Sierra Nevada National Park. The National Park is one of the most important ecological reserve in Latin America, known for its rich bio-diversity and presence of several ancient indigenous cultures. In 2004, coca cultivation in the Sierra Nevada National Park amounted to 250 ha.

2.1.1.9 Possible areas of new cultivation

The survey covered and interpreted 100% of the national territory, including areas previously not known as being coca growing regions. In doing so it serves as an early warning system to detect and prevent the spread of coca into new areas.

Potential small coca fields have been detected in remote areas outside the established agricultural areas of the departments of the Orinoco and Amazon river basins. Field verification has not been carried out in these areas because it was considered too time consuming and too costly to verify small and isolated patches of coca cultivation. Because of the absence of field verification, the estimate for coca cultivation in these areas are presented as indicative and not included in the final estimate. The 2004 survey 7 Landsat images analysed for vegetation having similar characteristics as coca fields. A total of 222 ha were assessed as possible coca cultivation in new area.

Table 14: Possible coca cultivation in new areas

Department	ha
Amazonia	115
Guainía	1
Vaupés	106
Total	222

Poverty in 2000 by department and coca cultivation in 2004 in Colombia



Sources: for coca cultivation Government of Colombia, National monitoring system supported by UNODC; for poverty indicators DNP
The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

2.1.1.10 Coca cultivation and poverty

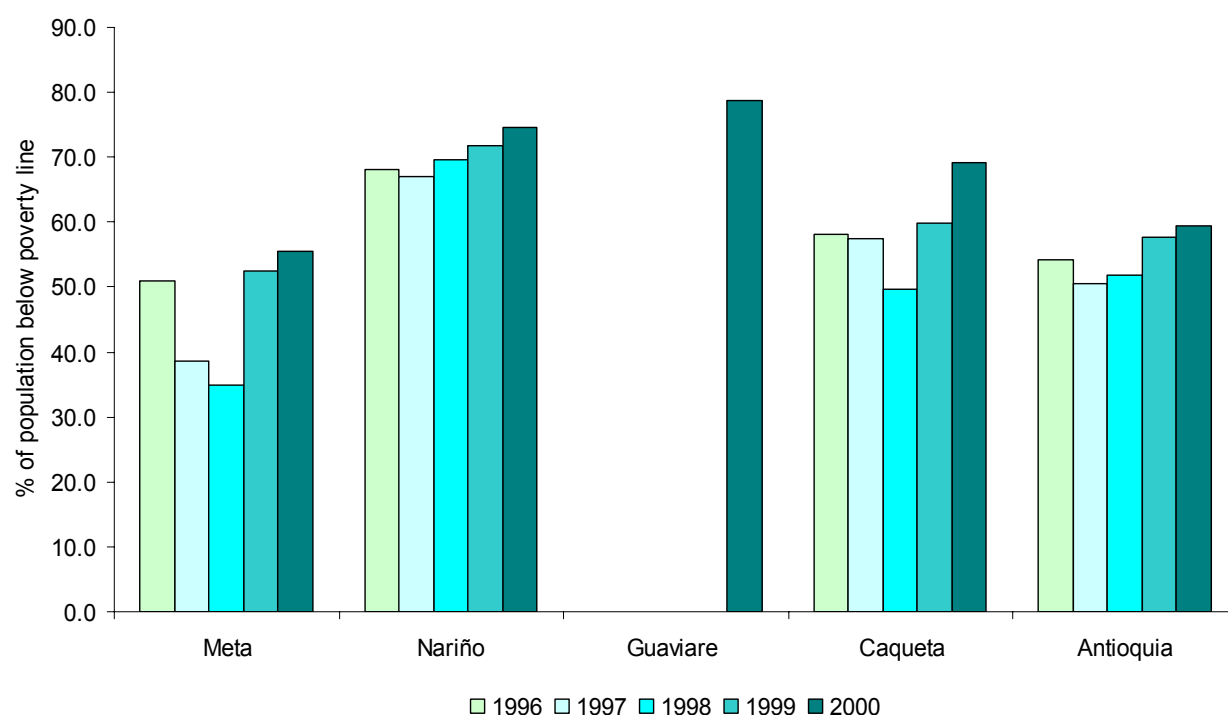
The drug problem in Colombia is the result of a number of factors which have created a fertile ground for coca cultivation to proliferate. In cases where coca is planted as a result of choice and not coercion, poverty is one of them. In most cases, the emergence of illicit crops does not significantly increase peasants' income, but can improve their basic subsistence when other income generating activities are not present. Coca farmers are far from being the main beneficiary from the huge profits generated by this business.

The analysis of poverty and coca cultivation is complicated by the discrepancies of recent data on poverty. The latest data available at the department level from DNP dates from 1996 – 2000. In 2005, the Colombian government will implement a national population and household census, which will collect data on poverty.

Analysing the available data on the percentage of people below a poverty line and an extreme poverty line from 1996 to 2000, no statistically significant correlation could be found between poverty and coca cultivation at the departmental level. Departments like Guainia and Choco where poverty levels were high were not departments with significant levels of coca cultivation or opium poppy, while Meta with relatively fewer people below the poverty line accounted for a large part of coca cultivation in 2004. In addition to the general level of poverty in the department, other factors can play a more important role in the expansion of coca cultivation like the proximity of the department to narco-trafficking centers and favourable agricultural conditions.

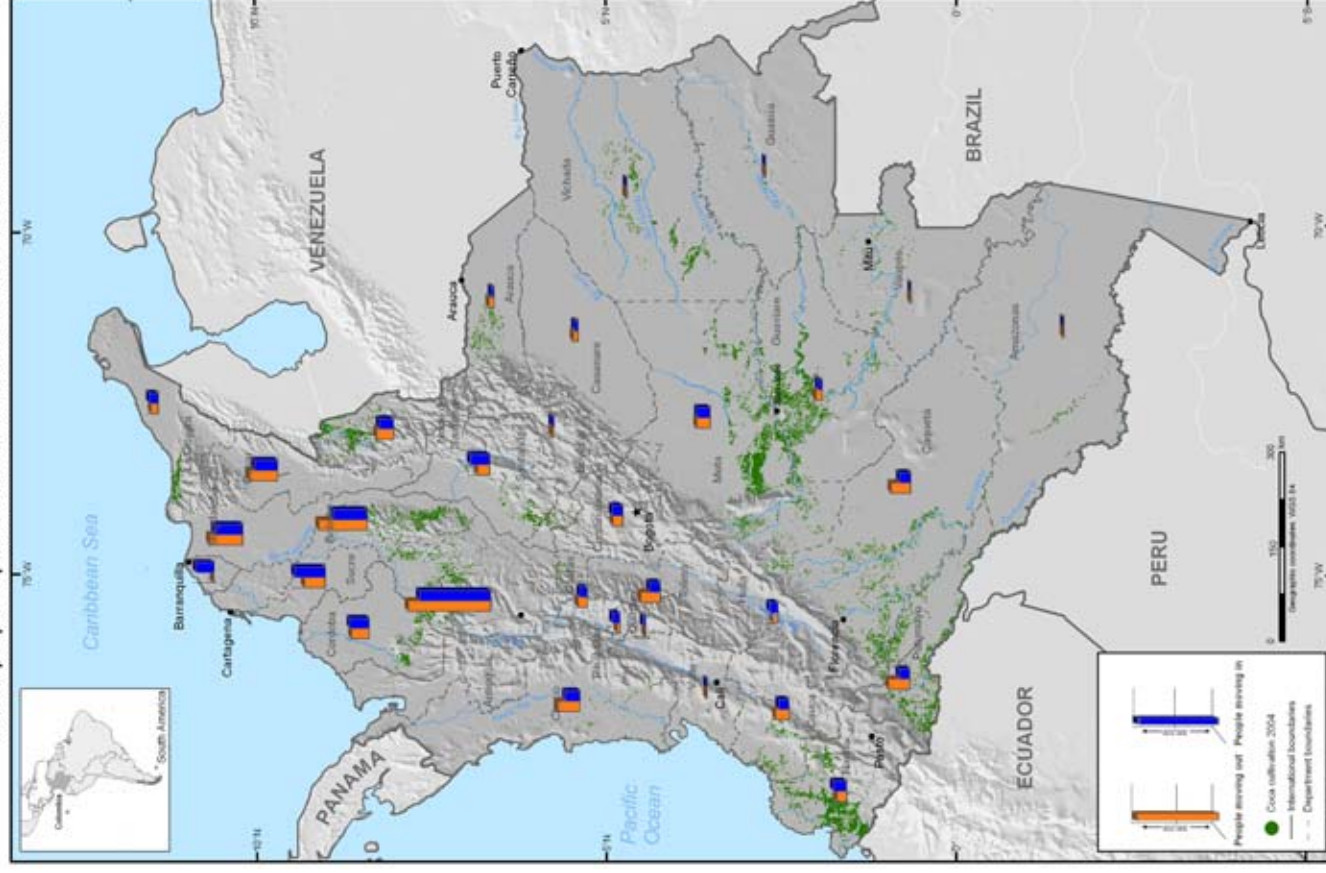
Overall, according to DPN, rural areas of Colombia are characterized by a very high proportion of people (88 %) living below the poverty or extreme poverty line. A much lower percentage (61%) are found in urban areas. Poverty indicators are presented on the graph below.

Table 15: Percentage of people below poverty line from 1996 - 2000

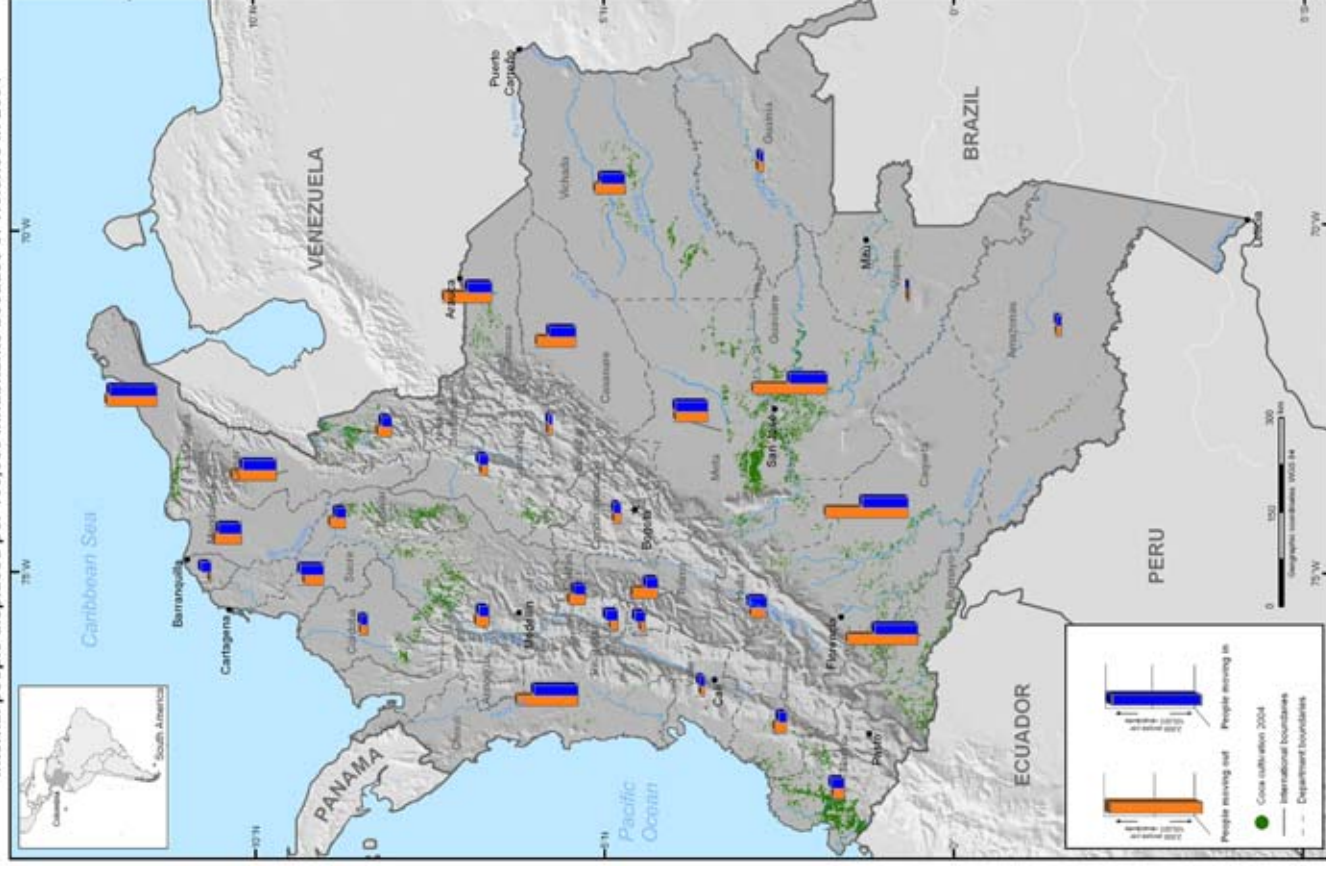


Source: DNP

Internal people displaced because of violence between 1995 and 2004



Internal people displaced per 100,000 inhabitants because of violence in 2004



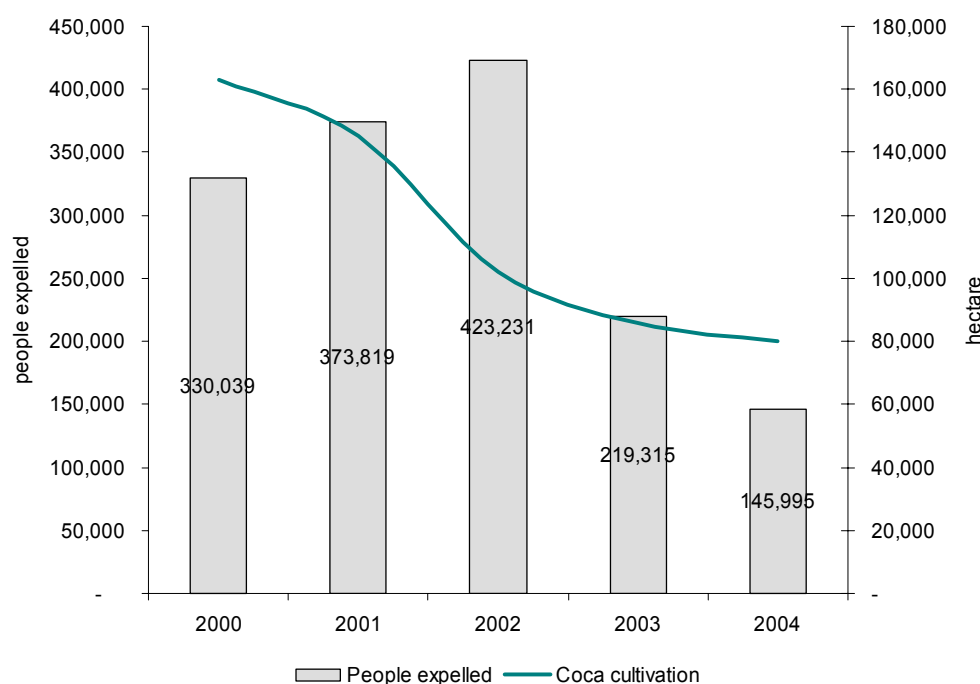
Sources: for coca cultivation 2004 - Government of Colombia - National monitoring system supported by UNODC; for displaced people Red de Solidaridad Social. The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

2.1.1.11 Coca cultivation and displacement

Violence, armed conflict, drug trafficking and the search for better living conditions have generated enormous displacement of persons over the past two decades. There remains a significant discrepancy between the number of internally displaced persons (IDPs) recorded by different sources. The problem is known to be important and has produced a real humanitarian crisis for the country.

In Colombia, the Social Solidarity Net, known as RSS, maintains a registry at the municipality level of people who had to leave a municipality because of violence during the year. At the national level, since 2002, decreasing trends were noted for the total number of internally displaced people and total area under coca cultivation. Both of these are encouraging trends and UNODC will continue to examine this issue to see if more firm correlative factors can be estimated to give the government and the international community more insight into this complex relationship.

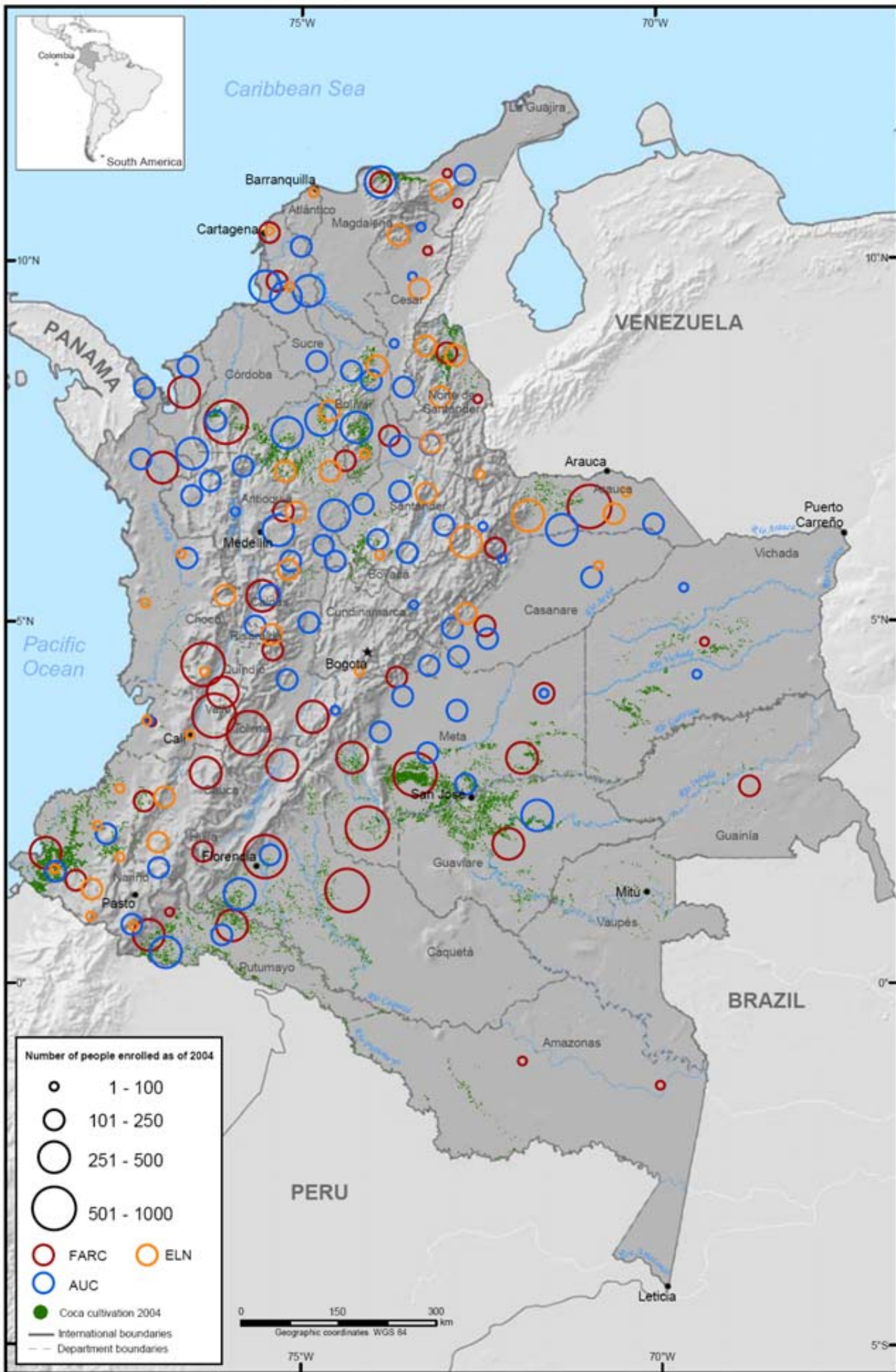
Figure 4. Number of IDP and coca cultivation, 2000 - 2004



Source: RSS

While no statistically significant correlation has so far been established at the department level between number of IDPs and coca cultivation, there is a positive correlation between the number of IDPs and the number of people enrolled in armed groups at the department level.

Illegal armed groups and coca cultivation in Colombia, 2004



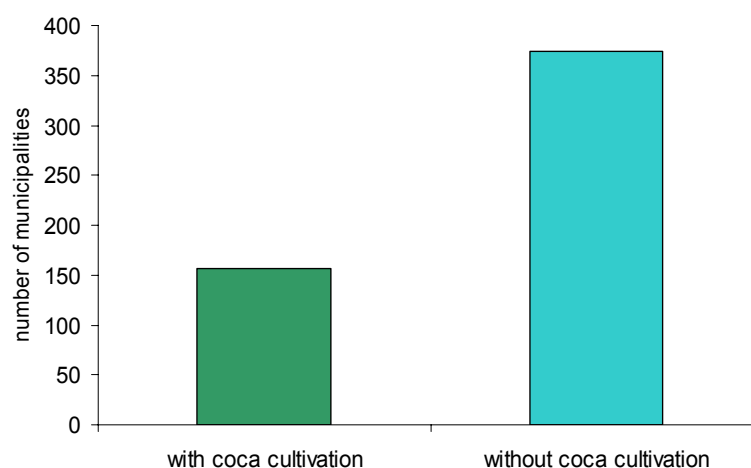
Sources: for coca cultivation: Government of Colombia, National monitoring system supported by UNODC; for number of persons enrolled in armed groups: Ministry of Defence. The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations.

2.1.1.12 Coca cultivation and armed groups

According to government sources, there were about 28,100 people enrolled in illegal armed groups in Colombia in 2004, distributed over about 530 municipalities.

Illegal armed groups were reported in 156 municipalities where coca cultivation was found, and in 374 municipalities where coca cultivation was not found.

