

COCA CULTIVATION IN THE ANDEAN REGION

A survey of Bolivia, Colombia, Ecuador and Peru



data collection

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June 2007

UNODC's Illicit Crop Monitoring Programme (ICMP) promotes the development and maintenance of a global network of illicit crop monitoring systems in the context of the illicit crop elimination objective set by the United Nations General Assembly Special Session on Drugs. It provides overall coordination and direct technical support and supervision to UNODC supported annual illicit crop surveys at the country level.

This reports presents the results of the annual coca cultivation surveys in Bolivia, Colombia, and Peru, which were conducted jointly by UNODC (ICMP) and the respective Governments with a regional perspective.

The implementation of UNODC's Illicit Crop Monitoring Programme in the Andean region was made possible thanks to financial contributions from the Governments of Austria, Colombia, France, the Netherlands, Turkey, the United Kingdom, the United States of America, and from the European Commission.

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PREFACE

The evidence presented in this *Survey* bears out an argument that UNODC has been making in relation to the world drugs problem: the overall situation is stable, yet fragile.

In 2005, slight decreases in coca cultivation in Bolivia and Peru were offset by an increase in Colombia. In 2006, the reverse occurred. While the regional trend was downward, this time a decrease in Colombia was offset by increases in Bolivia and Peru.

Progress in Colombia can be attributed to record levels of eradication, both aerial and manual. Colombia also continues to seize an impressive amount of its own cocaine, to intercept imports of precursor chemicals, and to destroy drug labs. It is also facing up to the corrupting power of the drugs trade on government, and seeking to break the links between drug trafficking and insurgency.

But as the experience of Bolivia and Peru demonstrate, a long term reduction of the world's supply of coca depends not only on effective law enforcement, but also on eradicating the poverty that makes farmers vulnerable to the temptation of growing lucrative illicit crops. All Andean countries require greater support for development assistance that can generate growth and create brighter prospects for communities at the beginning of the supply chain. They should also be encouraged to work more closely together to exchange intelligence on trafficking flows and carry out joint operations.

The solution to the Andean coca problem does not rest solely in the region. Andean governments would not be grappling with a problem on this scale if there was no global demand for cocaine. This year alone, the Colombian authorities – at great risk and great expense – have eradicated more than 200,000 hectares of coca: an area twice the size of New York City! Yet they will have to do it again and again unless the world curbs its appetite for cocaine.

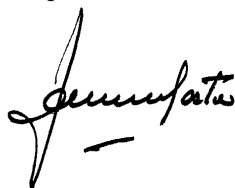
Global demand for cocaine is steady, with a decline in the United States offset by a rise in Europe. In these affluent societies, where celebrities are often glamourized for their drug abuse, greater investment is needed in drug prevention and treatment. People who think that they can control the “white lady” should realize, before it is too late, that she is a killer rather than a seductive mistress. Furthermore, the risks that they take are not only to themselves. They are a threat to society if they take drugs and then drive, and they are destroying the lungs of our planet by supporting a trade that is cutting down the Amazon forests.

Meanwhile, countries of the Caribbean, Central America and West Africa are caught in the cross-fire: their societies, already made vulnerable by poverty, are increasingly exposed to the crime of drug trafficking and the tragedy of drug abuse.

In short, recent evidence suggests that the drug problem *can be*, and *is being*, contained. To consolidate this progress, it will take a concerted effort at every stage of the drug trade: more effective prevention and treatment to reduce *demand*; greater technical assistance and regional co-operation to stop *trafficking*; and comprehensive national drug control plans including law enforcement and social and economic development in order to reduce *supply*.

Minor annual fluctuations in coca crop surveys are a useful indicator of trends. But the real test is the long-term commitment of societies – and not just governments – to tackle the root causes of drug supply and demand for the sake of a safer and healthier world.

Progress *is* possible. In recent years, the Golden Triangle of South East Asia – once notorious for opium cultivation – has become almost opium free. Let this be an inspiration to us to eliminate the world's biggest supply of cocaine.



Antonio Maria Costa
Executive Director
UNODC

PART 1. REGIONAL OVERVIEW

FACT SHEET – Andean Coca Surveys for 2006

	2005	Variation	2006
Global coca cultivation	159,600 ha	-2%	156,900 ha
Colombia	86,000 ha	-9%	78,000 ha
Peru	48,200 ha	+7%	51,400 ha
Bolivia	25,400 ha	+8%	27,500 ha
Ecuador	n.a.		< 100 ha
Farm-gate value of coca cultivation	US\$ 1,330 million	-12%	US\$ 1,159 million
Colombia (coca products)	US\$ 843 million	-18%	US\$ 694 million
Peru (coca leaf)	US\$ 307 million	-7%	US\$ 285 million
Bolivia (coca leaf)	US\$ 180 million	0%	US\$ 180 million
Farm-gate value of coca cultivation in % of GDP¹			
Colombia	0.7%		0.5%
Peru	0.4%		0.4%
Bolivia	2.1%		2.0%
Global cocaine production	980 mt	+0.4%	984 mt
Colombia	640 mt	-5%	610 mt
Peru	260 mt	+8%	280 mt
Bolivia	80 mt	+18%	94 mt
Average wholesale price of cocaine			
Colombia (in main cities)	US\$ 1,860/kg	-5%	US\$ 1,762/kg
Peru (in producing regions)	US\$ 897/kg	-8%	US\$ 823/kg
Bolivia (in main cities)	US\$ 1,830/kg	+2%	US\$ 1,870/kg
Ecuador	US\$ 4,500/kg		n.a.
Reported eradication of coca cultivation			
Colombia (spraying & manual)	170,060 ha	+25%	213,371 ha
Peru (manual)	12,237 ha	+4%	12,688 ha
Bolivia (manual)	6,073 ha	-17%	5,070 ha
Ecuador (manual) ²	18 ha	n.a.	8 ha
Reported seizure of cocaine (base and HCl) in South America	379 mt		n.a.
Colombia	215 mt	-18%	177 mt
Peru	22 mt	-10%	20 mt
Bolivia	11 mt	+27%	14 mt
Ecuador	43 mt	-12%	38 mt ³

¹ GDP of the respective year as reported by the Government.

² Reported until September 2006.

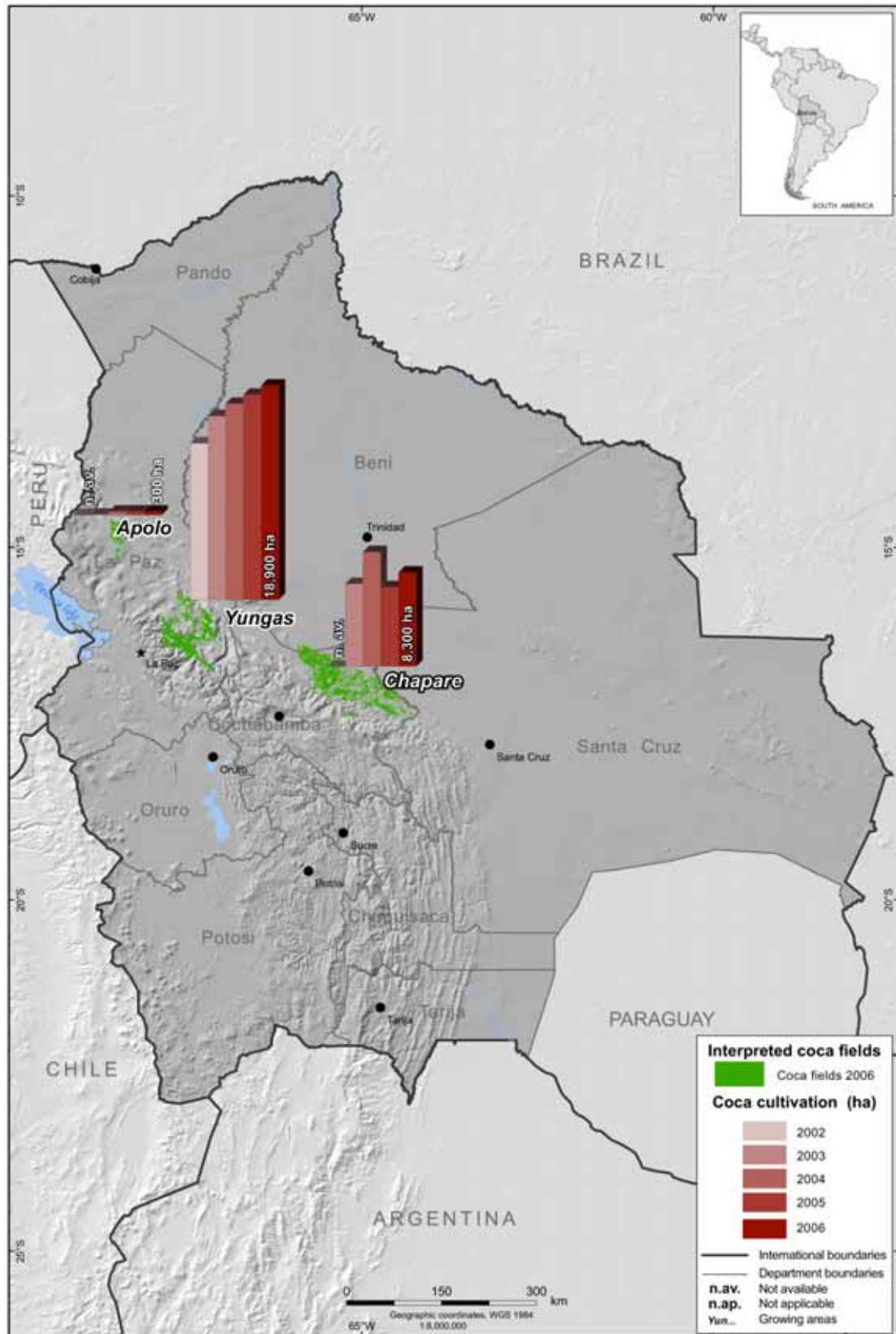
³ Source: INCSR 2007.