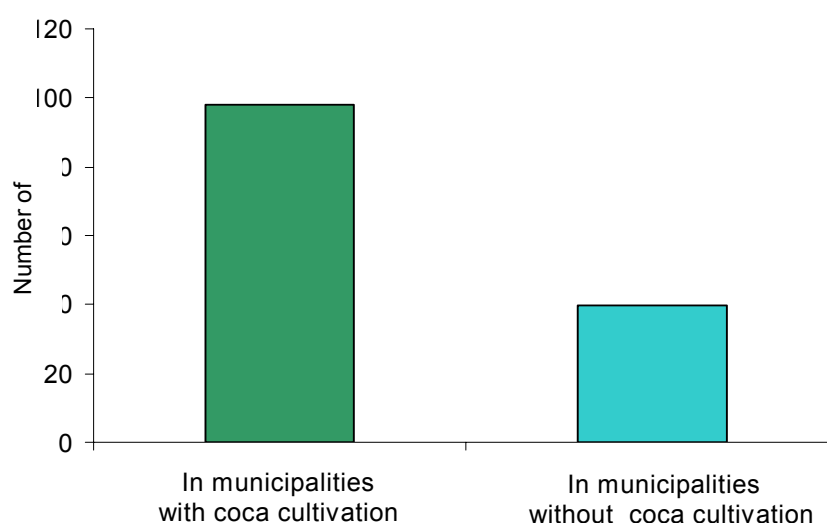
Figure 5. Number of municipalities with presence of illegal armed groups, Colombia 2004



Source: Ministry of Defence

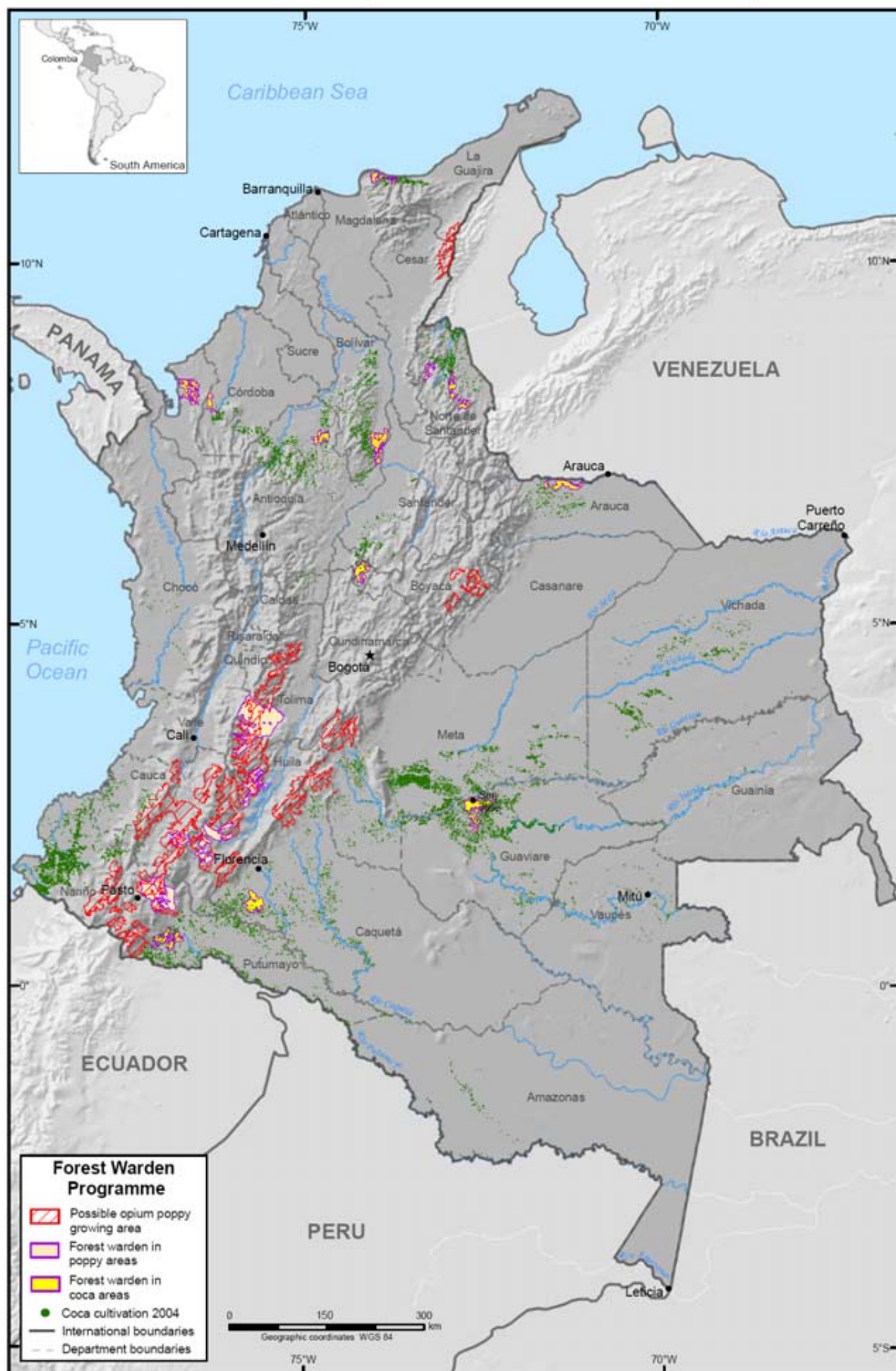
The size of these groups was larger in municipalities where coca cultivation was found than in municipalities free of coca cultivation. In municipalities where coca cultivation was observed, there were on average approximately 100 people enrolled in illegal armed groups, whereas in municipalities where coca cultivation was not found, there were on average 40 people enrolled in such groups. This difference is statistically significant, and supported the reports mentioning the involvement of illegal armed groups in narco-trafficking. Although not directly involved in coca cultivation per se, illegal armed groups controlled the business and prices of coca base offered to the coca farmers. These groups probably then derive considerable benefits from the processing and sale of cocaine hydrochloride.

Figure 6. Average number of people, at municipality level, enrolled in illegal armed groups in Colombia in 2004



Source: Ministry of Defence

Forest Warden Families Programme and coca cultivation in Colombia, 2004



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

2.1.1.13 Coca cultivation and the forest warden families programme

An important project presently been carried out by UNODC for Plan Colombia, is the Monitoring of the Government's "Forest Warden Families Programme", whose main objective is the incorporation of farmer families into a process of voluntary eradication of illicit crops and the recovering of forest in ecological and social vulnerable areas, through a contract with payments of a monthly salary (US\$ 170) per family in three years. The map shows the geographic location of the 36 ongoing projects.

The Forest Warden Families Programme has three main components: environmental, social and economic, represented respectively by the preservation of the environment, an increase in social protection and a temporary financial aid to the beneficiary families. The selection criteria for the areas of each project is based in the identification of a number of districts within one or two municipalities that constitutes a geographic unit along with the commitment of the inhabitants to keep all farms of his own district free of illicit crops. This minds that a break of this commitment from just one family in a given district implies the retirement of all families of that district from the project. However, in practice, this environmental criteria has been replaced by the consideration of lists of families willing to enter in the agreement.

The role of SIMCI II to provide support to UNODC in this endeavour has consisted mainly in the design of the monitoring methodology, the establishment of base lines at the start of each Forest Warden Families Programme and periodic verification of the absence of illicit crops as well as forest recovery using remote sensing tools.

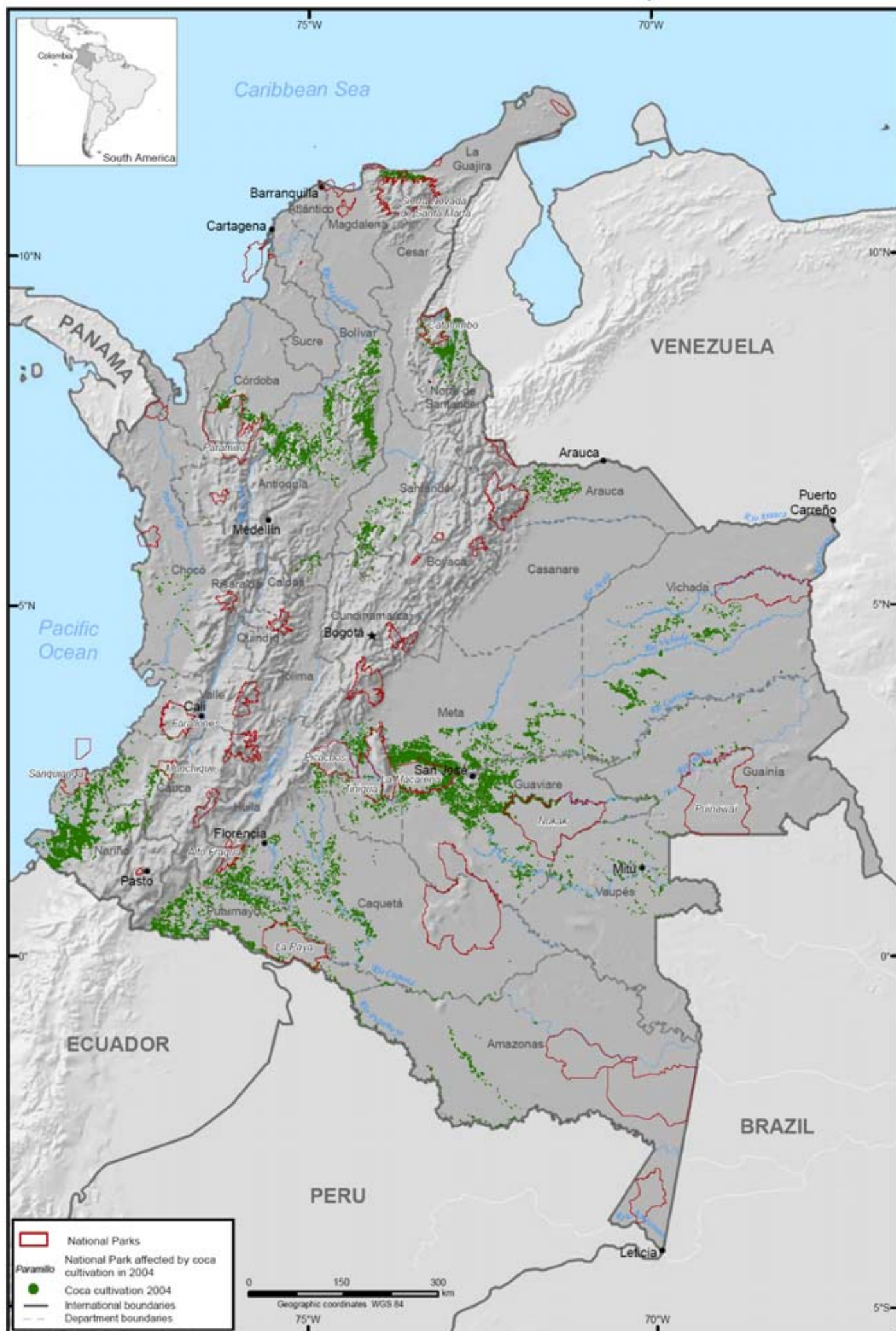


*Forest Warden Families programme
in the Sierra Nevada Region*



Social work in Forest Warden Families

National Parks and coca cultivation in Colombia, 2004



Sources: for coca cultivation Government of Colombia - National 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

2.1.1.14 Coca cultivation in National Parks

The presence of illicit crops in both Natural Parks and Indigenous Territories has been monitored by SIMCI since the 2001 survey, and the data have been delivered to the competent authorities to enable them to identify actions and projects to be applied for the preservation of its social and environmental characteristics with minimum of harm.

The limits of National Parks and Indian territories have been provided by the official entities in charge of their management. In 2004, the limits of National Parks were edited by the monitoring project in cooperation with technicians from the Ministry of Environment. The editing improved the match between SIMCI cartographic material and the official boundaries of the Parks. National Parks boundaries are not always precise and therefore coca cultivation estimated in each of them depends on the accuracy of their delimitation. To enable annual comparison the same boundaries were used for each year.

Out of the 50 National Parks in Colombia, coca cultivation in 2004 was found in 13 of them. With 5,400 ha in 2004, coca cultivation represented 0.05% of the total area covered by National Parks, and coca cultivation in National Parks represented 7% of the total level of coca cultivation in 2004.

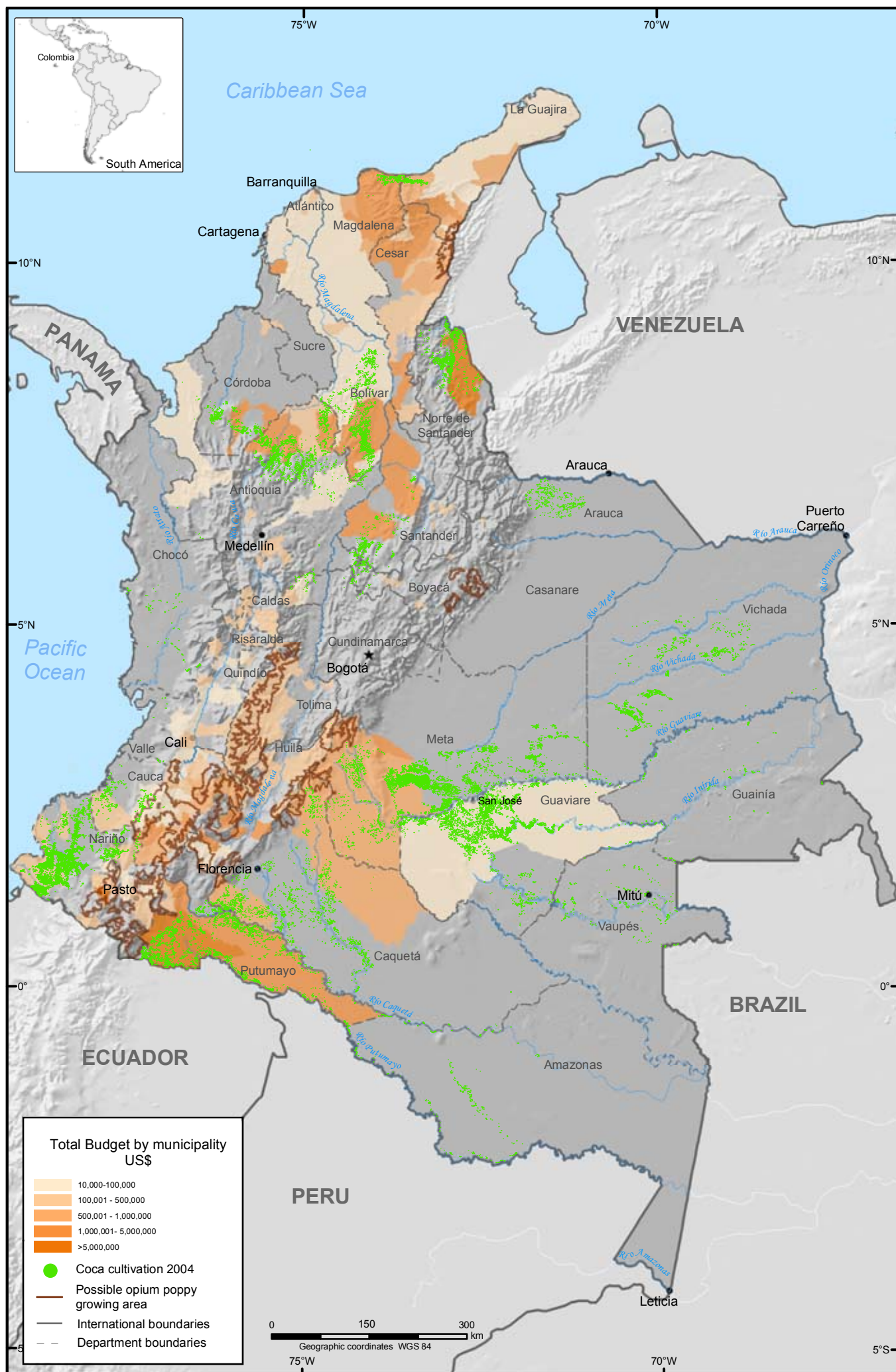
Compared to 2003, the increase of 30% of coca cultivation found in the National Parks in 2004 is mainly due to an adjustment of the amount of coca cultivation in the National Park of Sierra La Macarena, located in the department of Meta. In 2003, the imagery acquired over the park was very cloudy. The satellite images acquired in 2004 over the same area were less cloudy and therefore permitted a better assessment of the situation. The increase between 2003 and 2004, therefore represented more an adjustment of the estimate rather than an actual increase of coca cultivation.

The detailed results by indigenous territories are presented in annexes

Table 16: Coca cultivation in National Parks in Colombia, 2003 – 2004 (ha)

National Parks	2003 (ha)	2004 (ha)
Sierra La Macarena	1,152	2,707
Nukak	1,469	1,044
Paramillo	110	461
Tinigua	340	387
Sierra Nevada	212	241
La Paya	310	230
Puinawai	33	139
Catatumbo-Bari	129	107
Los Picachos	13	15
Sanquianga	7	14
Alto Fragua	8	12
Munchique	1	8
Farallones	2	1
Tayrona	4	0
Total	3,790	5,364

Budget of alternative development programmes 1999-2007 and coca cultivation in Colombia, 2004



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

2.1.1.15 Coca cultivation and alternative development projects

According to the Colombian Agency for International Cooperation (ACCI), the Presidential Programme against Illicit Crops (PCI) and data provided by UNODC, the total budget for ongoing alternative development initiatives between 1999 and 2007 amounted to about US\$ 590 million. This total includes US\$ 350 million for initiatives that have a national coverage, and a about US\$ 240 million invested directly in the departments and municipalities.

Most of the alternative development activities are funded by USAID (58%), and the Colombian Government (38%).

Table 17: Source of funding for ongoing alternative development in Colombia, 1999 – 2004 (US\$)

Source of funding	Total budget 1999 – 2007 (US\$)	% of total
USAID	342,000,000	58%
Colombian Government	224,000,000	38%
UNODC	19,000,000	3%
Canada	4,000,000	1%
Spain	140,000	0.02%
IDB	120,000	0.02%
Rounded total	590,000,000	100%

Source: ACCI –June 2004, UNODC, PCI

Between 2000 and 2004 the total amount invested in alternative development projects directly in the department and the municipalities was estimated at about US\$ 155 million. This was a steady increase in the annual budgets from US\$ 3,000,000 in 2000 to US\$ 78,000,000 in 2004.

The budget of US\$240 million for the period 1999 – 2007 invested directly in the departments and municipalities covers alternative development initiatives to prevent mostly coca cultivation, but also in some department opium poppy cultivation.

The departments of Putumayo and Norte de Santander received about US\$ 102 million, representing 43% of the total.

Coca cultivation in the department of Putumayo amounted to 66,000 ha in 2000 and represented 40 % the national total. The investment in alternative development, combined with intense aerial spraying enabled a decrease in coca cultivation from 66,000 ha to only 4,000 ha in 2004.

At its peak in 1999, coca cultivation in Norte de Santander, Santander and Magdalena, amounted to 15,500 ha or 9% of the national total. In 2004, coca cultivation amounted to 5,000 ha. The total budget 1999-2007 for alternative development in Norte de Santander amounted to about US\$ 85 million, mainly allocated from 2004 and on.

Between 2000 and 2004 coca cultivation in Caqueta decreased of 20,000 ha, but alternative development in this department only amounted to US\$5,5 million, while aerial spraying was intense in 2001 and 2002 (above 17,000 ha annually). In 2004, coca cultivation amounted to 6,500 ha representing 8% of the national total.

For the Amazonian departments of Guaviare, Guania, Vaupes and Vichada, the investment in alternative development was less than 1% of the total budget 99-07, while the coca cultivation amounted to 16,300 ha, representing 20% of the total, and while aerial spraying campaigns were rather intense (representing 28% in 2003 and 24% in 2004 of the total annual aerial spraying). The department of Meta received 2% of the total budget 1999-2007, while coca cultivation represented 23% of the national total in 2004.

Table 18: Approximate alternative development budget 1999 – 2007 (US\$)

Department	Approximate total budget 99-07 (US\$)	% of total budget	Accumulated coca cultivation 00-04	Accumulated opium poppy cultivation 02-04
Putumayo	54,500,000	23%	138,812	0
N. de Santander	47,900,000	20%	30,992	0
Santander	19,800,000	8%	5,460	0
Magdalena	17,800,000	7%	2,514	0
Bolívar	12,900,000	5%	21,391	0
Cauca	12,100,000	5%	12,544	2,205
Cesar	11,500,000	5%	0	1,780
Antioquia	11,200,000	5%	18,189	0
Nariño	11,000,000	5%	63,750	2,230
Huila	8,500,000	4%	0	2,395
La Guajira	6,000,000	3%	1,891	275
Caqueta	5,800,000	2%	63,261	105
Meta	4,700,000	2%	63,324	0
Córdoba	4,500,000	2%	3,528	0
Tolima	2,600,000	1%	0	3,131
Caldas	2,000,000	1%	412	8
Atlántico	1,900,000	1%	0	0
Valle	1,600,000	1%	453	0
Risaralda	800,000	0.3%	0	0
Boyacá	700,000	0.3%	1,638	0
Guaviare	500,000	0.2%	96,485	0
Quindío	200,000	0.2%	0	0
Sucre	100,000	0.01%	0	0
Amazonas			2,724	0
Arauca			8,032	0
Chocó			1,380	0
Cundinamarca			273	0
Guainía			4,367	0
Vaupés			7,137	0
Vichada			27,521	0
Total	238,600,000		576,078	12,129

Source: ACCI –June 2004, UNODC, PCI

The situation in the department of Nariño could be pointed out as a particular case, considering that coca cultivation increased from 4,000 ha in 1999 to 17,600 in 2004, despite intense aerial spraying in 2003 and 2004 and investment in alternative development amounting to US\$ 11 million or 4% of the total budget 1999 – 2004. Opium poppy cultivation also takes place in the department, representing about 12% of the national total.

Table 19: Change in coca cultivation 2000 – 2004, Alternative development budget 1999 – 2004 and Accumulated aerial spraying of coca cultivation 1999 – 2004.

Department	Change coca cultivation 00-04	Approximate total budget 99-07 (US\$)	Accumulated aerial spraying of coca cultivation 99- 04
Putumayo	-61,636	54,500,000	148,751
Caqueta	-20,103	5,800,000	76,924
Guaviare	-7,850	500,000	108,686
Cauca (*)	-3,310	12,100,000	9,523
N. de Santander	-3,225	47,900,000	48,586
Bolivar	-2,558	12,900,000	22,820
Santander	-1,702	19,800,000	2,330
Vaupes	-409		756
Vichada	-243		4,357
Guainía	-132		
Valle	-31	1,600,000	
Cesar (*)	0	11,500,000	
Huila (*)	0	8,500,000	
Tolima (*)	0	2,600,000	
Atlántico	0	1,900,000	
Risaralda	0	800,000	
Quindio	0	200,000	
Sucre	0	100,000	
Cundinamarca	5		
Boyacá	37	700,000	102
Chocó	73		
La Guajira (*)	235	6,000,000	449
Caldas (*)	358	2,000,000	190
Magdalena	506	17,800,000	1,632
Arauca	574		17,070
Amazonas	783		
Cordoba	1,419	4,500,000	1,284
Antioquia	2,621	11,200,000	30,463
Narino (*)	4,811	11,000,000	100,837
Meta	7,617	4,700,000	19,249
Rounded total	-83,000	238,600,000	594,009

Source: ACCI –June 2004, UNODC, PCI



Organic coffee



Tropical fruits (arazá)

2.1.2 REPORTED OPIUM POPPY CULTIVATION

Opium poppy cultivation was introduced in Colombia in the 1980's, in a few marginal agricultural zones, when coffee prices fell down. The farmers cultivated the plant in a range of 1,700 to 3,000 meter, in small fields, intersperse with licit crops.

Opium poppy is now mainly being cultivated on mountain sides in south-western Colombia, especially in the departments of Huila, Tolima, Cauca and Nariño, and in minor quantities in Cesar and Guajira.