Map 1: Coca cultivation density in the Andean Region, 2006



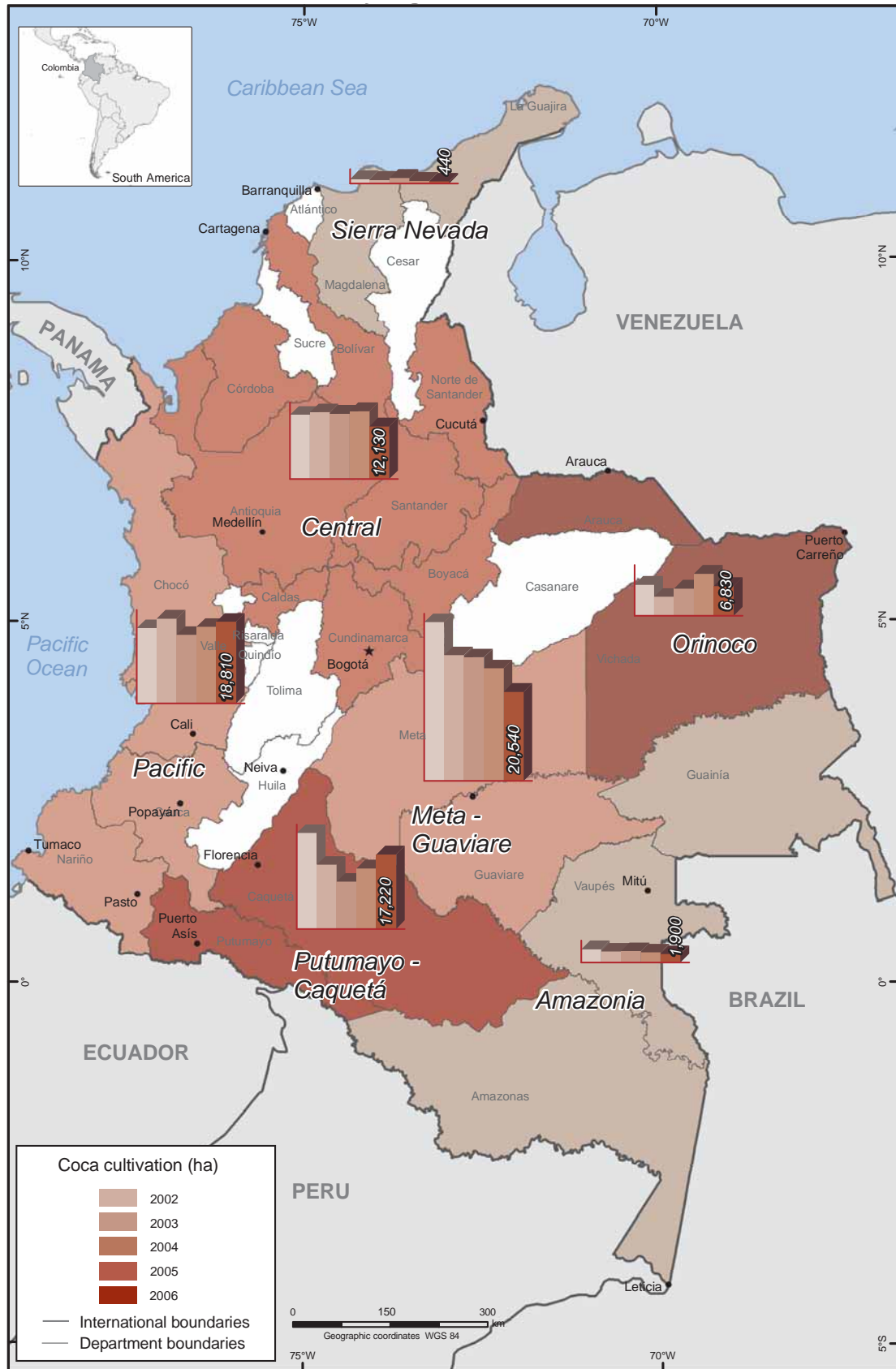
Sources: National monitoring systems supported by UNODC - Governments of Bolivia, Colombia and Perú
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Map 2: Bolivia, coca cultivation by region, 2002 to 2006



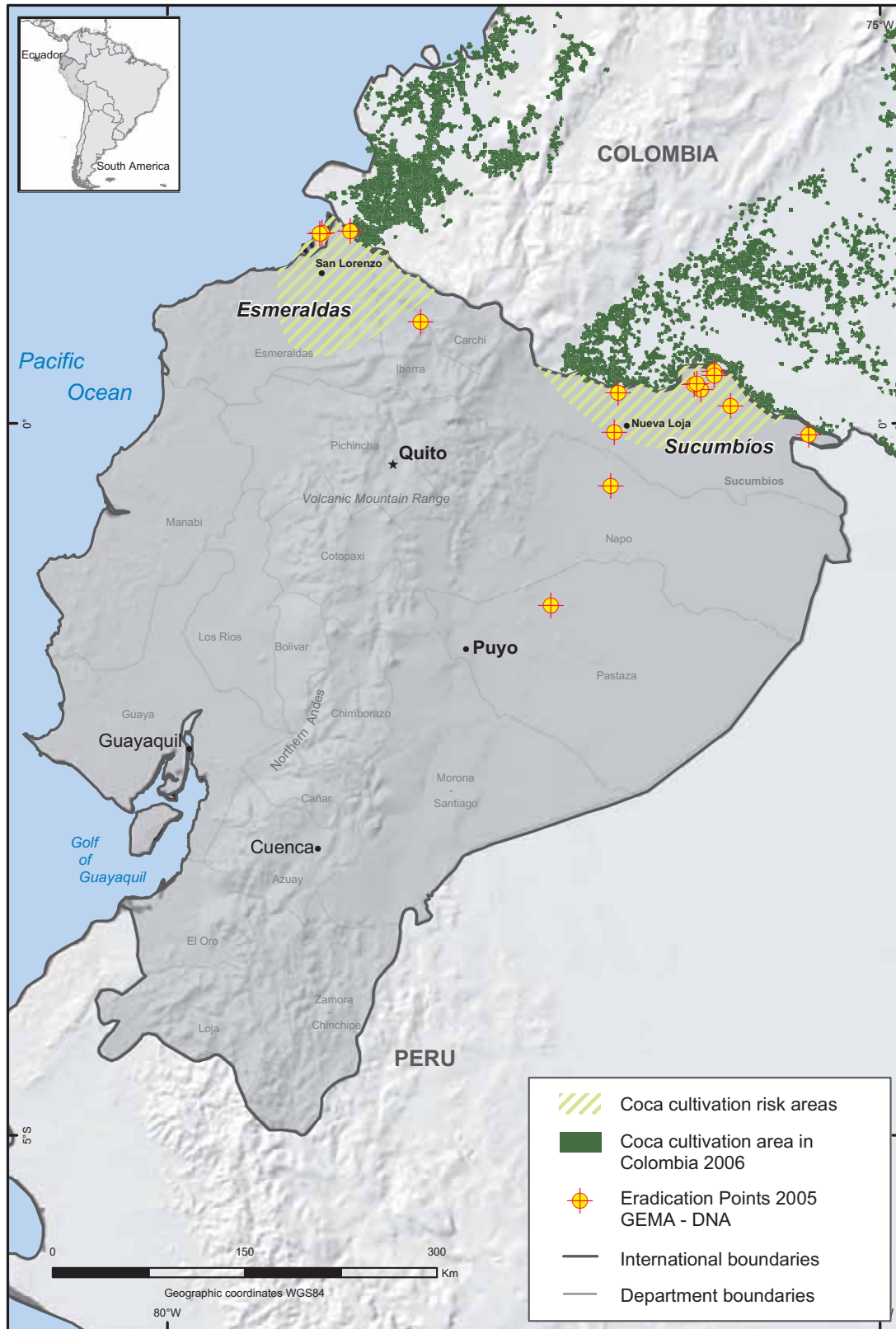
Source: Government of Bolivia - National monitoring system supported by UNODC
 The boundaries and names shown and the designation used on this map do not imply official endorsement or acceptance by the United Nations