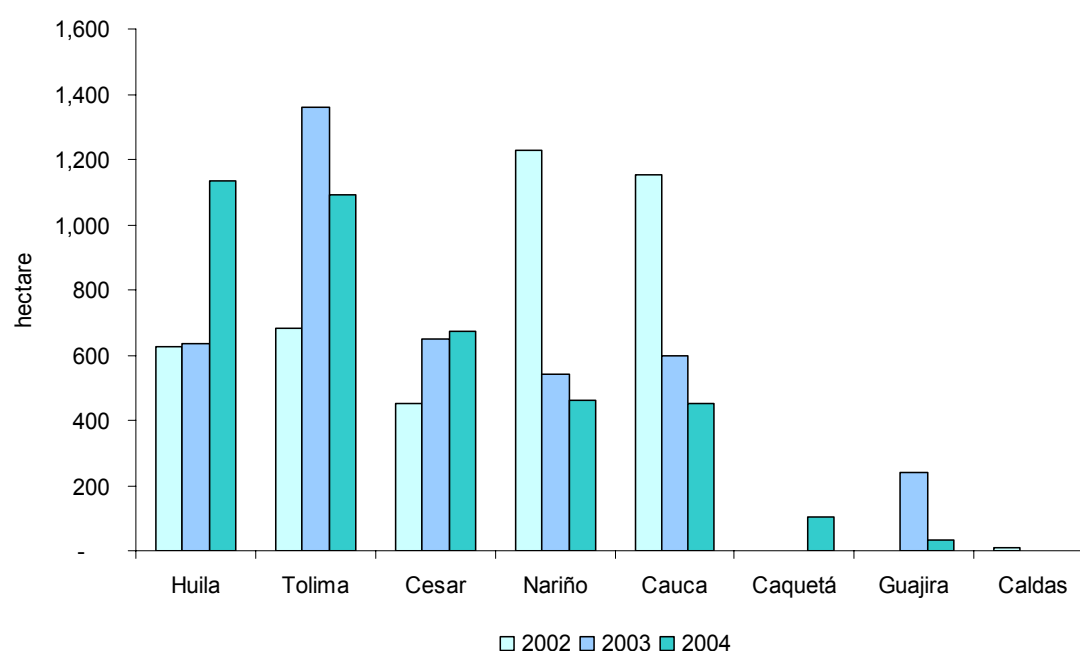
UNODC – so far – has not monitored the extent of opium poppy cultivation in Colombia. According to Colombian Government figures, the total area under opium poppy cultivation has not varied much during the 1990's in spite of extensive spraying efforts. Apart from a short-lived boom in 1994, opium poppy has remained between 4,000 – 7,000 hectares. As of December 2004, the DIRAN's estimates based on reconnaissance flights and spray operations, identified 3,950 hectares of opium poppy under cultivation, a stable situation compared to 4,026 hectares in 2003.

Table 20: Opium poppy cultivation in Colombia, 2002 – 20004 (in ha)

Department	2002	2003	2004	% change 2003-2004	% 2004 total
Huila	624	636	1,135	78%	29%
Tolima	682	1,359	1,090	-20%	28%
Cesar	454	651	675	4%	17%
Nariño	1,230	540	460	-15%	12%
Cauca	1,155	600	450	-25%	11%
Caqueta			105		3%
Guajira		240	35	-85%	1%
Caldas	8				0%
Total	4,153	4,026	3,950	-2%	100%
Rounded total	4,200	4,000	4,000	0%	

Source: DIRAN

Figure 7. Opium poppy cultivation in Colombia, 2002 – 20004 (in ha)



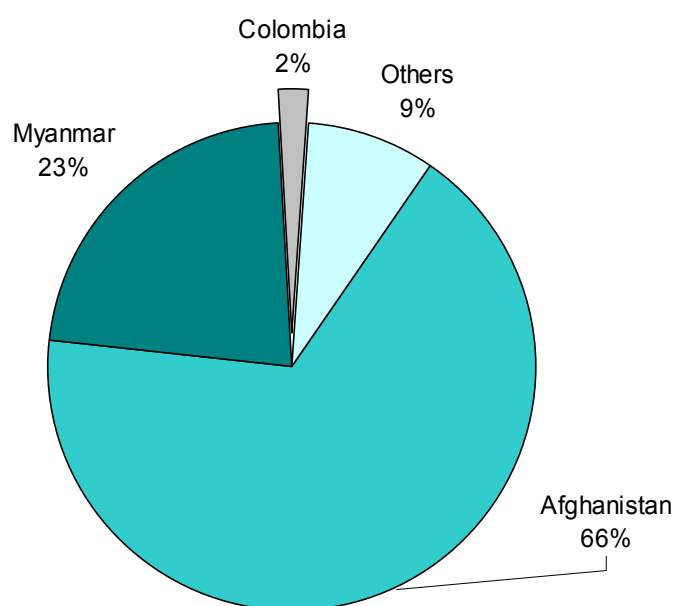
Source: DIRAN

Table 21: Global opium poppy cultivation, 1994 – 2004 (in ha)

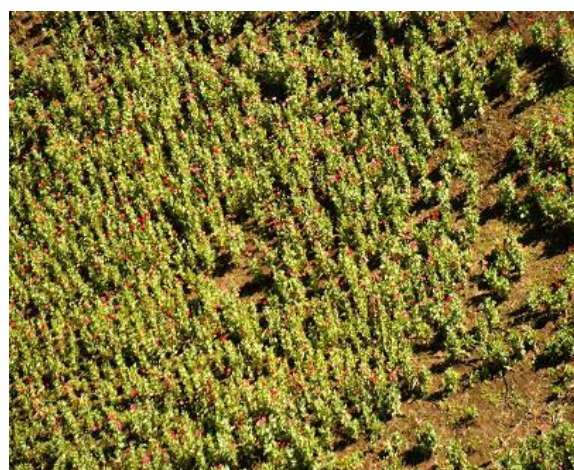
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Afghanistan	71,500	53,800	56,800	58,400	63,700	90,600	82,200	7,600	74,100	80,000	131,000
Myanmar	146,000	154,000	163,000	155,200	130,300	89,500	108,700	105,000	81,400	62,200	44,200
Colombia	15,100	5,200	5,000	6,600	7,400	6,500	6,500	4,300	4,100	4,100	4,000
Others	39,900	37,000	32,800	31,800	36,600	29,600	24,600	25,200	20,600	22,300	16,800
Total	272,500	250,000	257,600	252,000	238,000	216,200	222,000	142,100	180,200	168,600	196,000

Source: UNDOC

Figure 8. Global opium poppy cultivation, 1994 – 2004 (in ha)



Opium poppy fields, Cesar department, August 2004



Opium poppy field, Cesar department, August, 2004

2.2 YIELD AND PRODUCTION

2.2.1 COCA LEAF YIELD, COCA BASE AND COCAINE PRODUCTION

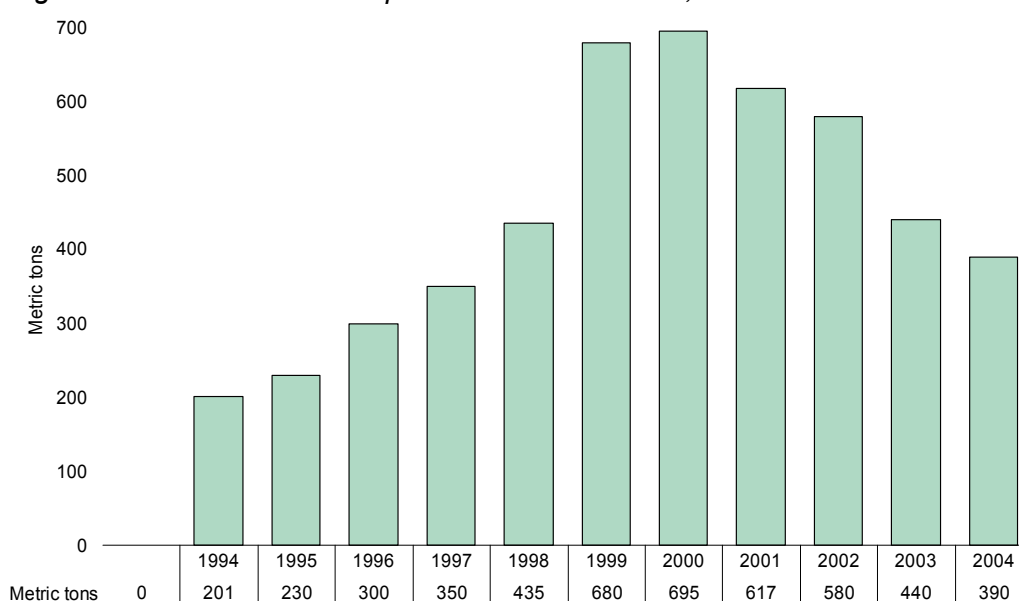
In October 2004, UNODC conducted a pilot survey on the farmers' practices on their coca fields interviewing 55 known coca farmers in 120 fields of three municipalities (San Jose, El Retorno and Miraflores) of Guaviare department. This pilot survey helped designed a larger survey that will be implemented jointly by the Colombian government and UNODC in 2005 in three regions: Putumayo – Caqueta, Sur de Bolivar (departments of Bolivar, Antioquia and Cordoba) and Catatumbo (northern part of the department of Norte de Santander). Through weighting of the coca leaves in a sample of about 180 fields selected randomly and interviews of about 540 coca farmers, the survey will provide a basis for the analysis of coca leaf yield in Colombia in 2005.

To establish an estimate of the cocaine production in 2004, UNODC relied on information available from other sources. The most comprehensive work on this topic has been done by the US government and the findings of this work indicated that the average cocaine yield per hectare of coca plants amounts to 4.7 kg/ha in Colombia.

Some recent estimates from US sources in Colombia, suggested that the average amount of pure cocaine obtained from one hectare under cultivation of coca bush was 4.0 kg in 2003. In contrast, the DIRAN estimated an average output of cocaine per hectare of coca cultivation of 5.8 kg/ha/year. The yield/conversion rate of 4.7 kg of cocaine per hectare of coca cultivation used by UNODC in this report falls within these ranges of estimates.

Estimating the actual production of cocaine in Colombia in 2004 is rather difficult, because coca fields are harvested more than once in a given year and eradication activities are spread over several months. In order to arrive at a realistic estimate for Colombia, UNODC like in the previous two years, calculated an average of the two cultivation figures recorded in December 2003 and in December 2004 by the UNODC supported national monitoring system. This average of 83,000 ha was then multiplied by the estimated yield per hectare. The result amounted to 390 metric tons of potential cocaine production in Colombia for 2004. While this calculated estimate is not very accurate, it is probably closer to the actual amount produced during the calendar year than a figure derived solely from the extent of cultivation recorded at the end of the year, after extensive eradication campaign.

Figure 9. Potential cocaine production in Colombia, 1994 – 2004



Source: UNDOC

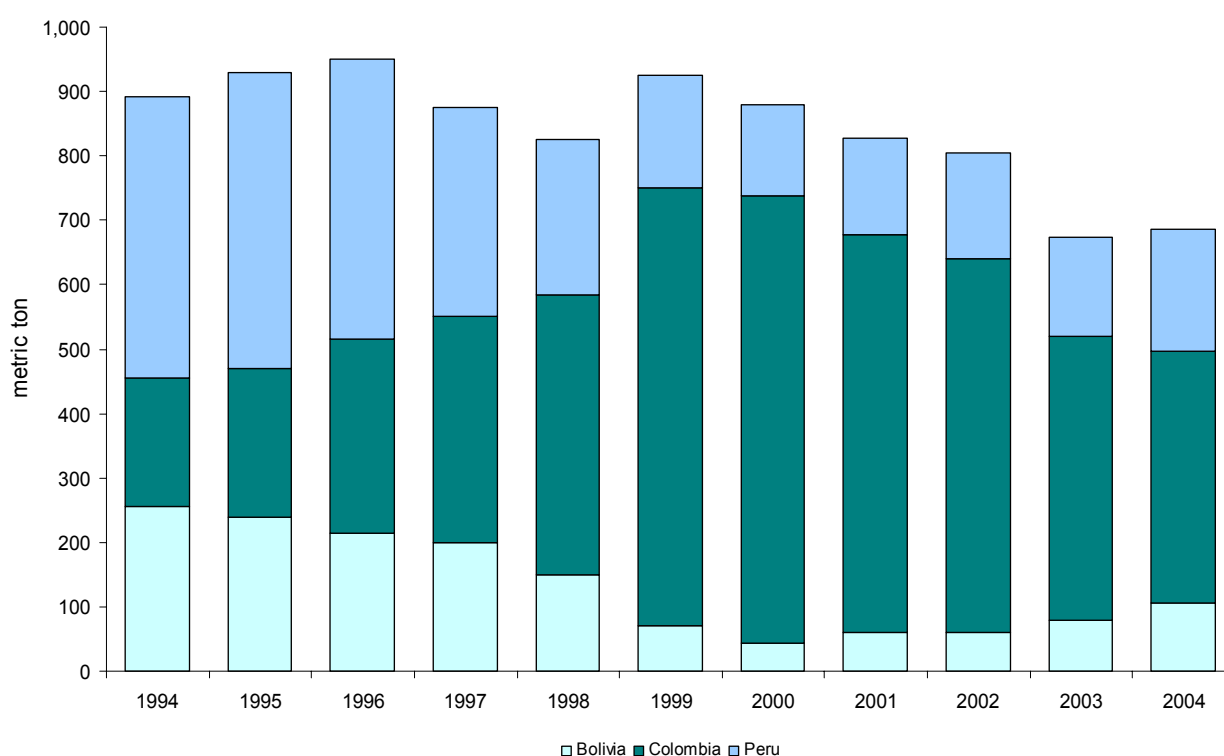
Between 2003 and 2004, the total potential cocaine output thus decreased of 50 metric tons, representing an annual decrease of 11%. In 2004, the potential cocaine production in Colombia represented 57% of the global potential cocaine production of 687 metric tons. The decrease in Colombia was matched by increases in potential cocaine production in Bolivia and Peru, and the global potential cocaine production remained grossly stable between 2003 and 2004.

Table 22: Global potential cocaine production, 1994 - 2004

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	% change 2003-2004	% of 2004 total
Bolivia	255	240	215	200	150	70	43	60	60	79	107	35%	16%
Peru	435	460	435	325	240	175	141	150	165	155	190	23%	28%
Colombia	201	230	300	350	435	680	695	617	580	440	390	-11%	57%
Total	891	930	950	875	825	925	879	827	805	674	687	2%	

Source: UNODC

Figure 10. Global cocaine production, 1994- 2004



Source: UNDOC



Coca base production in a farm laboratory (kitchen)

Main findings of the Guaviare Pilot Study

In October 2004, UNODC conducted a pilot survey on the field practices of coca farmers interviewing 55 coca farmers in 120 fields of three municipalities (San Jose, El Retorno and Miraflores) of Guaviare department. The farmers were not selected randomly, but chosen by the surveyors from their acquaintance, often among farmers benefiting from development assistance. This pilot survey was built to design a larger survey that will be implemented jointly by the Colombian government and UNODC in 2005 in three regions: Putumayo – Caqueta, Sur de Bolivar (departments of Bolivar, Antioquia and Cordoba) and Catatumbo (northern part of the department of Norte de Santander). Through weighting of the coca leaves in a sample of about 180 fields selected randomly, and the interviews of coca farmers, the survey will provide a basis for the analysis of coca leaf yield in Colombia in 2005.

The pilot survey was not representative and not robust enough to be used for the establishment of the coca leaf production estimate at the national level in 2004. It also revealed some discrepancies in the answers from the farmers and helped to finalize the design of the survey in preparation for 2005. Nevertheless a summary of the main findings of the 2004 pilot survey, excluding the data from Miraflores (10 farmers) not yet entered at the time of writing, is presented here below:

According to the interviews conducted with farmers in the municipalities of San Jose and El Retorno, the average fresh coca leaf yield per hectare per harvest was 1,175 kg/ha. On average, farmers reported to harvest every 63 days, which represented 5.7 harvest/year. Assuming that each harvest yielded approximately the same amount, the annual yield for fresh coca yield in the 2 municipalities was around 6,700 kg/ha. About 90% of the farmers mentioned that the best yield, averaging 1,590 kg/ha, was obtained in the second or third year after planting. However, when reporting on a separate question their total annual production and total harvested coca area, the annual yield of fresh leaves was 3,700 kg/ha in 2003 and 3,845 kg/ha in 2004. To resolve the discrepancy between the yield estimates reported by farmers, the larger study to be conducted in 2005 will actually weight the coca leaf harvest from sampled field plots.

85% of the farmers reported to process their coca leaves in their farms. 63% of them processed the leaves themselves, while 15% contracted someone (and 22% did not respond).

Farmers reported an average production of 1,36 g. of coca base per kilo of fresh coca leaf. Using the two extremes averages of fresh coca leaf yield of 6,700 kg/ha and 3,800 kg/ha, the annual coca base yield would vary between 9.1 kg and 5.2 kg. Farmers reported an average coca base price of 2,180,000 COP/kg, or US\$ 830/kg. This gave an average annual income ranging from COP 20,000,000 (US\$ 7,600) to COP 11,000,000 (US\$ 4,300) per hectare.

Farmers reported to plant fields of on average 0.72 ha, but to harvest only 68% of what they planted, i.e. 0.48 ha. On the other hand, the average coca field size measured on the satellite images was 1.2 ha for San Jose and El Retorno. Combining the two extremes estimates of annual income per hectare and average area harvested by farmers, the annual farmer's income from coca cultivation ranged between COP 5,500,000 and COP 24,000,000, i.e. approximately between US\$ 2,000 and US\$ 9,000. The larger survey to be conducted in 2005 will provide data that should reduce this range.

On average, farmers reported to cultivate their fields for 6 years. 80% reported to have lost at least one harvest, of which 48% mentioned it was due to aerial spraying, the other reasons being fungus and plague. About 80% of these farmers who lost at least one harvest said that they waited until the coca crop recovered. It took them on average 6 months to obtain a new harvest of coca leaf.

About 90% of the farmers reported to use fertilizers and insecticide. About 40% of the farmers reported to mix the coca bushes with licit crops. In their majority (70%), the farmers preferred to plant the variety known as 'la dulce' for its higher productivity.

2.2.2 OPIUM LATEX AND HEROIN PRODUCTION

DIRAN's previous estimates assumed that Colombian farmers harvested three opium poppy crops per year. Recent US government studies on heroin production showed however that, in Colombia, opium poppy farmers cultivate two crops per year in all growing regions but one (Nariño department).

According to these studies, opium poppy fields yield between 13 and 17 kilograms of latex per hectare and per harvest, depending on the growing region. Assuming an average yield of 15 kilograms per hectare, and 2 harvests per year, the total potential opium latex production would be around 118 metric tons. Based on a conversion rate of 24 kg of opium latex for one kilo of pure heroin (US-DEA study, 'Operation Breakthrough' conducted in 2001), the total potential heroin production in Colombia would amount to about 5 metric tons of heroin in 2004, representing about 1% of the global heroin production in 2004 estimated at 565 metric tons⁴.



Flowers and capsules of mature poppy plants
(Source: DIRAN)



Latex extraction from a poppy capsule
(Source: DIRAN)

⁴ UNODC World Drug Report

PRICES

2.2.3 COCA LEAF, COCA BASE AND COCAINE PRICES

Compared to Bolivia and Peru, the market for coca leaf is not equally developed in Colombia because most farmers process themselves the coca leaves into a product referred to as coca base. However, some prices were obtained in 2004 for coca leaves trade for a few regions. Prices for coca leaves in Colombia, ranging between US\$ 0.4/kg and US\$1.8/kg appeared much lower than in Peru (US\$2.8/kg) and Bolivia (US\$5.0/kg) in 2004.

Table 23: Coca leaf price ('000 of COP/kg) in some regions of Colombia, 2004

Months	Caqueta	Nariño	Meta
January	2,000		
February	1,880		
March	2,000		
April	1,760		
May	1,920		
June	2,240		
July	2,000		
August	1,600		
September	1,640		1,200
October	1,640		800
November	1,680		800
December	1,680		
Annual Average	1,837	4,800	933
Annual Average in US\$	0.7	1.8	0.4

Source: National Monitoring System Supported by UNODC-SIMCI

Most peasants sell coca base that they themselves produce in small “kitchen” located on the farm. The necessary technical know-how was brought to the farmers during the 90’s by drug-traffickers with the objective to facilitate and increase the commercialisation of cocaine

In 2004, the average price for one kg of coca base amounted COP 2,121,000 (US\$ 807). As had to be expected from declines in coca-leaf production, coca base prices increased over the 2000-2004 period. This trend, however, did not continue in 2004.

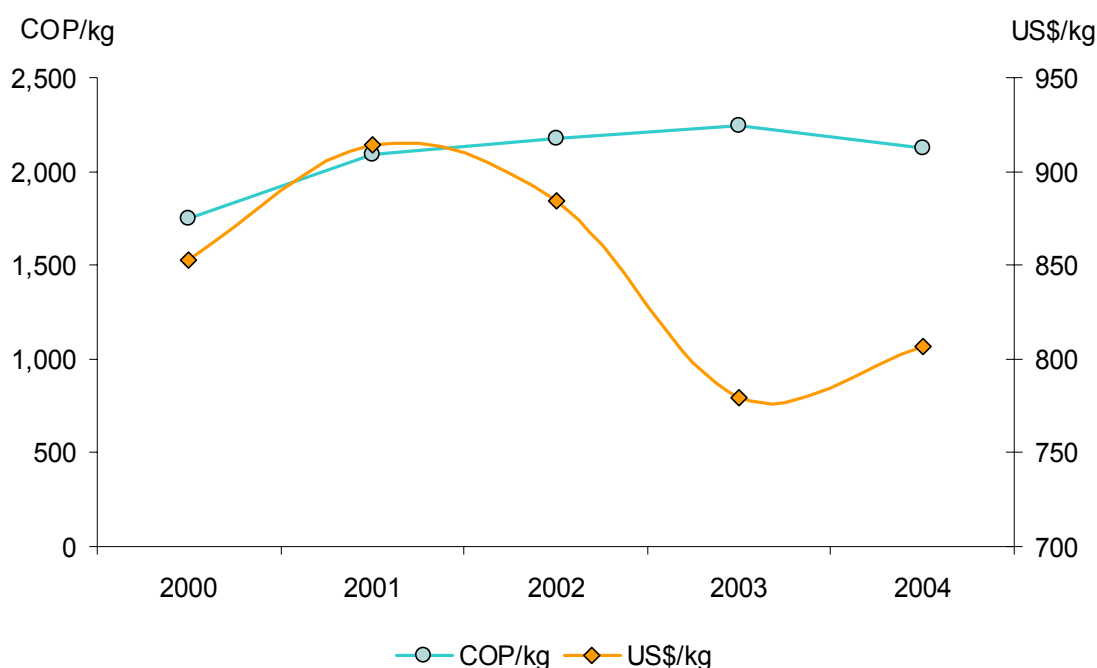
One possible explanation for this – which still has to be validated - is that the reduction of coca leaf production in Colombia in 2004 was compensated by imports of coca base. Reports of increased availability of cocaine on the US market (Monitoring the Future, Michigan University U.S.A) as well as the development of the Colombian peso / US-dollar exchange rate would support this hypothesis. Following a strong depreciation of the Colombian peso over the 1999-2003 period which, at least partly, could be linked to lower cocaine exports, the Colombian peso appreciated again vis a vis the US-dollar in 2004. Data suggest that a strong increase in legal exports as well as sound fiscal and monetary policies pursued by the Colombian authorities were primarily responsible for this. Ongoing cocaine exports, sourced not only from domestic production but from coca base imports, seem to have played a role in this as well. The net results of these trends were that the annual coca base prices declined in terms of Colombian pesos, but increased in US\$ terms in 2004.