Map 3: Colombia, coca cultivation by region, 2002 to 2006



Source: Government of Colombia - National monitoring system supported by UNODC
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Map 4: Ecuador, coca cultivation risk areas, 2006



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

Map 5: Peru, coca cultivation by region, 2002 to 2006



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

1 COCA CULTIVATION IN THE ANDEAN REGION

In 2006, coca cultivation in the Andean region decreased slightly by 2 per cent from 159,900 hectares in 2005 to only 156,900 hectares in 2006. Cultivation decreases in Colombia were partly offset by increases in Bolivia and Peru. The estimates suggest that the global coca cultivation area has been essentially stable since 2003. However, global coca cultivation continues to be lower than in any year of the 1990s and 29 per cent below the peak level recorded in 2000 (221,300 hectares).

Colombia remained the country with the world's largest coca growing area, representing half of the global area under coca bush. Peru remains the second largest coca cultivating country behind Colombia, and accounted for one third of the global cultivation in 2006. Bolivia, the third largest producer of coca leaf in the world, still trails far behind Colombia, and accounted for only 18 per cent of global coca cultivation.

Figure 1: Coca cultivation in the Andean region (hectares), 1995 to 2006

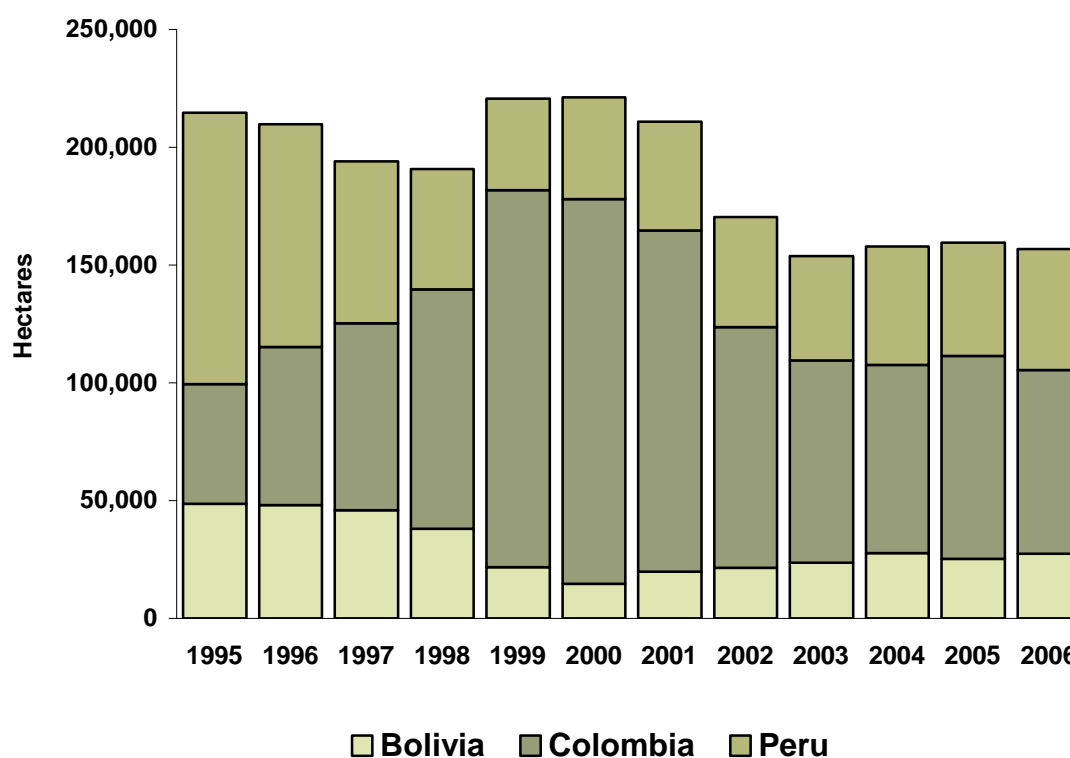


Table 1: Coca cultivation in the Andean region (hectares), 1995 to 2006

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	% change 2005-2006
Bolivia	48,600	48,100	45,800	38,000	21,800	14,600	19,900	21,600	23,600	27,700	25,400	27,500	8%
Peru	115,300	94,400	68,800	51,000	38,700	43,400	46,200	46,700	44,200	50,300	48,200	51,400	7%
Colombia	50,900	67,200	79,400	101,800	160,100	163,300	144,800	102,000	86,000	80,000	86,000	78,000	-9%
Total	214,800	209,700	194,000	190,800	220,600	221,300	210,900	170,300	153,800	158,000	159,600	156,900	-2%

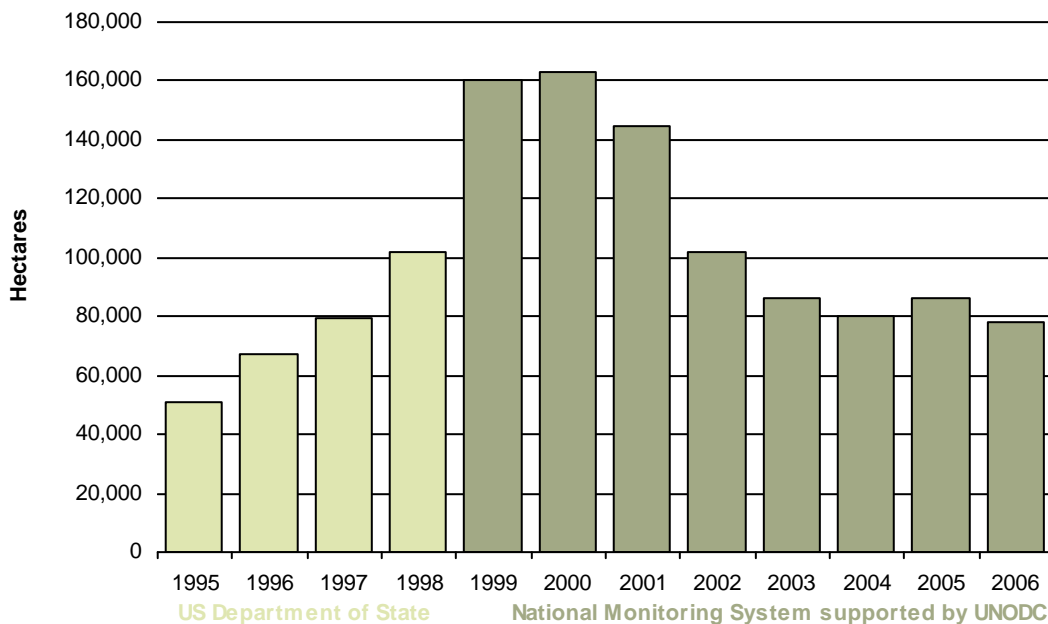
Source: ■ United States Department of States ■ National Monitoring Systems supported by UNODC

There are no indications of large-scale coca cultivation outside the three main coca growing countries Bolivia, Colombia and Peru, despite evidence of low-level coca bush cultivation in some parts of Ecuador. Preliminary results of a rapid assessment undertaken by UNODC and the Government of Venezuela in 2006 including large parts of the Venezuela-Colombia border area indicate that the extent of coca cultivation on the Venezuelan side is marginal.