Table 24: Monthly coca base price in Colombia 2004 (in '000 COP/kg)

Months	Guaviare San Jose	Nariño Samaniego	Caqueta	Sur Bolivar	Meta
January	2,300	2,200	2,150	2,100	2,150
February	2,300	1,900	2,100	2,100	2,100
March	2,200	1,900	2,050	2,100	2,050
April	2,200	1,900	2,120	2,100	2,120
May	2,200	2,200	2,100	2,100	2,100
June	2,200	2,200	2,200	2,100	2,200
July	2,000	1,900	2,000	2,100	2,000
August	2,000	1,900	2,050	2,150	2,050
September	2,100	2,300	2,050	2,150	2,050
October	2,300	2,400	2,050	2,150	2,300
November	2,300	2,400	1,800	2,200	2,200
December	2,200	2,100	1,800	2,200	2,300
Average (COP)	2,192	2,108	2,039	2,129	2,135
Average US\$/kg	835	804	775	812	814

Source: National Monitoring System Supported by UNODC-SIMCI

Figure 11. Annual coca base price in Colombia 2000 - 2004 (in US\$)



Sources: PDA, UNODC/SIMCI

Using the average price for coca base of US\$ 807/kg in 2004 and assuming a 1:1 conversion rate between coca base and cocaine HCl, the total farm-gate value of the 390 metric tons of coca base produced in Colombia in 2004 would amount to about US\$ 315 million, representing 0.3% of the estimated 2004 GDP of US\$ 95.3 billions⁵.

⁵ Economist Intelligence Unit

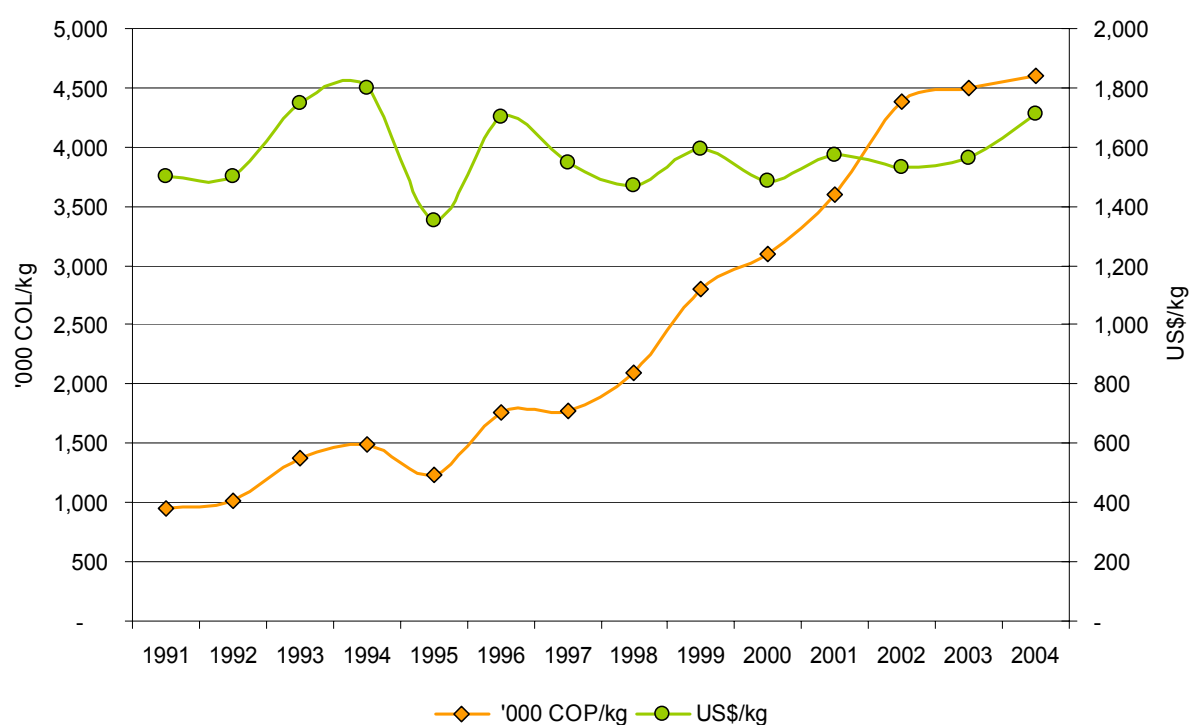
Between 2003 and 2004, cocaine HCl price increased slightly to reach COP4, 600,000 /kg (or +2%), i.e. US\$ 1,713 (+9%). These prices referred to cocaine of a purity of about 80%. Cocaine prices increased between 2000 and 2004; the increase was, however, far less than one would have had to expect against the background of massive declines in domestic coca leaf production. In addition to the possibility of increased imports of Peruvian coca base, to offset the shortfall, improved law enforcement activities within as well as around Colombia, might have contributed to the rather stable development of cocaine prices in Colombia. This is of importance, as the incentives to cultivate coca thus remained in check while in previous years – notably in the second half of the 1990s – eradication efforts actually increased coca prices in local currency, and thus acted as an incentive for ever more farmers to become engaged in this cultivation.

Table 25: Cocaine HCl price in Colombia 1991 - 2004

Year	'000 COP/kg	US\$/kg
1991	950	1,500
1992	1,020	1,500
1993	1,377	1,750
1994	1,488	1,800
1995	1,232	1,350
1996	1,762	1,700
1997	1,769	1,550
1998	2,101	1,472
1999	2,800	1,592
2000	3,100	1,485
2001	3,599	1,571
2002	4,389	1,532
2003	4,500	1,565
2004	4,600	1,713

Sources: DIRAN and PDA

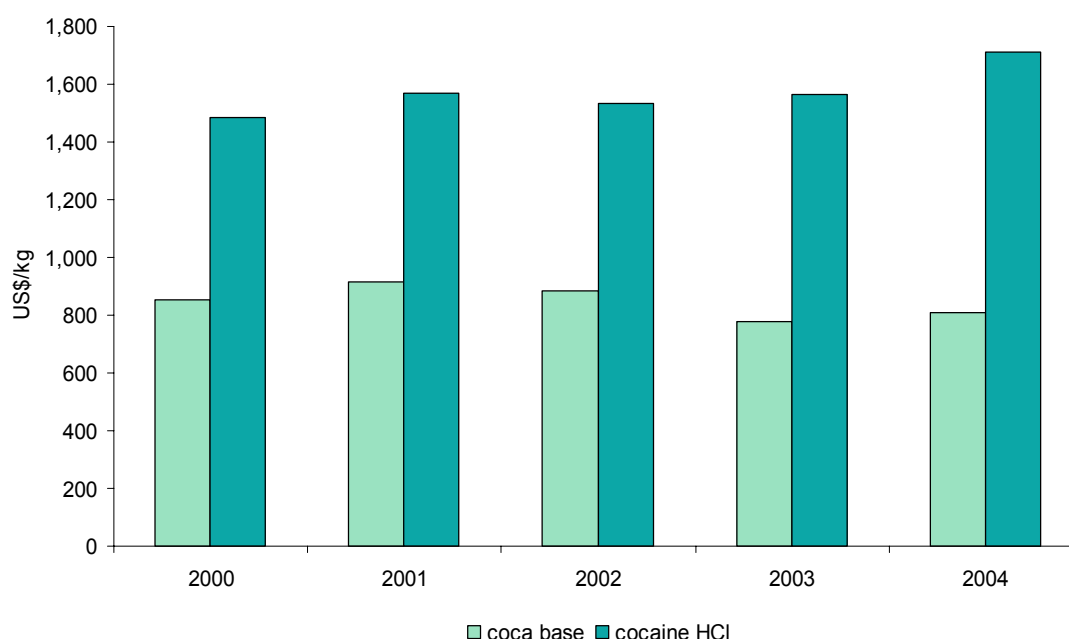
Table 26: Cocaine HCl price in Colombia 1991 – 2004



Source: DIRAN

It may be also interesting to note that there is a widening difference between the price obtained for coca base by farmers and the average cocaine price. In 2001 and 2002, coca base represented 58% of the price of cocaine; in 2004, coca base represented 47% of the price of cocaine. This seems to indicate that the risk premium of cocaine production in Colombia increased over the last few years, apparently a consequence of increased enforcement efforts by the authorities. However, this comparison is valid only in Colombian market. The price of coca base paid in Colombia represents about 3% of the cocaine price to the consumer in the international market. INCB suggested that cocaine price stability might also be due to improvements in productivity.

Table 27: Comparison of coca base and cocaine HCl prices in Colombia, 2000-2004 (US\$/kg)



Sources: PDA, UNODC/SIMCI

2.2.4 OPIUM LATEX AND HEROIN PRICES

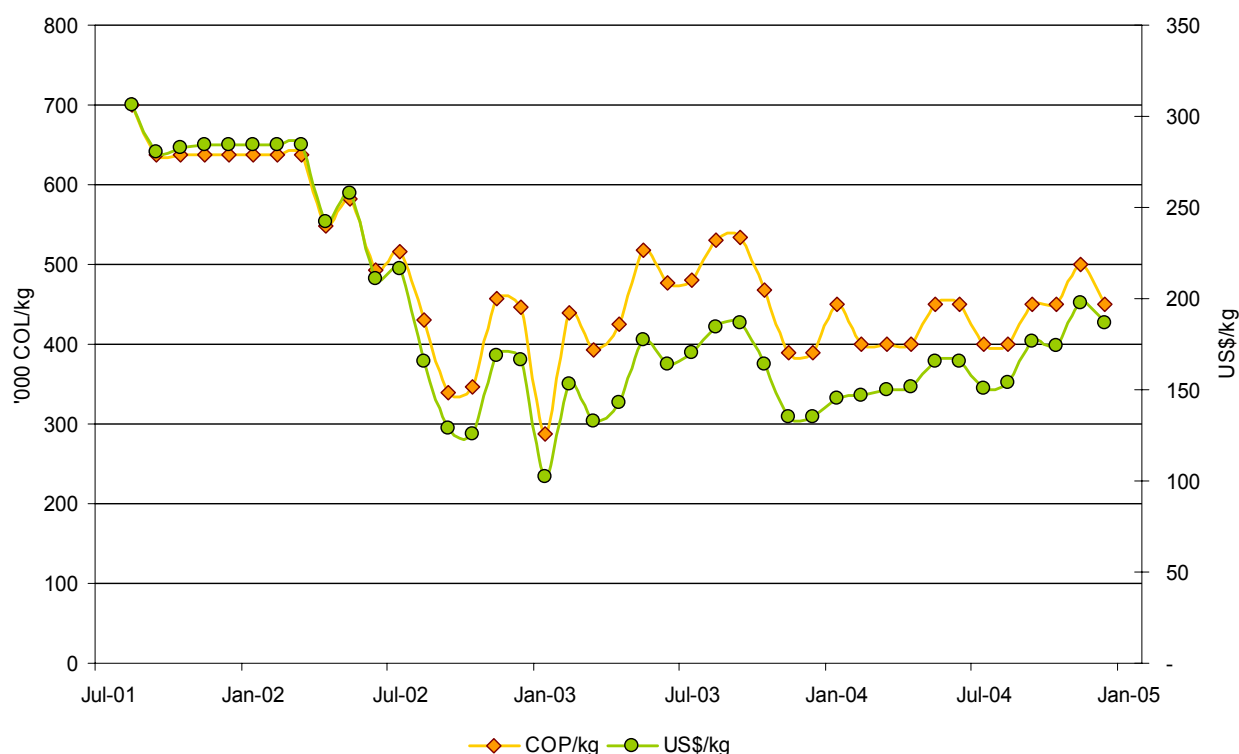
Opium prices in 2004 were rather similar to the opium prices reported in 2003. However, the annual average price of opium latex decreased by 47% compared to 2001.

Table 28: Monthly opium latex prices in Colombia, 2001 – 2004 ('000 COP/kg)

Months	2001	2002	2003	2004
January		638	288	450
February		638	440	400
March		638	393	400
April		548	424	400
May		583	519	450
June		493	476	450
July		517	480	400
August	700	431	531	400
September	638	339	534	450
October	638	347	469	450
November	638	457	389	500
December	638	447	389	450
Annual Average ('000 COP/kg)	650	506	444	433
Annual Average US\$/Kg	288	211	154	164

Sources: DIRAN, PDA, SIMCI (extrapolation in italic)

Figure 12. Monthly opium latex prices in Colombia, 2001 – 2004 ('000 COP/kg and US\$/kg)



Source: UNODC/SIMCI

With an estimated opium latex production of 118 metric tons, the potential value of the 2004 farm-gate production of opium latex would amount to about US\$ 19 million. A similar value as estimated in 2003.

Table 29: Monthly morphine prices in Colombia 2003 - 2004

Months	2003		2004	
	'000 COP/kg	US\$/kg	'000 COP/kg	US\$/kg
January	10,500	3,737	18,000	6,548
February	11,500	3,994	16,000	5,887
March	9,833	3,333	16,000	5,991
April	10,000	3,370	16,000	6,062
May	11,625	3,974	18,000	6,619
June	12,250	4,224	18,000	6,626
July	12,300	4,362	16,000	6,030
August	12,375	4,300	16,000	6,157
September	12,250	4,276	18,800	7,365
October	12,100	4,231	19,600	7,595
November	9,600	3,345	20,000	7,905
December			19,000	7,879
Annual Average	11,383	3,945	17,617	6,703

Source: DIRAN

Table 30: Monthly heroin prices in Colombia 2003 - 2004

Months	2003		2004	
	'000 COP/kg	US\$/kg	'000 COP/kg	US\$/kg
January	14,500	5,160	21,000	7,639
February	14,333	4,978	18,000	6,623
March	15,250	5,169	18,000	6,740
April	15,000	5,056	18,000	6,819
May	17,500	5,983	21,000	7,722
June	17,500	6,034	21,000	7,730
July	17,650	6,259	18,000	6,784
August	15,000	5,212	18,000	6,927
September	18,000	6,283	20,800	8,148
October	18,000	6,294	22,000	8,525
November	18,000		23,000	9,090
December	18,000		22,000	9,123
Annual Average	16,561	5,740	20,067	7,635

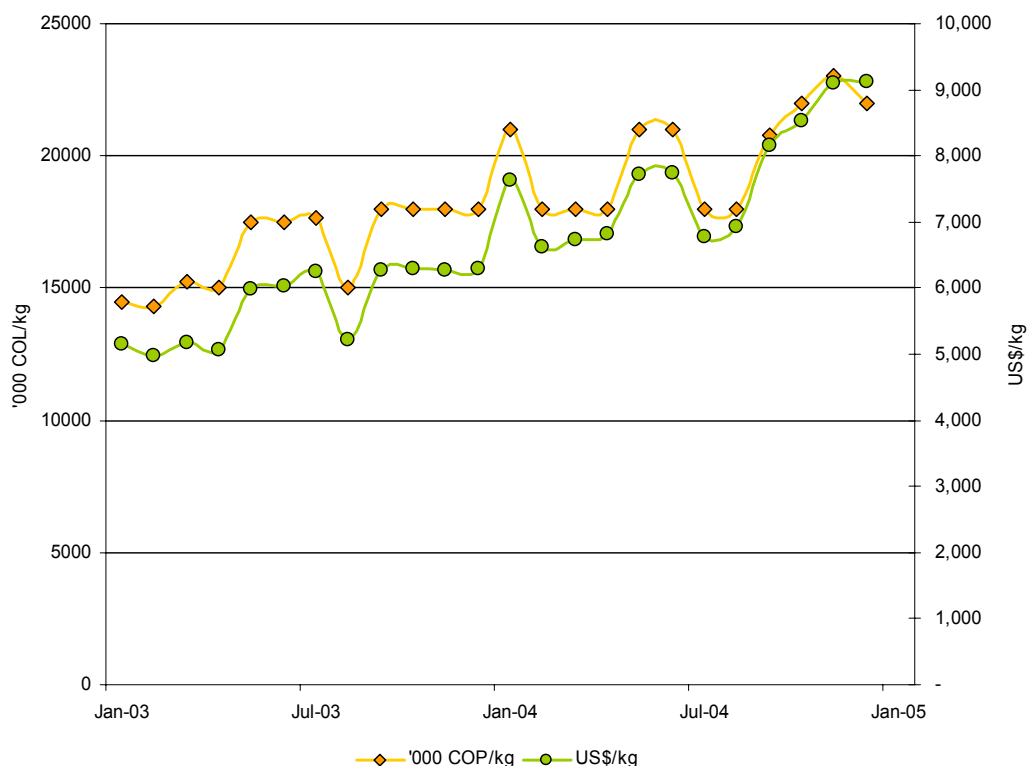
Source: DIRAN

Trend in heroin and morphine prices per kg showed a similar pattern of a steady increase between 2003 and 2004. The average annual heroin price in 2004 was COP 20,067,000 /kg or US\$ 7,635/kg, representing an increase of 21% in COP and 33% in US\$ compared to the annual average of 2003. But heroin prices in US\$ terms increased by 77% between January 2003 and December 2004.



Opium poppy field in blossom (Source: DIRAN)

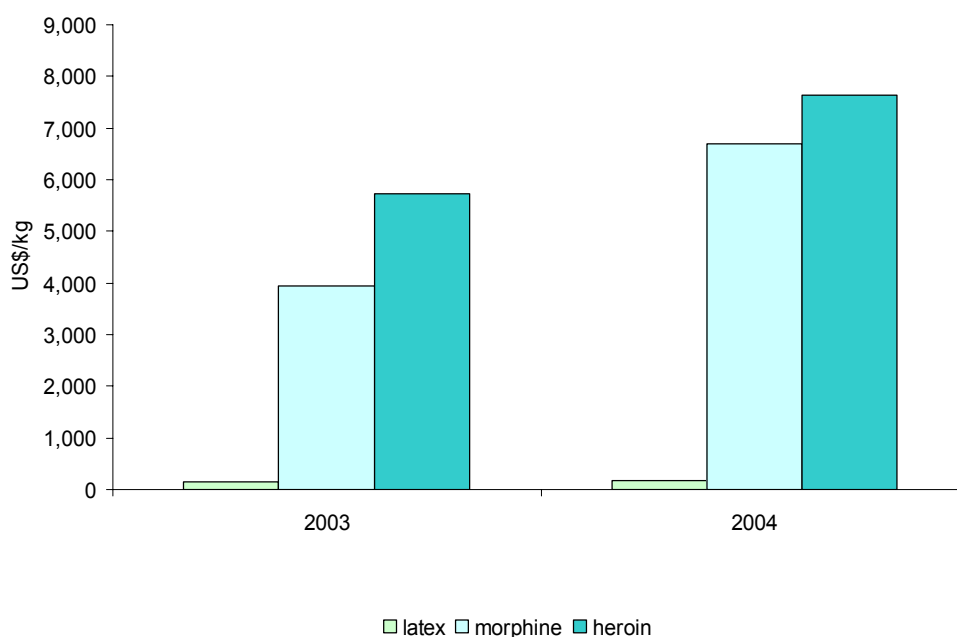
Table 31: Monthly heroin prices in Colombia, 2003 – 2004 ('000 COP/kg and US\$/kg)



Source: DIRAN

Contrary to the coca farmers who process the coca leaves and sell coca base, opium poppy farmers sell directly the opium latex they extract from plant, without processing. While coca farmer sell the coca base in 2004 at a price representing 47% of the average price of cocaine, opium poppy farmers obtained for their opium latex only 2% of the heroin price on the national market.

Table 32: Comparison of prices of opium latex, morphine and heroin in Colombia, 2003-2004 (US\$/kg)



Sources: DIRAN, UNODC/SIMCI

2.3 REPORTED AERIAL SPRAYING

The Colombian anti-drugs strategy includes a number of measures ranging from aerial spraying, to force or voluntary manual eradication, including alternative development and crops substitution programmes. UNODC did not participate in or supervise the spraying activities. All data were received directly from DIRAN.

By far the most important is the spraying programme carried out by the Antinarcotics Police – DIRAN. This is realized through aerial spraying with a mixture of products called Round up – composed of an herbicide called glyphosate - and a surfactant called Cosmoflux and other additives. In late 2002, the National Narcotics Council approved an herbicide concentration of 2.5 litres per hectare for opium poppy and 10.4 litres per hectare for coca, with a view to increasing the spraying effectiveness percentage, which was estimated as being 90.8%.

However, it should be kept in mind that the chemical mixture has effect over the leaves and not over the roots or the soil, and therefore the bush can be subject of a prune operation at about one feet over the ground to obtain a renewal of the bush in about six months.

The Illicit Crop Eradication Programme foresees an Environmental Management Plan and environmental auditing, as well as periodic verifications on the ground of the effectiveness of spraying activities and their environmental impact. The Ministry of Environment certified in July 2004 to the “Eradication of Illicit Crops Programme by Aerial Spraying with Glyphosate”, the observance of the environmental obligations imposed in the Management Plan.

Reports from DIRAN showed that, for the fourth consecutive times, spraying activities reached record level in 2004. The DIRAN sprayed a total of 136,551 hectares and the Army manually eradicated 2,589 ha of coca. In addition, DIRAN sprayed 3,061 hectares and the Army manually eradicated 804 ha of opium poppy. Compared to 2003, the spraying and manual eradication activities over coca cultivation increased by 3%, and it increased by 71% for opium poppy cultivation.

Regarding the estimates on spraying area, it is important to differentiate between the accumulated sprayed area reported here – which is the sum of areas during a given time period (calculated by multiplying the length of flight lines by their width), and the effective sprayed area, which disregards the overlap between adjacent sprayed bands and areas sprayed several times in the same calendar year.

Once coca fields are sprayed, it takes approximately six to eight months to recover productive crops when the bushes are pruned or replanted. However, when heavy rain occurs or bushes are washed by the farmers immediately after the spraying, the loss in coca leaf can be reduced and the crop recovered quickly. Therefore, coca cultivation sprayed during the first semester of 2004 had time to re-establish a vegetation cover that could be detected on the satellite images.

The sustainability of the eradication efforts depends to a large extent on the real alternatives open to the farmers and to the displacement of the cultivation into new and more remote areas of the country (balloon effect). Visual observations during verification flights showed an important replanting rate of coca cultivation in Nariño.

An in-depth study carried on in 2004 by independent experts from OAS/CICAD on the impact of aerial spraying on environment and public health has demonstrated that no significant harm can be attributed to the spraying with glyphosate. (CICAD, report available on internet).

Table 33: Monthly aerial spraying of coca cultivation 2004 (ha)

Department	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Arauca									2,590	2,746			5,336
Guaviare	5,447						320	5,478	6,193	6,713	3,865	2,875	30,892
Meta						384	50	911	1,048	404	445	646	3,888
Caqueta		1,337	215		596	181			709	3,586	5,782	3,870	16,276
Putumayo		274	3,471	4,773	2,215	902			584	2,297	1,546	1,461	17,524
Santander							1,562	201	91				1,855
Bolivar							582	4,024	1,851				6,456
Antioquia		729	3,837	1,121	2,999	1,698	481	184					11,048
N. Santander							3,273	2,018	394				5,686
Nariño	10,999	9,424	5,325	5,284	114							161	31,307
Cauca		828								85	899		1,811
Caldas							15	143	31				190
Vichada					143	1,303							1,446
Magdalena							1,632						1,632
Guajira							449						449
Vaupes											524	232	756
Total	16,446	12,590	2,849	11,177	6,068	4,468	8,364	12,959	13,491	15,833	13,062	9,244	136,551

Source: DIRAN

Table 34: Monthly aerial spraying of opium poppy cultivation 2004 (ha)

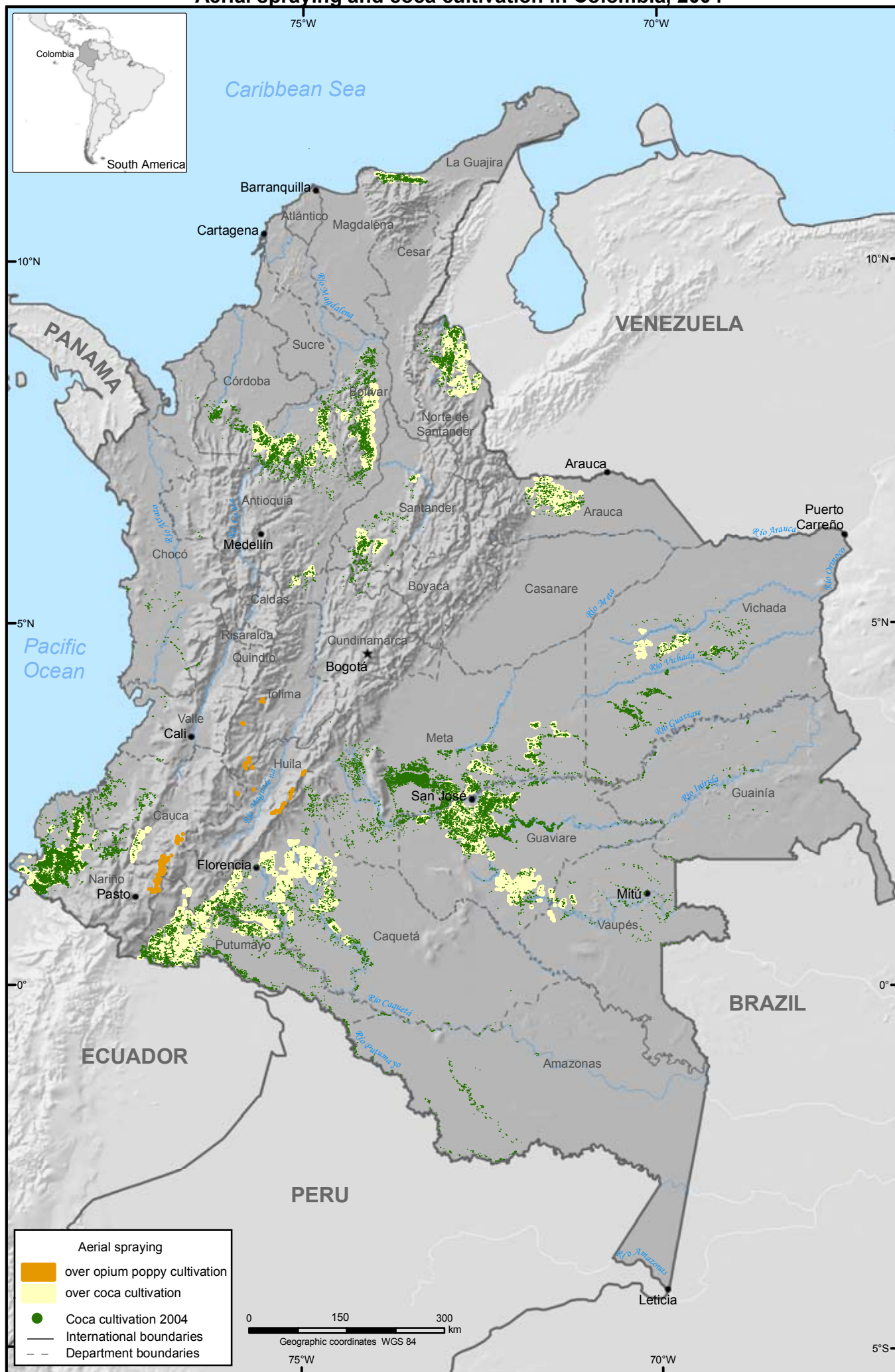
Department	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Tolima	69			58	149			427		107			810
Huila	91			146	135		238	206		87	8		913
Caqueta	39												39
Cesar				163			274			67			505
Guajira										18			18
Nariño	244	98											342
Cauca	139	12		197	62			25					435
Total	582	110	-	565	346	-	513	658	-	279	8	-	3,061

Source: DIRAN



Aerial spraying over coca fields. (Source: DIRAN)

Aerial spraying and coca cultivation in Colombia, 2004



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

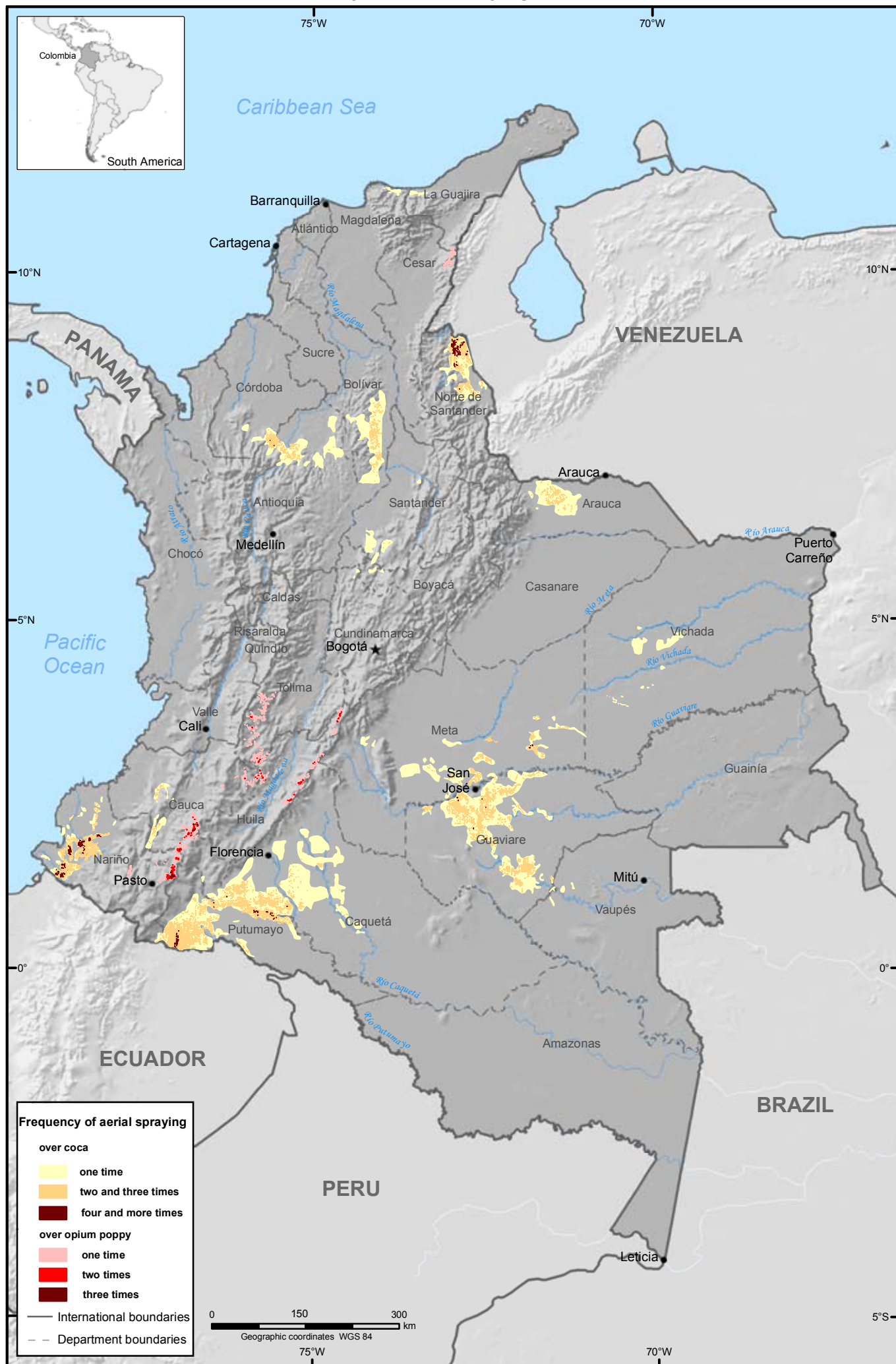
Table 35: Aerial Spraying and manual eradication of coca cultivation in Colombia, by department and year (in ha)

Sources	Environmental Audit of the National Narcotics Bureau						Antinarcotics Police Department				
Department	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Guaviare	3,142	21,394	14,425	30,192	37,081	17,376	8,241	7,477	7,207	37,493	30,892
Meta	729	2,471	2,524	6,725	5,920	2,296	1,345	3,251	1,496	6,973	3,888
Caqueta	-	-	537	4,370	18,433	15,656	9,172	17,252	18,567	1,059	16,276
Putumayo	-	-	-	574	3,949	4,980	13,508	32,506	71,891	8,342	17,524
Vichada	-	50	85	-	297	91	-	2,820	-	-	1,446
Antioquia	-	-	684	-	-	-	6,259	-	3,321	9,835	11,048
Cordoba	-	-	264	-	-	-	-	-	734	550	-
Vaupes	-	-	-	-	349	-	-	-	-	-	756
Cauca	-	-	-	-	-	2,713	2,950	741	-	1,308	1,811
N. Santander	-	-	-	-	-	-	9,584	10,308	9,186	13,822	5,686
Nariño	-	-	-	-	-	-	6,442	8,216	17,962	36,910	31,307
Santander	-	-	-	-	-	-	470	-	-	5	1,855
Boyaca	-	-	-	-	-	-	102	-	-	-	-
Bolivar	-	-	-	-	-	-	-	11,581	-	4,783	6,456
Arauca	-	-	-	-	-	-	-	-	-	11,734	5,336
Magdalena	-	-	-	-	-	-	-	-	-	-	1,632
Guajira	-	-	-	-	-	-	-	-	-	-	449
Caldas	-	-	-	-	-	-	-	-	-	-	190
Sub-total	3,871	23,915	18,519	41,861	66,029	43,111	58,073	94,153	130,364	132,817	136,552
Manual eradication								1,745	2,752	4,011	2,589
Total eradication	3,871	23,915	18,519	41,861	66,029	43,111	58,073	95,898	133,116	136,828	139,141
Net cultivation	45,000	51,000	67,000	79,000	102,000	160,000	163,000	145,000	102,000	86,000	80,000

Table 36: Aerial Spraying and manual eradication of opium poppy in Colombia, by department and year (in ha)

Sources:	Environmental Audit of the National Narcotics Bureau					Antinarcotics Police Department				
Department	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Antioquia		120							-	-
Caldas									-	-
Caqueta			383					401	-	39
Cauca	53	123	50		828	1,601	387	236	550	435
Cesar	305	713	91	650	125	423	426	548	1004	505
Guajira	177	371		50					75	18
Huila	1,383	715	2,175	749	1,426	2,421	429	545	391	913
Meta									-	-
Nariño					313	1,090	630	788	725	342
Tolima	1,549	4,843	4,290	1,452	5,557	3,720	194	854	250	810
Sub-total	3,466	6,885	6,988	2,901	8,249	9,254	2,066	3,371	2,295	3,061
Manual eradication							319	213	271	804
Total eradication	3,466	6,885	6,988	2,901	8,249	9,254	2,385	3,584	3,266	3,865
Net cultivation	5,200	4,900	6,600	7,400	6,500	6,500	4,300	4,200	4,200	3,950

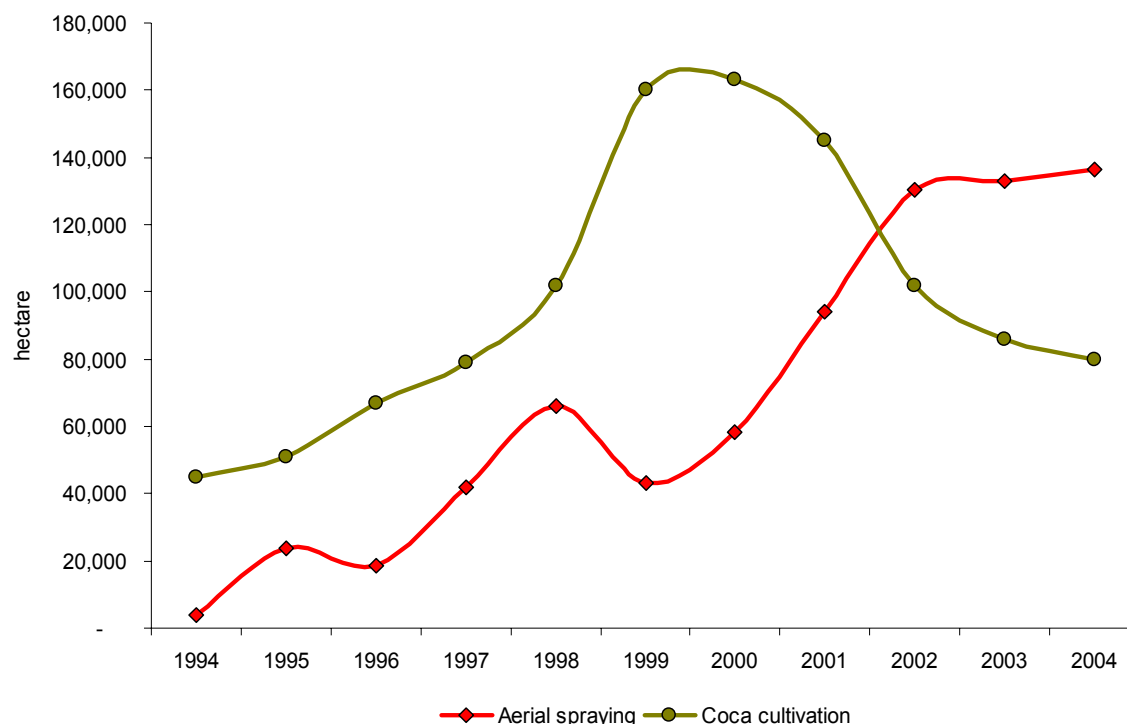
Intensity of aerial spraying 2000-2004



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

As can be seen from the graph below, the reduction in coca cultivation noted since 2002, corresponded mainly to an increased and sustained spraying efforts. As aerial spraying stabilized after 2002 at 130,000 ha, coca cultivation kept decreasing, although to a lower rate between 2003 and 2004.

Table 37: Comparison of net coca cultivation and accumulated sprayed areas (ha).



Sources: DIRAN, UNODC/SIMCI

When analysed at the department level, the data showed that the level of aerial spraying in 2001 had a statistically significant impact on the reduction of coca cultivation between 2001 and 2002. There was a significant negative correlation (-0.83) between the amount of aerial spraying in 2001 and the change in the extent of coca cultivation between 2001 and 2002. For the following years, aerial spraying had an impact in the total reduction of coca cultivation. The impact became statistically less significant in later years due to heavy replanting.



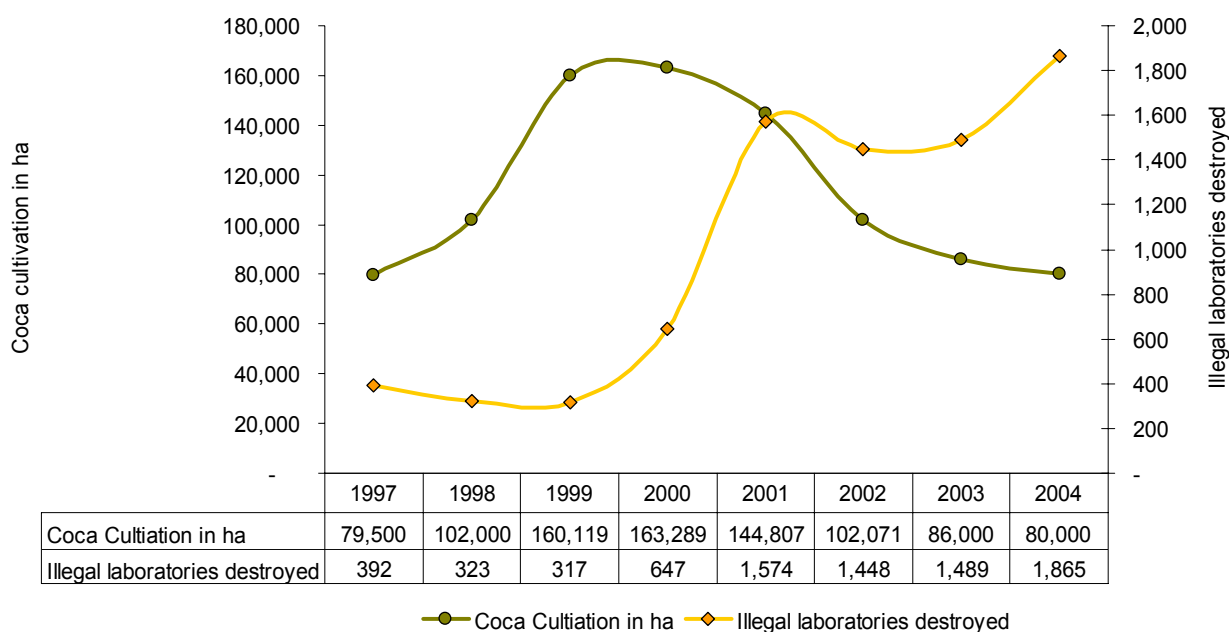
Sprayed coca fields in Nariño department, March 2005

2.4 REPORTED SEIZURE

UNODC was not involved in the collection of data on seizures and destruction of laboratories. However they are reproduced here for information and because they provide interesting indications as to the existence of possible trafficking corridors and allow for a better understanding of the dynamics that surrounds the overall drug business.

According to DNE, a total of 1865 illegal laboratories were destroyed in 2004. Out of these, a total of 1,582 corresponded to laboratories processing coca paste or coca base, 243 processing cocaine hydrochloride, 19 permanganate of potassium, 8 heroin, 1 morphine, 1 ammoniac. The product was not identified for 11 laboratories. Compared to 2003, it represented an increase of 25% in the number of illegal laboratories destroyed, demonstrating the high intensity of the actions taken by the Colombian Government against illicit drug production and coca cultivation.

Figure 13. Number of illegal laboratories destroyed and coca cultivation, 1997-2004



Source: Drug Observatory, DNE



Coca leaves are processed into coca paste, coca base and then cocaine hydrochloride

The distribution by department of the number of illegal laboratories destroyed and which were processing derivatives of coca leaves (coca paste, base and cocaine hydrochloride), also highlighted the department of Nariño as the most important illicit drug production center in Colombia, in addition to be an area where coca cultivation is expanding. By contrast, relatively few illegal laboratories were dismantled in Meta department, the department with the highest level of coca cultivation in 2004.

Table 38: *Illegal laboratories destroyed and coca cultivation in 2004*

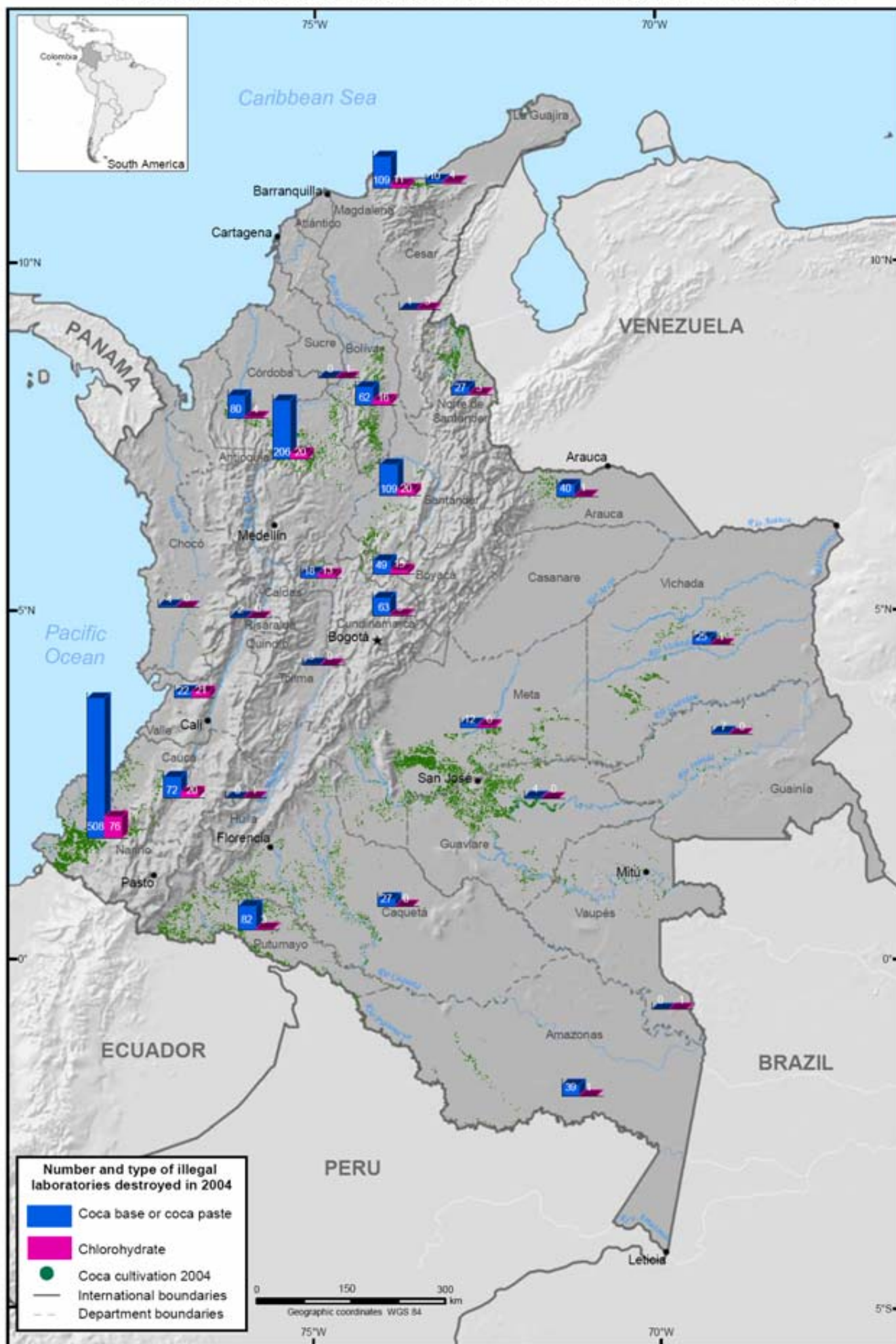
Department	Coca paste or base laboratories destroyed (kg)	Cocaine hydrochloride laboratories destroyed (kg)	Coca cultivation in 2004 (ha)
Nariño	508	76	14,154
Antioquia	206	20	5,168
Magdalena	109	11	706
Santander	109	20	1,124
Putumayo	82	3	4,386
Cordoba	80	4	1,536
Cauca	72	20	1,266
Cundinamarca	63	3	71
Bolivar	62	16	3,402
Boyaca	49	15	359
Arauca	40	1	1,552
Amazonas	39	1	783
Caqueta	27		6,500
N. Santander	27	3	3,055
Vichada	25	1	4,692
Valle	22	21	45
Caldas	18	13	358
Meta	12	6	18,740
La Guajira	10	4	9,769
Guainia	7		721
Choco	4		323
Guaviare	4		556
Tolima	3		
Risaralda	2		
Cesar	1	3	
Sucre	1		
Huila	-	1	
Vaupes	-	1	1,084
Total	1,582	243	80,350

Source: Drug Observatory, DNE

The destruction of nineteen illegal laboratories processing permanganate potassium, a precursor for the production of cocaine hydrochloride, was also reported for 2004 for the department of Antioquia (7), Cauca (4), Meta (2), Valle (2), Cundinamarca (1), Magdalena (1), Nariño (1), Santander (1).

Of the eight illegal laboratories destroyed which were processing heroin, five were found in Nariño department and three in Antioquia. One laboratory processing morphine was also destroyed in Nariño.

Destruction of clandestine laboratories and coca cultivation in Colombia, 2004



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

The data reported by DNE also showed an increase of 32% in cocaine seizure, from 113 metric tons in 2003 to 149 metric tons in 2004. Also not confirmed, the increase in cocaine seizure despite decreasing domestic production of cocaine might be due to import of coca paste and cocaine, in particular through Nariño department at the border with Ecuador.

Table 39: Reported seizures of illicit drugs

Drug	unit	1999	2000	2001	2002	2003	2004
Coca seeds	kg	754,032	1,678	98,916	27,752	173,141	
Coca leaf	kg	307,783	897,911	583,165	638,000	688,691	567,638
Coca paste	kg	365	118	53	974	2,368	1,218
Coca base	kg	16,035	9,771	16,572	22,615	27,103	37,046
Basuco	kg	543	802	1,225	1,706	2,988	2,321
Cocaine hydrochloride	kg	47,003	89,856	57,140	95,278	113,142	149,297
Opium seed	kg	50	17	43	124	87	
Opium latex	kg	29	17	4	110	27	57
Morphine	kg	154	91	47	21	78	39
Heroin	kg	515	564	788	775	629	763
Raw cannabis	kg	70,124	75,465	86,610	76,998	108,942	151,163
Cannabis resin	kg	338	na	0	3,5		
Cannabis seeds	kg	25,214	121,350	11,310	510	24	
Synthetic drugs	unit	1,022	na	22,750	175,382	5,042	19,494

Source: Drug Observatory, DNE

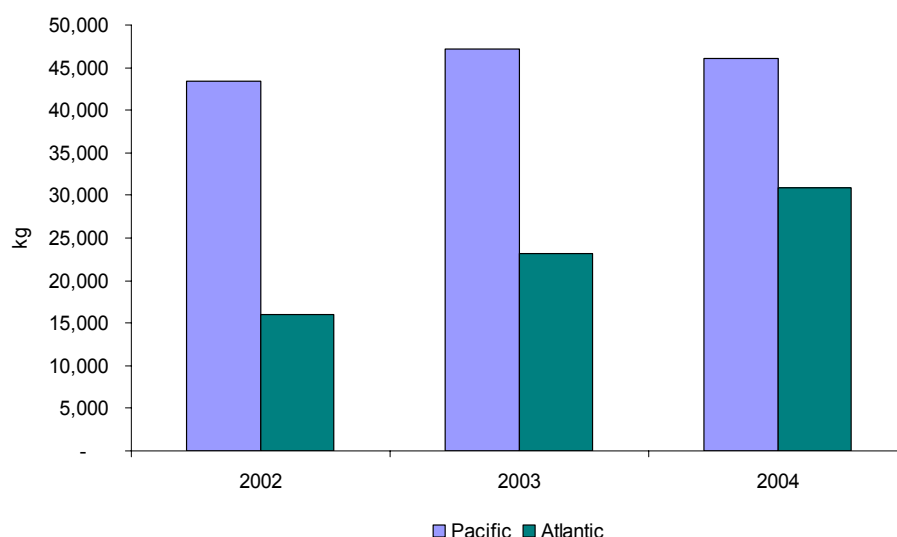
Out of the total of 149 metric tons of cocaine seized in 2004, 77 metric tons or 52% were seized by the Colombian Navy on sea or in seaports. This showed that most of the shipment of cocaine seizure took place by sea. The Pacific route continued to be the most important route for trafficking (60% of the maritime seizure in 2004). However, while the level of seizure remained stable in the Pacific, seizures have increased by 100% between 2000 and 2004 in the Atlantic.

Table 40: Reported seizures of cocaine in the Pacific and Atlantic routes, 2002 - 2004

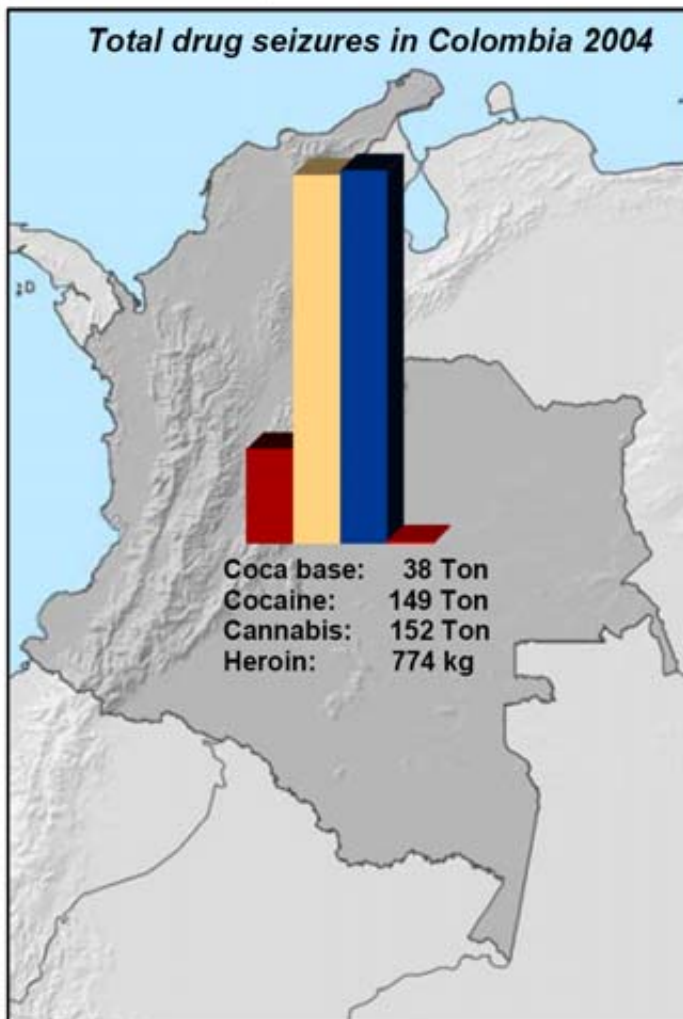
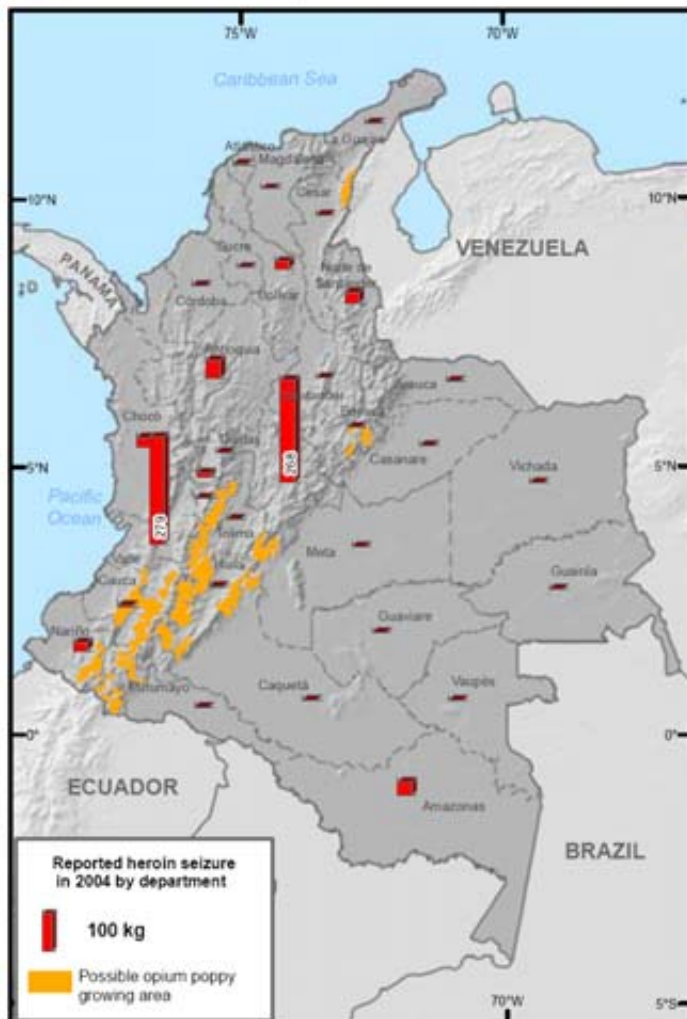
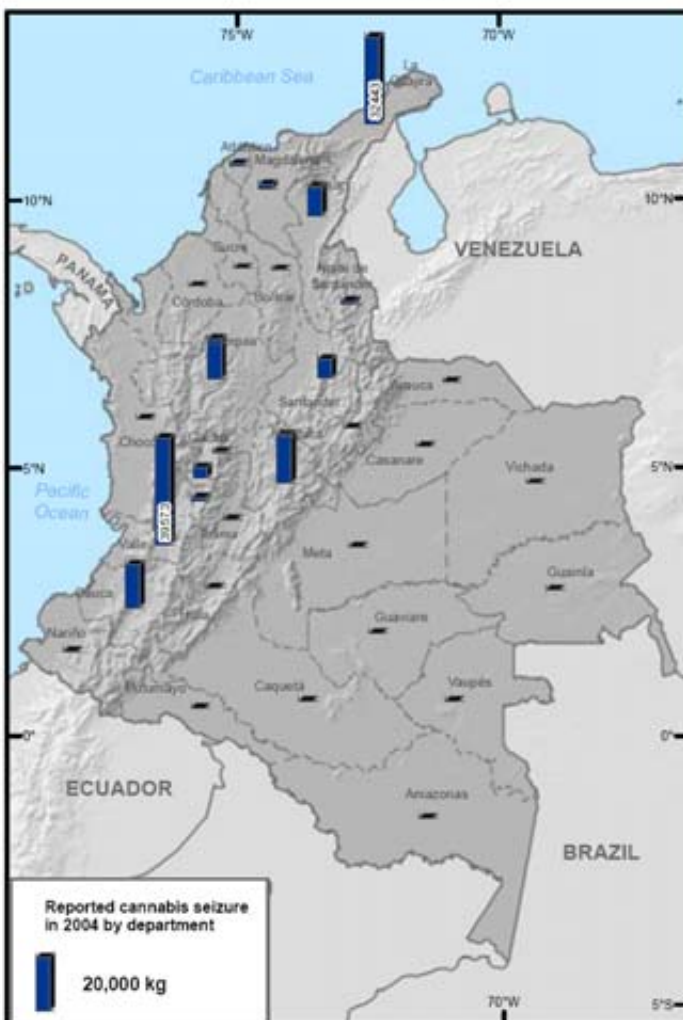
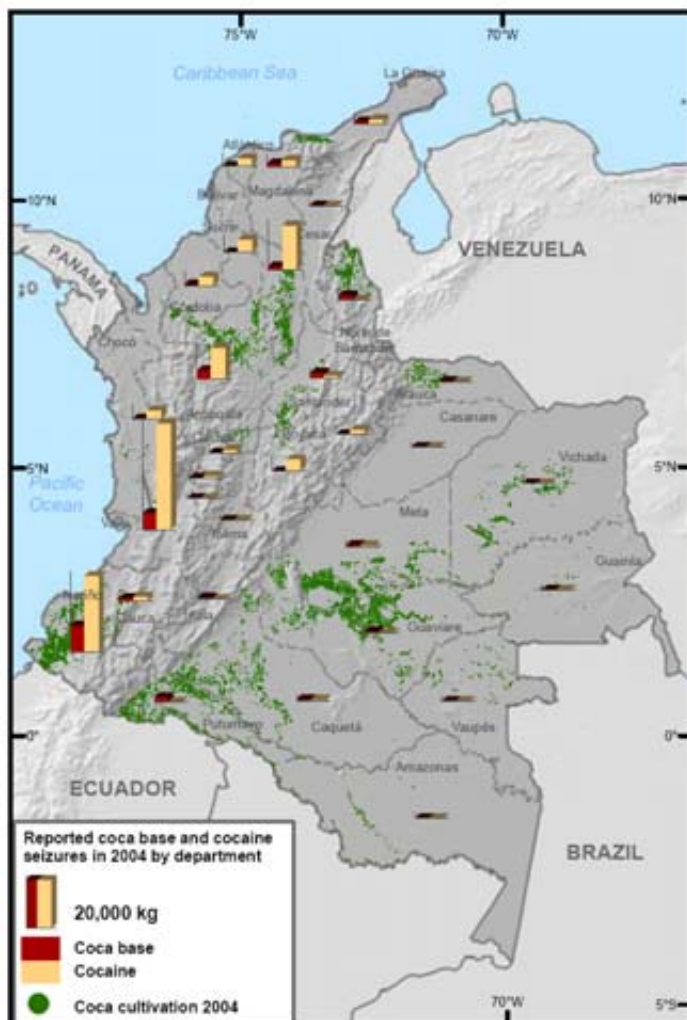
	2002	2003	2004
Pacific	43,435	47,137	46,128
Atlantic	16,065	23,157	30,928
Total seized by sea	59,500	70,294	77,056
Total seizures	95,278	113,142	149,297
% of seizures seized on sea	62%	62%	52%

Source: Colombian Navy, Intelligence Division

Figure 14. Reported seizures of cocaine in the Pacific and Atlantic routes, 2002 - 2004



Drug seizures by department and coca cultivation in Colombia, 2004



Source: Government of Colombia - National 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

Table 41: Reported seizure of illicit drugs in 2004

Department	Coca Base or paste kg	Basuco kg	Cocaine hydrochloride kg	Coca leaf kg	Marijuana kg	Heroin kg	Latex kg	Morphine kg	Extasis units
Valle	7.109	529	44.336	397	39.573	274	29	5	
Nariño	11.237	11	31.756	225.207	170	22	11	23	
Bolívar	1.207	14	18.311	36.994	91	19			9.994
Antioquia	3.794	647	12.979	59.984	15.093	48	2	0	
San Andres		1	7.067		322	18			
Sucre	5		5.335		54				
Bogotá	62	503	4.524		12.940	262		1	
Córdoba	786	30	4.045	25.543	92				
Chocó	174	2	3.455		123	24			
Atlántico	31	10	3.297		879	3			
Boyacá	63	10	1.958	6.773	50	0			
La Guajira	917	1	1.904	1.550	32.443	15			
Cauca	1.277	61	1.792	58.160	15.828	3	13	3	
Caldas	147	64	1.560	1.912	564				
Santander	2.424	31	1.209	10.375	7.172				100
Risaralda	61	95	864		4.016	11			9.400
Meta	864	58	625	900	191				
Caquetá	805	1	456	6.010	40				
Cundinamarca	30	58	387	3.991	5.038	6		3	
N. Santander	2.130	5	267	11.964	1.372	29			
Amazonas	0	1	93	4.288	44	35			
Huila	711	63	80	103	258	3	2	3	
Casanare	43	2	46		26				
Tolima	13	41	45		234	0			
Arauca	220	1	42	35.160	106				
Putumayo	1.796	3	31	9.711	11				
Guaviare	671		25	742	8				
Quindío	38	56	5		1.341	0			
Cesar	47	3	0	6	11.083			2	
Vaupés	12		0		0				
Vichada	23	12	0	39.822	139				
Guainía	33		0	3.800	4				
Magdalena	1.532	9	2.801	24.246	1.857				
TOTAL 2004	38.264	2.321	149.297	567.638	151.163	773	57	39	19.494

Source: Drug Observatory, DNE

Table 42: Reported seizure of Potassium Permanganate and Acetic Anhydride

Department	Potassium permanganate kg	Potassium Permanganate litre	Acetic Anhydride litre
Nariño	56,535	24,079	-
N.Santander	20,614	416	-
Antioquia	19,480	8,539	4
Bogota D.C.	17,712	-	-
Cauca	16,522	1,043	-
Valle	11,016	4	95
Magdalena	8,052	-	680
Cordoba	4,082	-	-
Boyaca	3,674	541	-
Santander	3,129	2,506	-
Sucre	2,450	-	-
Putumayo	2,038	-	-
Meta	1,857	0	-
Cundinamarca	1,420	4	-
Guajira	501	-	-
Arauca	381	38	-
Caldas	375	-	-
Bolivar	117	-	-
Cesar	110	16,008	-
Vichada	76	-	-
Choco	1	4	-
Caqueta		624	-
Total	170,142	53,805	779

Similarly to the reported number of illegal laboratories of coca base and cocaine, Nariño was the department showing the highest levels of seizures of the cocaine precursor potassium permanganate, both solid and liquid. Seizures of potassium permanganate were also large in Norte de Santander although only three cocaine laboratories were destroyed in 2004.

Most of the seizure (87%) of the heroin precursor Acetic Anhydride, were made in the Northern Magdalena department.



Drug seizure (Source DIRAN)

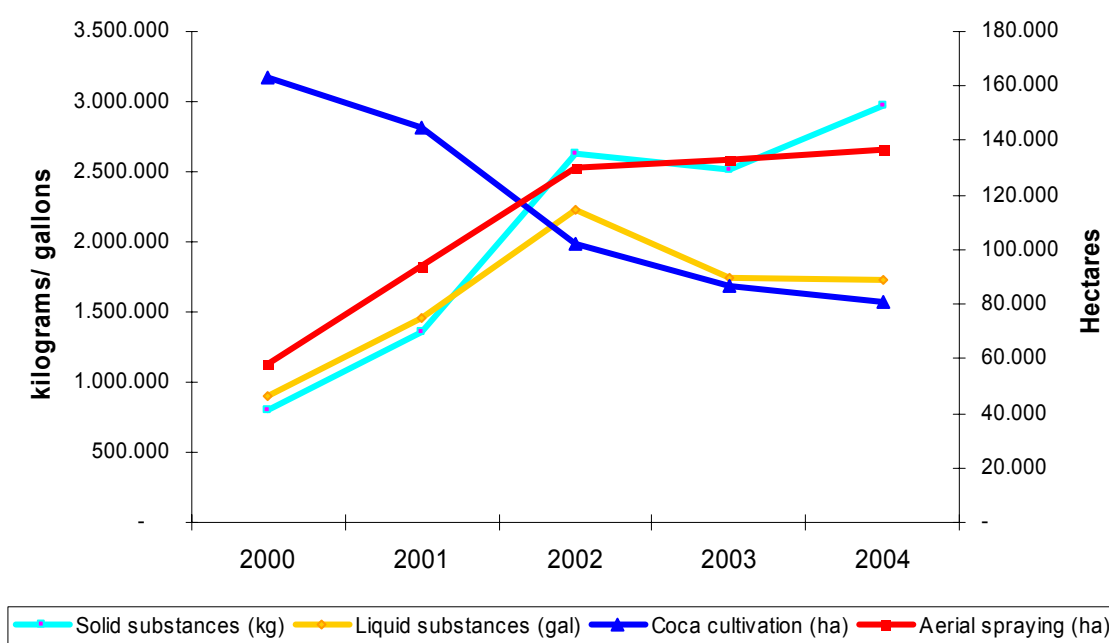
Chemical substances seizures

Most of the chemical substances used for the production of illicit drugs, enter to the country by open smuggling activities. About 80 principal or substitute chemical substances for drug production have been identified and only 30 of them are controlled.

The trends of a continued reduction in coca cultivation in 2004 along with the similar continued increase of aerial spraying, as well as solid chemical substances seizures in the period 2000-2004, contrast with the decrease in the seizures of liquid chemical substances in 2002-2004, when these last ones dropped an average of 22% in 2003 and 2004. Among the most important solid substances seizures are cement, urea, lime, bicarbonate of soda and potassium permanganate. Top seizures in liquid substances were gasoline, acetone, sulphide acid, thinner and hydrochloric acid. A high percentage of the seized substances are destroyed *in situ* with the consequent environment damages.

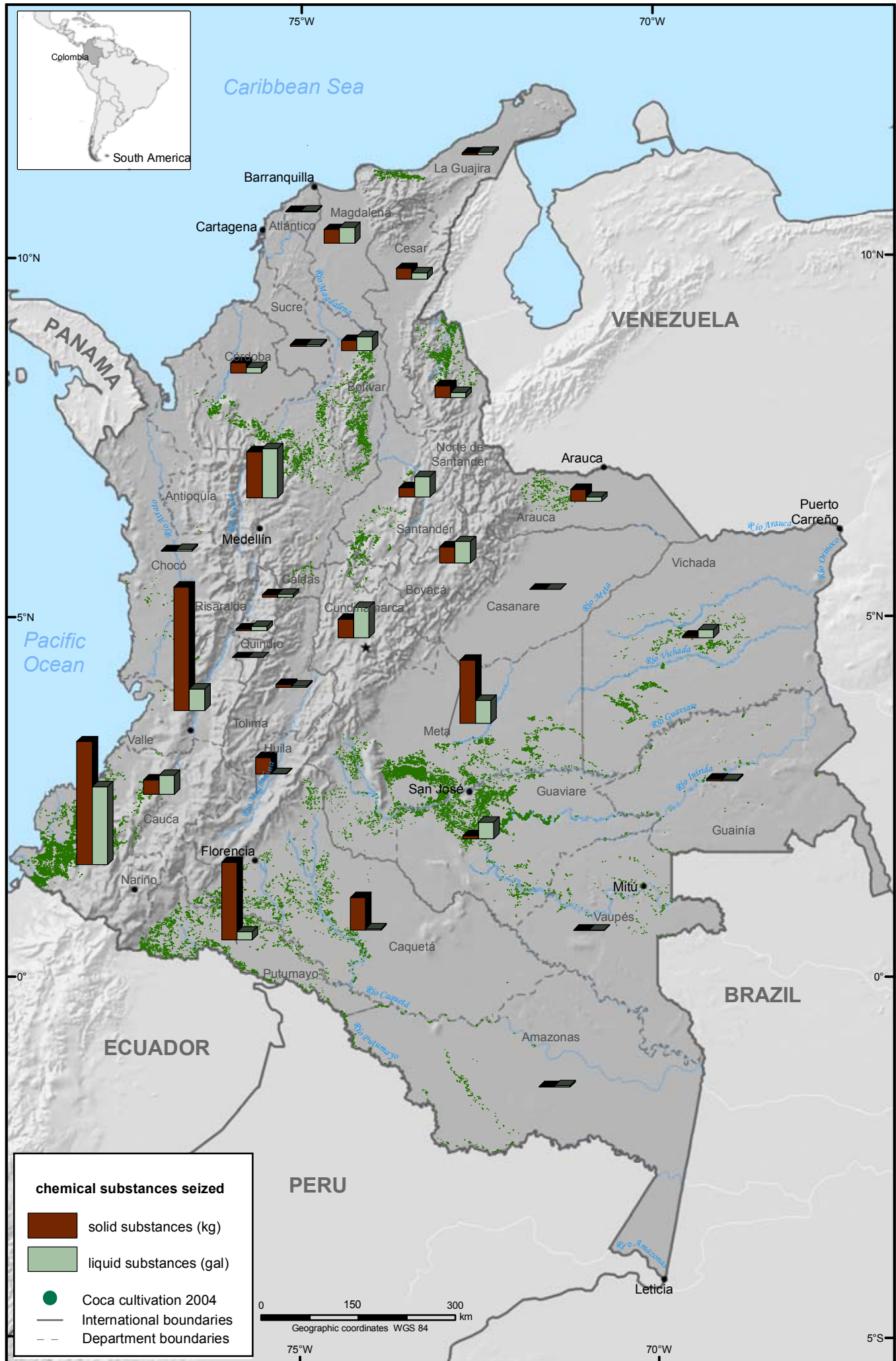
Table 43: Chemical substances seized 2000-2004

	2000	2001	2002	2003	2004
Solid substances (kg)	799,104	1,361,927	2,629,171	2,512,974	2,977,902
Liquid substances (gal)	898,986	1,459,986	2,229,375	1,742,992	1,730,931
Coca cultivation (ha)	163,289	144,807	102,071	86,340	80,500
Aerial spraying (ha)	58,073	94,153	130,364	132,817	136,551



Sources: DIRAN, DNE, UNODC/SIMCI

Precursors seizures and coca cultivation in Colombia, 2004



Source: Government of Colombia - National 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

3 METHODOLOGY

3.1 COCA CULTIVATION

The monitoring of coca cultivation in Colombia is based on the interpretation of various types of satellite images. For the 2004 census, the project analyzed a total of 70 LANDSAT images, 28 ASTER and 2 SPOT-4 images, taken between August 2004 and February 2005. The images cover the whole national territory (less the islands of San Andres and Old Providence) equivalent to 1,142,000 square km.

In September 2004, the University of Natural Resources and Applied Life Sciences of Vienna (Austria) conducted a technical evaluation of the methodology developed for the assessment of coca cultivation. The University concluded that the methodology is appropriate and commended the work of the remote sensing team performing the interpretation of the satellite images. The University also made some recommendations that will be addressed during the next survey, in particular the use of aerial photography for quality control.

The estimation of the total area under coca cultivation in Colombia in 2004 is the result of the following steps:

1) Identification and acquisition of satellite images

The survey relied mostly on LandSat 7 ETM+ images, and to a lesser extent on ASTER and SPOT 4 images.

Table 44: Satellite images used for the 2004 survey in Colombia

SENSORS	TOTAL AREA IN SQUARE KM	IN % OF TOTAL
LandSat 7 ETM+	795,585	95
ASTER	42,785	4
SPOT 4	7,154	1
Total	845,525	100

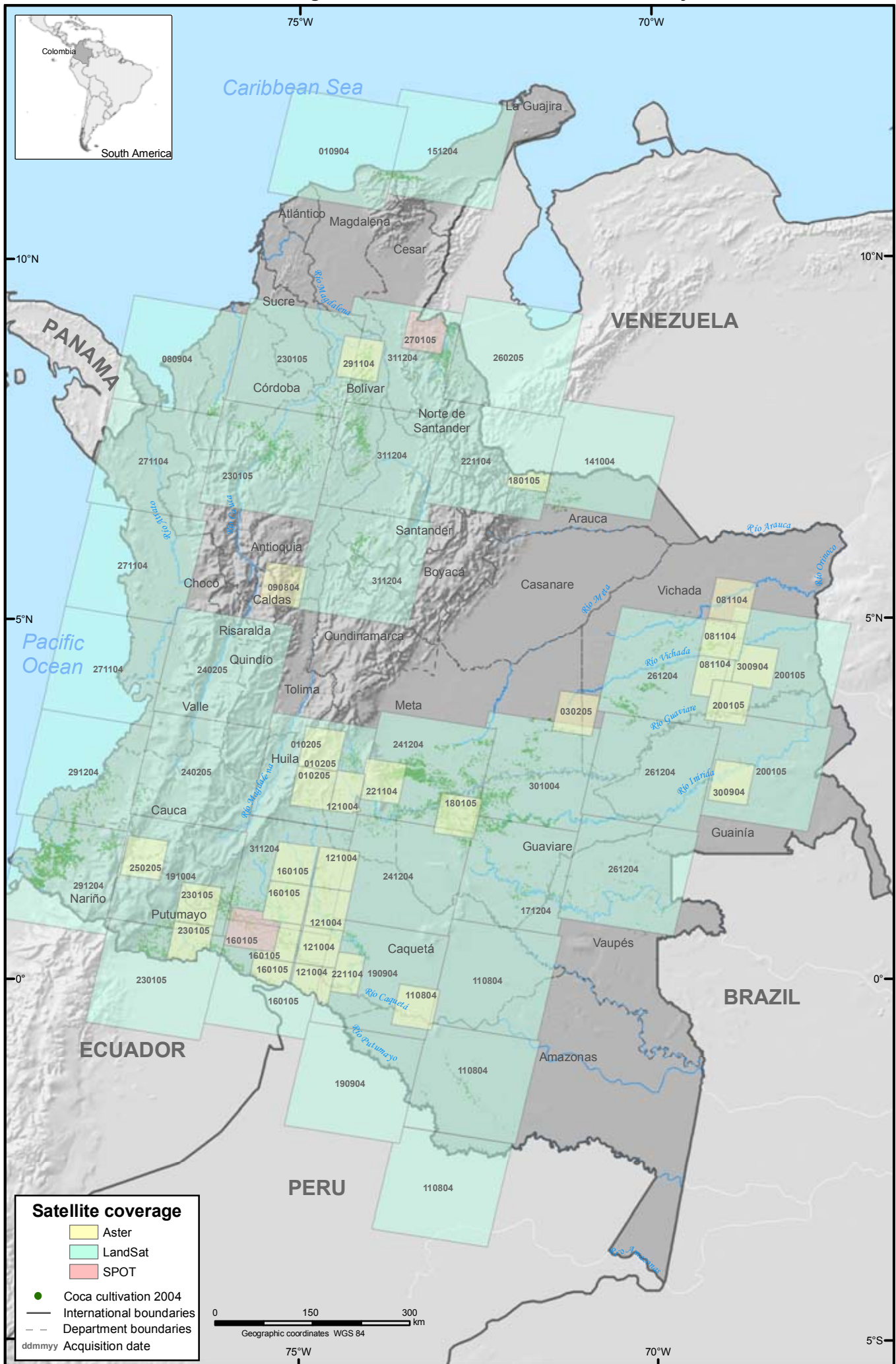
One of the major difficulties in data acquisition is the frequent cloud cover over the Colombian territory. Therefore, satellite with a frequent revisit and a continuous recording of the area were favoured. The relatively low prices of LandSat 7 ETM+ and ASTER images also contributed to their larger selection than SPOT images.

LandSat 7 ETM+ data are collected in 7 spectral bands of 30 meter spatial resolution and an additional panchromatic band of 15 meter spatial resolution. The satellite has a 16-day repeat cycle, which enhances the chance for cloud free images. The swath width of 185 km is appropriate for regional studies. The project identified suitable images by consulting frequently the on-line catalogue of available LandSat 7 images at the US Geological Survey.

As of May 2003, the Scan Line Corrector (SLC) of the LandSat 7 ETM+ instrument failed. This malfunction is leading to gaps in the image, gradually diminishing towards the centre of a scene. The assessment of coca cultivation under these gaps is described in the below section on correction. For future surveys gap-filled products or LandSat 5 data may be used, if available. The project identified suitable images by consulting frequently the on-line catalogue of available LandSat 7 images.

ASTER images consist of 16 spectral bands with a spatial resolution ranging from 15 to 90 meters. The monitoring of vegetation covers relies mostly on the spectral bands 1, 2 and 3 with a pixel size of 15 meter. The swath width of 60 km requires the acquisition of more images than with LandSat 7 ETM+ to cover equivalent area. About 500 ASTER images would be needed to cover the entire country.

Satellite coverage for the Colombia coca cultivation survey 2004



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

SPOT 4 has a spectral resolution of 20 meter and a swath width is of 60 km. About 500 SPOT images would be necessary to cover the entire country.

2) Image pre-processing

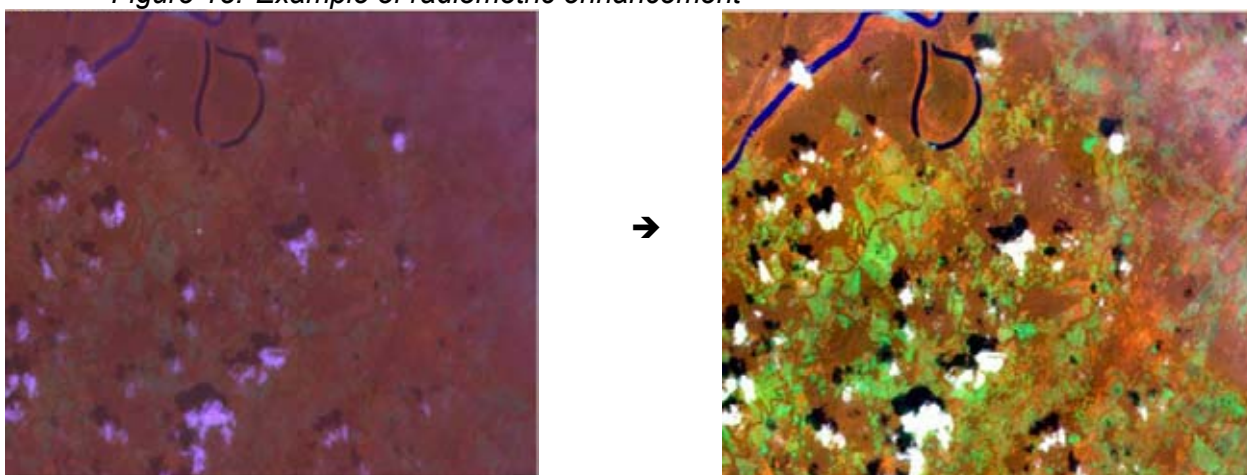
Geo-referencing

In order to use image datasets in conjunction with your other spatial data available (e.g. digital elevation model), it is necessary to align the image data to the same map coordinate system. The satellite images were geo-referenced on the basis of mosaics built with the geo-referenced images with the less cloud coverage used in previous census and the Digital Terrain Model –DTM- from the Space Shuttle Radar Mission of USA. During its revision of the methodology, the University of Natural Resources and Applied Life Sciences of Vienna (Austria) recommended to ortho-rectify the images with detailed Digital Elevation Model to increase the geometric accuracy.

Radiometric and spatial enhancements

To improve the visual interpretation process, various radiometric enhancements and filter techniques are applied to enhance the contrast of the image.

Figure 15. Example of radiometric enhancement



To enhance the spatial characteristics of an image various filters that modified the value of a pixel using the values of surrounding pixels, were used.

Figure 16. Example of spatial enhancement



Band combination

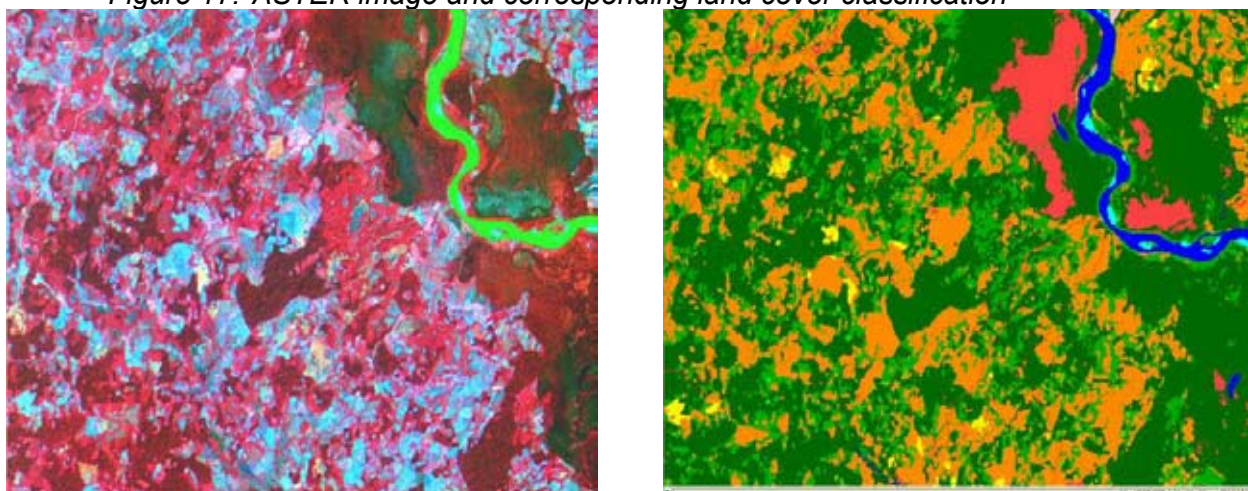
To allow an easy interpretation of the displayed image, it is possible to assign which band is displayed with which colour.

3) Digital land cover classification of land use and vegetation

One of the difficulties for an automatic classification of vegetation in Colombia is the absence of well defined crop calendar. Most crops, including coca, are cultivated throughout the year. This makes it difficult to separate coca from other crops based on phenological differences. The automatic land cover classification is not used to detect coca cultivation, but rather to study broadly the various land cover present on an image. That study will help to identify the areas where coca cultivation can be interpreted visually later on (Chuvieco, Basic Principles of Spatial Teledetection, 1990).

The project performed a supervised classification, i.e. training areas represent the features to be mapped in advance and class signatures are calculated. Each pixel is then assigned to a land cover class depending on an algorithm. In this case, based on the maximum likelihood algorithm, thirteen land over classes are classified within each image: : primary forest and rainforest, secondary forest and shrubs, grassland and shrubs, water bodies, sand banks, clouds and shadows, roads, urban and populated areas, inundated areas, rock outcrops, bare soils, crops, other.

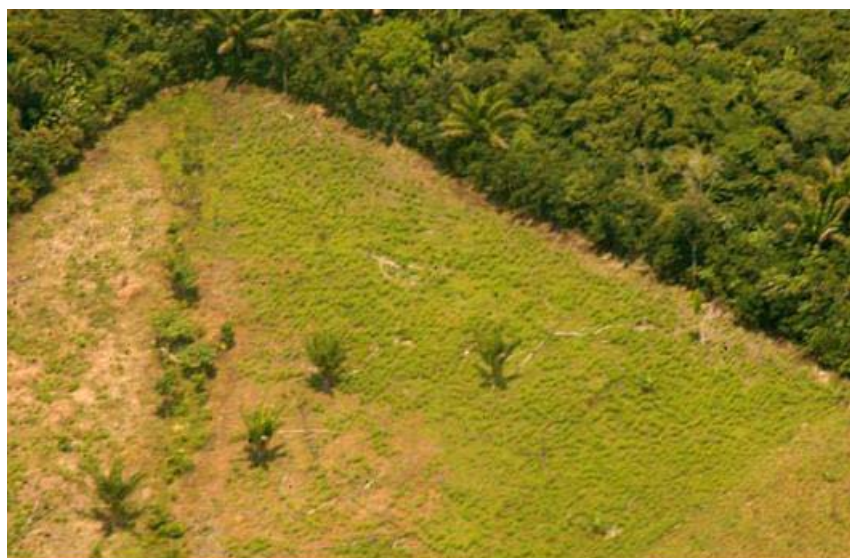
Figure 17. ASTER image and corresponding land cover classification



4) Visual interpretation of the coca fields

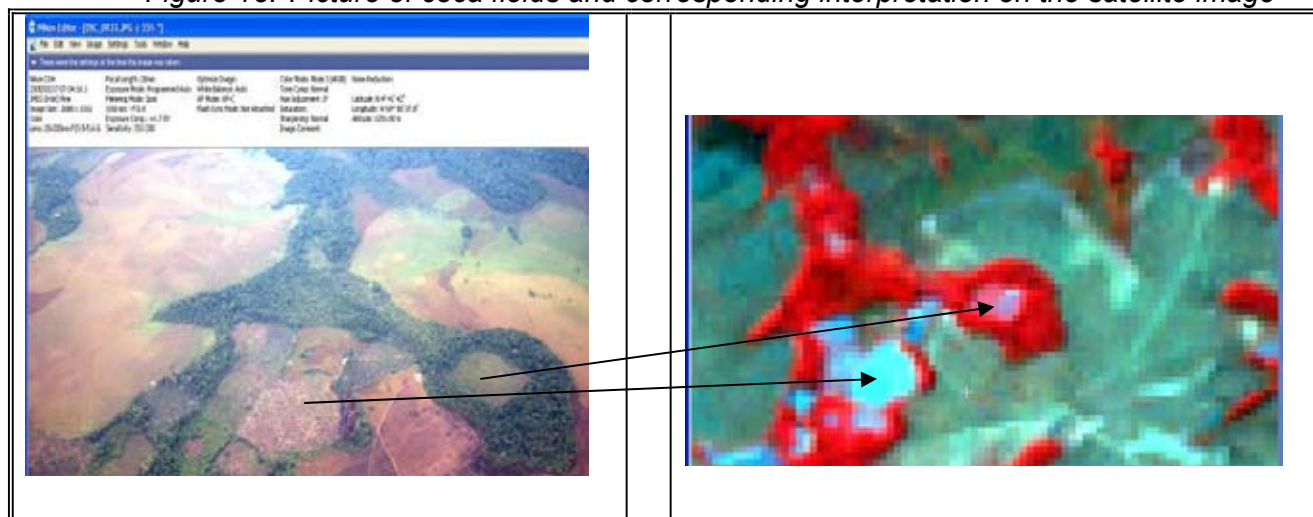
The classification of coca fields relies on the visual interpretation of satellite images. The detection is based on the spectral characteristics, the shape, and the surroundings of the fields. The class 'coca' can be considered to be composed of bare soils and small rows of bushes (see figure 18). No distinction is made between the different phenological stages of coca bushes.

Coca fields are digitized on screen with the help of semi-automatic software tools (e.g. pixel seeding). Small polygons of less than 0.25 ha (2 or 3 Landsat 7 pixels) are deleted because the interpretation is not enough reliable due to the coarse spatial resolution of the sensor.



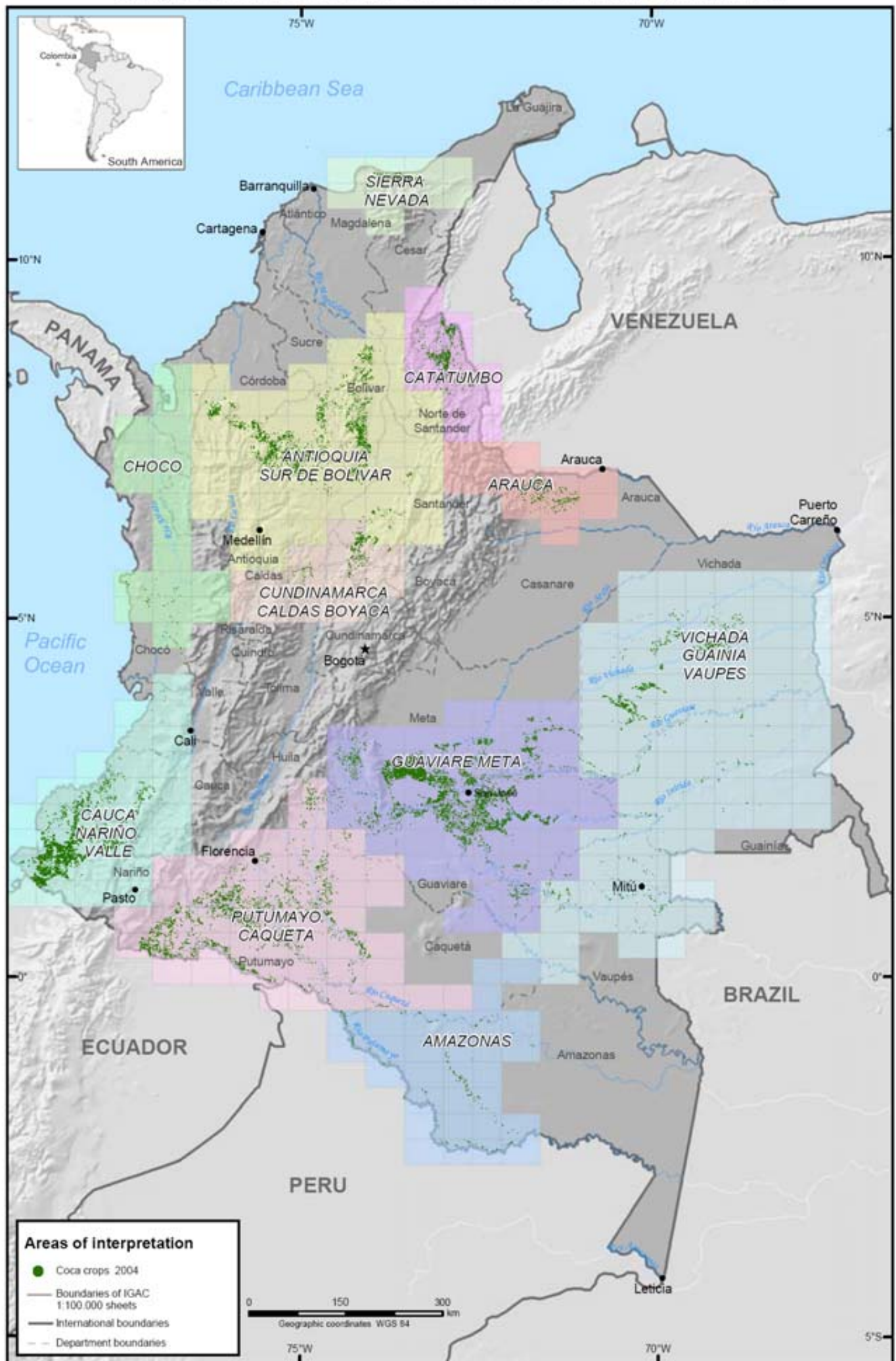
Coca fields detected during a verification flight

Figure 18. Picture of coca fields and corresponding interpretation on the satellite image



The supervised training of the computer system to recognize patterns of the data is closely controlled by the interpreter. The result of training is a set of signatures. Each signature corresponds to a class and is used with a decision rule to assign the pixels to a class. The project identifies 14 classes such as primary forest, pastures, roads, secondary forest, bare soil, etc.

Study area distributed by region and coca cultivation in Colombia, 2004

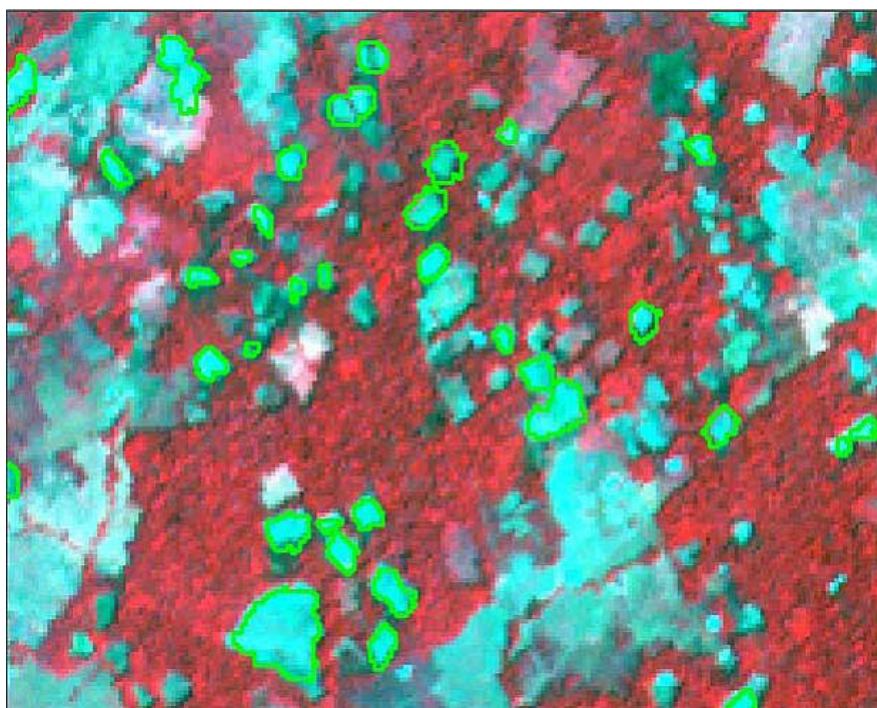


Sources: for coca cultivation Government of Colombia - National monitoring system supported by UNODC; for boundaries of 1:100 000 sheets IGAC
The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

Coca fields are digitized on screen. For this purpose a software tool called 'pixel seeding' is used to delineate the fields. This means that pixels are grouped together automatically by the software if their spectral value is similar. The similarity threshold for grouping pixels is determined by the interpreter.

In addition, aerial photos taken by the Antinarcotics police (DIRAN), recording of aerial spraying path and coca polygons interpreted for the census of previous years are also used to facilitate the interpretation, as well as the information supplied by different government and UN agencies.

The interpretation process relies on the profound knowledge of the area by the interpreter. This knowledge is gained through many years of experience analysing satellite images and frequent over-flights. In addition, aerial photos taken by the Antinarcotics police (DIRAN), recording of aerial spraying path and the census of previous years are also used to facilitate the interpretation. Interpreters often have several years of experience with the project.



Visually interpreted coca fields (in green contour) on an ASTER image

5) Verification flights

Verification flights are required for correcting and improving the initial interpretation. The verification is based on direct visual inspection of the ground from a plane. Paper maps are used for orientation and as a data base for verification.

In addition to visual inspection from the aircraft, a digital camera combined with GPS was used for documentation. The preliminary interpretation results are edited and corrected with the verification findings.



Inside the cockpit during a verification flight



Digital camera mounted with GPS unit

6) Accuracy assessment

The assessment of the accuracy of the interpretation results is part of a quality control. The accuracy assessment has two aspects: a geometric accuracy which is the accuracy of the interpreted boundaries (or size) of land cover units and a thematic accuracy which measures the reliability of the identification of land cover classes.

Currently the images are geo-referenced on the basis of ground control points from maps and older images. In this case, for LandSat 7 ETM+ images a maximum positional deviation of the order of 1/10 of elevation difference can occur. During its revision of the methodology, the University of Natural Resources and Applied Life Sciences of Vienna (Austria) recommended to ortho-rectify the images with detailed Digital Elevation Model to increase the geometric accuracy to below 1.5 pixels.

Thematic accuracy is usually specified in terms of error matrix, giving frequency (probability) of misclassification between different classes. The compilation of the error matrix must be based on a representative, unbiased sample of reference data. The collection of reference data is difficult as

access to the ground is not possible due to security reasons. Reference data have been obtained through the use of high-resolution MDIS images provided by NAS, geo-referenced records of flying paths taken during the spraying actions (DELNORTE) and photographs taken from a portable digital camera on board small aircraft. In 2003, from a sample of 144 reference points, the overall thematic accuracy was estimated at about 89% (number of correctly interpreted polygons over total number of polygons checked). This calculation was not updated, but a similar level of accuracy can be considered for the results of the 2004 survey.

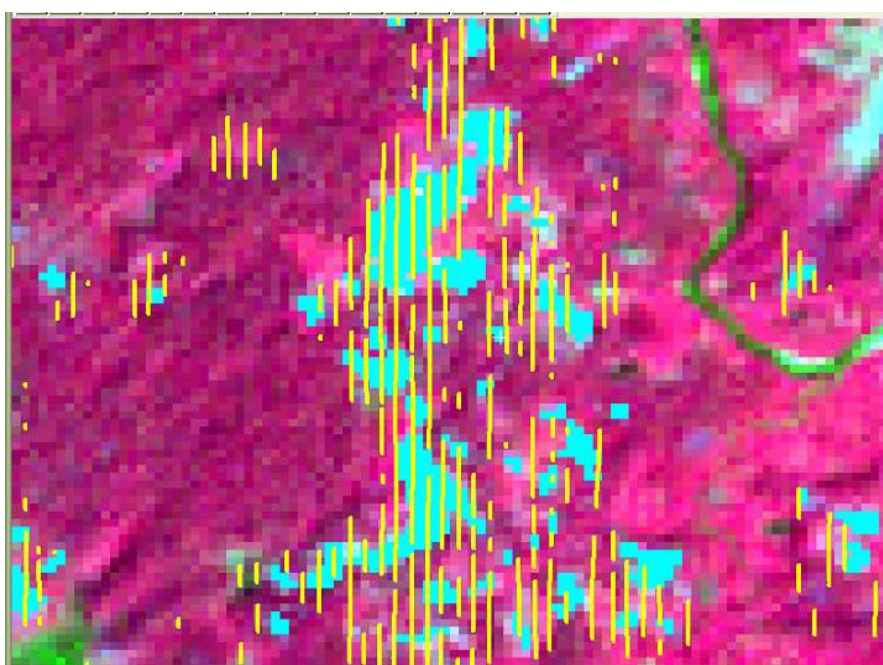
Although the thematic accuracy is a good indicator of the quality of the interpretation, it does not provide for a range of the results, and therefore it cannot be used to correct the results. Following the recommendations of the University of Natural Resources and Applied Life Sciences of Vienna (Austria), the project is currently developing an accuracy assessment method relying on aerial photography as surrogate ground data that might provide for such a bias-correction factor.

7) Corrections

Following the interpretation process, a number of corrections are applied to account for the effects of spraying activities before or after image acquisition, for missing image information due to clouds or gaps (SLC-off) and for differences in acquisition date of the images with respect to the census cut of date of 31 December. These corrections are necessary to improve the final statistics.

Correction for spraying

As part of the illicit crop eradication program, coca fields are sprayed from aircraft. The spraying lines are automatically recorded. After transforming the coordinates into the coordinate system of the satellite images, a buffer is calculated depending on the type of the plane and the recorded spraying line. The buffer is placed over the coca interpretation. Corrections are then performed depending on the date of image acquisition and on the date of spraying. Coca areas are ignored if they have been identified in images acquired before spraying, except for an estimated survival rate of 10%.



Coca fields are represented in cyan, spraying lines in yellow

Corrections for cloud cover and gaps in LandSat 7 images (SLC-off)

Clouds and shadows are delineated during the land cover classification process. In a first step, buffers of one kilometre width around the clouds are calculated. The coca cultivation area within

this buffer is measured. By comparison with the previous survey, trends for coca cultivation are calculated for the buffer area. This trend is used to estimate recent area under the clouds from corresponding area in the previous survey. Old coca fields under clouds or gaps are preserved in position and size, when trends indicate an increase in the surroundings areas.

In the 2004 survey, the corrections for the gaps of the LandSat 7 scenes were treated like clouds. The only difference is in a buffer of 300 meter instead of 1000 meter for the clouds. The definition of the buffer is based on experience in both cases.

Corrections for differences in acquisition dates of images

The satellite image only reflects the cultivation at their acquisition date. A correction factor should be applied to get the estimates at the cut-off date of 31st December. A monthly coca rate of increase or decrease is calculated from the difference in coca cultivation between images acquired over the same area at different dates. This rate is then applied to the initial interpretation for the number of months separating the acquisition date and the cut off date of 31 December.

Table 45: Corrections applied in 2004

	AREA (IN HA)	% OF INITIAL RESULT
Initial results	67,049	83.4
Correction for spraying	1,483	1.9
Correction for cloud cover and LandSat 7 gaps (SLC-off)	11,153	13.9
Correction for difference in acquisition dates of images	665	0.8
Final results	80,350	100

3.2 OPIUM POPPY CULTIVATION

In August 2004, the project conducted a test for the detection and measurement of opium poppy fields from high-resolution satellite imagery over a small area of 121 square km.

Unlike in some Asian countries where most of the illicit opium poppy cultivation takes place, opium poppy cultivation in Colombia does not have a fixed calendar and can be grown throughout the year. This means that at any date, opium poppy fields can be found at various phenological stages. This characteristic prevents the determination of a non-ambiguous spectral signature for opium poppy on one IKONOS image. It also complicates the establishment of annual estimates that would require frequent monitoring.

Opium poppy being cultivated on relatively small fields of less than one hectare, their detection requires the use of satellite images of a ground resolution finer than 5 meter. These high-resolution satellites images are available commercially, but their high cost prevents the establishment of a census survey of opium poppy cultivation in Colombia. The total area to be surveyed for opium poppy cultivation in Colombia would amount to 27,000 square km, or the equivalent of 221 high-resolution images of 11x11 km.

Considering these constrains, the project, with the support of the University of Natural Resources and Applied Life Sciences of Vienna (Austria), is developing a methodology that would combine the use of high-resolution satellite image on a sample basis, complemented with frequent over-flights for the non-ambiguous identification of opium poppy cultivation.

Up to now, the opium poppy estimates are based on aerial reconnaissance flights by the Antinarcotics Police (DIRAN). These flights were carried out two or three times during the year on small aircraft. The observer on board recorded the GPS coordinates of observable poppy fields and estimated visually the field area.

3.3 YIELD AND PRODUCTION

In October 2004, UNODC and the Colombian Government through DNE initiated a study for the assessment of the productivity and yield of coca cultivation. As result of the pilot survey, DNE sub-contracted a private company to conduct a study to gather information on coca leaf yield and general characteristics of the coca cultivation, through harvest tests, workshops and direct interviews with growers in three regions: Putumayo-Caqueta, Sur de Bolivar and Catatumbo (Northern part of the department of Norte de Santander). The UNODC Illicit Crop Monitoring Programme through its experts in Colombia and in Vienna, contributed to the design of the methodology based on the pilot survey in Guaviare. UNODC is also developing activities that would expand the results of this initial study to the rest of the regions of the country and to additional harvest periods.



Harvest of a plot of coca fields

To establish an estimate for the purpose of the present report, UNODC continues to rely on information available from other sources for coca as well for opium poppy. The most comprehensive work on this topic so far has been done by the US government (Operation Breakthrough). The National Police (DIRAN) has their own methodology and conducted field work in some.

3.4 PRICES

Prices of coca base and opium latex were collected by field technicians through interviews of farmers in the various coca and opium poppy growing departments. PNDA, the government's Alternative Development authority, suspended the collection of prices since 2004. Therefore, UNODC/SIMCI started the collection of prices in Caqueta, Nariño, Guaviare, South Bolivar and Meta. DIRAN also collect data on prices through intelligence methods for cocaine, coca base and heroin in several cities of the country.

4 ANNEX

- Corrections by departments (in ha)
- Satellite images coverage with acquisition date
- Coca cultivation over Indigenous territories

Annex: Correction for cloud cover, gaps, aerial spraying and date of imagery in 2004.

Department	Interpretation	Corrections				Total 2004
		for clouds	for gaps in satellite images	for aerial spraying	for date of imagery	
Antioquia	4,363	220	621	82	- 118	5,168
Amazonas	650	1	74	-	58	783
Arauca	1,180	2	15	225	130	1,552
Bolivar	2,873	44	404	79	2	3,402
Boyaca	227	125	7	-	-	359
Caldas	88	5	251	3	11	358
Caqueta	3,414	160	2,596	270	60	6,500
Cauca	1,065	38	167	-	- 4	1,266
Choco	300	12	-	-	11	323
Cordoba	1,106	86	280	10	54	1,536
Cundinamarca	38	21	12	-	-	71
Guainia	659	23	27	-	12	721
Guaviare	7,800	872	947	150	-	9,769
La Guajira	495	1	49	11	-	556
Magdalena	565	6	98	37	-	706
Meta	16,631	1,262	605	126	116	18,740
Nariño	12,824	937	124	269	-	14,154
Norte De Santander	2,224	7	375	125	324	3,055
Putumayo	4,039	16	276	41	14	4,386
Santander	979	121	10	14	-	1,124
Valle	34	22	-	-	- 11	45
Vaupes	921	5	121	37	-	1,084
Vichada	4,574	4	104	4	6	4,692
TOTAL	67,049	3,990	7,163	1,483	665	80,350

Annex: List of satellite images used for the Colombia coca cultivation survey 2004

LANDSAT7 ETM+			
Path	Row	Date acquisition	Date acquisition
3	58	September 14-04	
3	59	December 28-04	
4	56	December 3-04	
4	57	January 20-05	
4	58	January 20-05	
4	59	January 20-05	
4	60	January 20-05	
4	61	January 20-05	
4	62	January 20-05	
4	63	September 14-04	
5	56	December 26-04	
5	57	November 8-04	December 26-04
5	58	December 26-04	
5	59	December 26-04	
5	60	December 26-04	
5	61	December 26-04	
5	62	December 26-04	
6	55	October 14-04	
6	56	October 14-04	
6	57	October 30-04	
6	58	October 30-04	
6	59	December 17-04	
6	60	August 11-04	
6	61	August 11-04	
6	62	August 11-04	
7	52	September 03-04	
7	54	September 19-04	February 26-05
7	55	November 22-04	
7	56	November 22-04	
7	57	November 22-04	
7	58	December 24-04	
7	59	December 24-04	
7	60	September 19-04	
7	61	September 19-04	
8	52	October 28-04	December 15-04
8	53	December 31-04	
8	54	August 25-04	Oct.12,Dec.31-04
8	55	December 31-04	
8	56	December 31-04	
8	57	February 1-05	
8	58	December 31-04	February 1-05
8	59	October 12-04	December 31-04
8	60	October 12-04	
9	52	September 01-04	
9	53	December 22-04	
9	54	January 23-05	
9	55	January 23-05	
9	56	November 20-04	
9	57	February 24-05	
9	58	September 1-04	February 24-05
9	59	September.1-04	October 19-04
9	60	September 1-04	January 23-05
10	54	September 8-04	
10	55	November 27-04	
10	56	November 27-04	
10	57	November 27-04	
10	58	December 13-04	December 29-04
10	59	December 13-04	December 29-04
Total		58	12

ASTER		
LATITUDE	LONGITUDE	Date acquisition
-0.40°	-73.38°	August 11/04
-0.09°	-74.82°	October 12/04
0.00	-75.40°	January 16/05
0.08	-74.41°	November 22/04
0.45°	-74.71°	October 12/04
0.49°	-76.50°	January 23/05
0.53°	-75.29°	January 16/05
0.98°	-74.60°	October 12/04
1.02°	-76.39°	January 23/05
1.07°	-75.17°	January 16/05
1.52°	-74.48°	October12/04
1.60°	-75.06°	January 16/05
1.68°	-77.13°	February 24/05
2.28°	-72.80°	January 18/05
2.59°	-74.26°	October 12/04
2.67°	-74.79°	February 1/05
2.73°	-69.02°	September 30/04
2.75°	-73.84°	November 22/04
3.20°	-74.68°	February 1/05
3.69°	-71.16°	February 3/05
3.83°	-69.04°	January 20/05
4.19°	-69.24°	November 08/04
4.33°	-68.68°	September 30/04
4.73°	-69.12°	November 08/04
5.26°	-69.01°	November 08/04
5.49°	-75.23°	August 09/04
7.09°	-71.77°	January 18/05
8.64°	-74.14°	November 29/03
Total		28

SPOT4		
K	J	
645	348/6	January 16/05
646	332	January 27/05
Total		2

Annex: Coca cultivation in Indigenous Territories, 2003 - 2004

INDIGENOUS TERRITORIES	2003	2004
AFILADOR CAMPO ALEGRE (YARINAL AFILADORES)	68	50
AGUA NEGRA	25	26
AGUANEGRA	2	2
AGUAS NEGRAS	9	4
ALTO ALBI	33	3
ALTO SINU, ESMERALDA CRUZ GRANDE E IWAGADO	3	8
ANDABU	0	11
ANDOQUE DE ADUCHE	0	1
BACHACO BUENAVISTA	18	27
BARRANCO CEIBA Y LAGUNA ARAGUATO	66	47
BARRANCO COLORADO	24	19
BARRANQUILLITA	75	14
BARRIALOSA	0	3
BELLAVISTA Y UNION PITALITO	0	1
BEROCAL – ANAPO PUEBLO ESCONDIDO	4	0
BUENAVISTA	47	66
CABECERAS O PUERTO PIZARIO	0	1
CALI-BARRANQUILLA	44	17
CALLE SANTA ROSA RIO SAIJA	7	24
CAMPOALEGRE	0	4
CAÑO JABON	49	7
CAÑO NEGRO	3	2
CAÑO OVEJAS (BETANIA – COROCITO)	12	11
CAÑO CUNAS TSEPAJIBO - WARRACAÑA	1	0
CARANACOA YURI – LAGUNA MOROCOTO	5	0
CARPINTERO PALOMAS	53	35
CECILIA COCHA	3	8
CHIGUIRO	27	16
CHOCON	57	63
CODAGUA	0	11
CONCORDIA	9	12
CONSARA-MECAYA	23	15
COROCORO	12	3
COROPOYA	0	2
CUASBIL - LA FALDADA	25	12
CUENCA MEDIA Y ALTA DEL RIO INIRIDA	163	226
CUMARAL-GUAMUCO	54	49
DOMINICO-DONDOBO-APARTADO	0	1
EL HACHA	0	3
EL PROGRESO	0	2
EL TIGRE	33	9
EL UNUMA	201	327
EL VENADO	9	3
GABARRA-CATALAURA	24	3
GRAN ROSARIO	178	187
GUACAMAYAS MAMIYARE	0	1
GUACO BAJO Y GUACO ALTO	0	10
GUALCALA	3	0
GUELNAMBI-CARAÑO	0	2
HERICHA	4	2
HUITOTO DE MONOCHOA	0	2
INFI	3	1
JERICO CONSAYA	8	3
JIRIJIRI	1	0
KOGUI-MALAYO ARHUACO	208	302

LA ESPERANZA	0	1
LA FLORESTA-SANTA ROSA-RIO SANQUIANGA	36	7
LA FUGA	57	37
LA LLANURA	28	28
LA SAL	56	64
LA TURBIA	75	43
LA YUQUERA	18	19
LAGOS DEL DORADO LAGOS DEL PASO Y EL ROMANSO	358	275
LAGUNA ANGUILLA LA MACARENA	31	0
LAGUNA NEGRA Y CACAO	13	0
LLANOS DE YARI 8 YAGUARA II)	0	0
LOS IGUANITOS	0	11
MACUARE	72	12
MONOCHOA	3	0
MOTILON-BARI	20	24
NIÑERAS	121	40
NUKAK MAKU	18	17
NUNUYA DE VILLAZUL	2	3
PARTE ALTA DEL RIO GUAINIA	7	16
PIGUAMBI-PALANGALA	5	8
PIPALTA PALBI YAGUAPI	19	4
PREDIO PUTUMAYO	638	830
PUEBLO NUEVO-LAGUNA COLORADA	5	3
PUERTO ALEGRE Y LA DIVISA	2	2
PUERTO LIMON	0	9
PUERTO NARANJO – PEÑAS ROJAS –CUERAZO – EL DIAMANTE	2	0
PUERTO ZABALO-LOS MONOS	14	32
PULGANDE CAMPOALEGRE	24	32
RIO GARRAPATAS	0	6
RIO GUANGUI	6	8
RIO PAVASA Y QUEBRADA JELLA	0	4
RIO PUERRICHA	9	5
RIOS CATRU Y DUBASA	24	38
RIOS MUCO Y GUARROJO	4	2
RIOS TOMO Y WEBERI	16	11
RIOS TORREIDO Y CHIMANI	1	3
SAN JOSE DE LIPA O CAÑO COLORADO	0	61
SAN LUIS	0	2
SANTA CRUZ DE PIÑUÑA BLANCO	1	7
SANTA ROSA DEL GUAMUEZ	17	13
SANTA ROSA SUCUMBIOS EL DIVISO	80	96
SANTA TERESITA DEL TUPARRO	25	24
SARACURE Y RIO CADA	143	304
TONINA-SEJAL-SAN JOSE-OTROS	5	11
TORTUGAÑA-TELEMBI-PUNDE-PITADERO-BRAVO-TRONQUERIA-ZABAL	13	36
TUKUNARE	0	1
UNIDO UWA	7	0
VAUPES	272	426
WITORA O HUITORA	0	0
YARINAL (SAN MARCELINO)	159	124
YURI	0	2
Total Area coca ha	3.994	4359

For more information please contact:

UNODC Colombia
Cra 4 No. 72-35 Piso 7
Bogotá, Colombia
TEL: +57 1 255 9333
Fax: +57 1 314 2945
www.unodc.org
www.unodc.org/colombia
fo.colombia@unodc.org

All rights are reserved. No part of this publication may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval systems without permission in writing from UNODC. This includes the reproduction of single pictures, or parts of text, graphics, table or maps in magazines, newspapers or in any digital form, or for public events,