Coca cultivation in Colombia declined by 9 per cent from 86,000 hectares in 2005 to only 78,000 hectares in 2006. Overall, despite the increases and decreases observed in recent years, coca cultivation in Colombia has proven to be relatively stable at around 80,000 hectares since 2003. Meta-Guaviare remains the largest cultivation region in Colombia, with almost 21,000 hectares of coca bush, or just over a quarter of the total coca cultivation area, closely followed by the Pacific and Putumayo-Caquetá regions. Considerable decreases in the Meta-Guaviare, Central and Orinoco regions were partly offset by strong increases in the Putumayo-Caquetá region, once the largest cultivation region.

In 2006, the Colombian authorities further intensified their eradication efforts, especially in higher yielding regions such as Meta-Guaviare, Orinoco and Putumayo-Caquetá. The area of coca bush eradicated reached a record level of over 213,000 hectares, which includes about 172,000 hectares of spraying and 41,530 hectares of manual eradication. The cumulative area eradicated in 2006 was 2.7 times larger than the net cultivation area, which indicates an intensity of eradication activities never reached before.

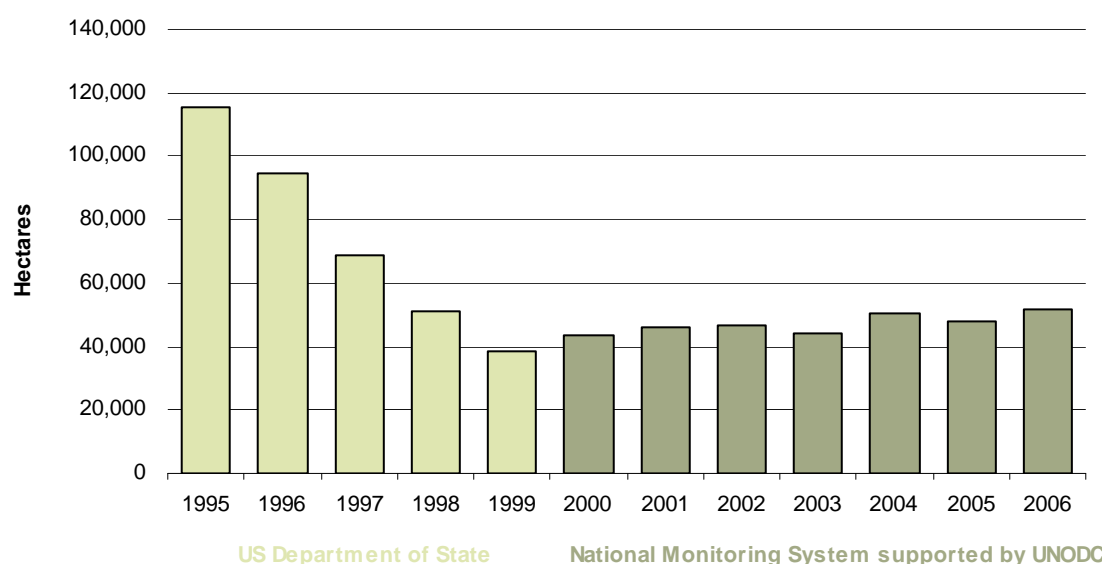
Figure 2: Coca cultivation in Colombia (hectares), 1995 to 2006



In 2006, coca cultivation in Peru increased by 7 per cent and amounted to 51,400 hectares, which is almost as high as the level reached in 2004. Despite this increase, coca cultivation remained well below the levels registered in the mid 1990s, when Peru was the world's largest cultivator of coca bush.

Although there was only a moderate increase in coca cultivation in the three major cultivating regions, Alto Huallaga, Apurímac and La Convención-Lares, they were still the largest contributors to the overall increase of 3,200 hectares in absolute terms. Furthermore, several of the smaller cultivation areas grew rapidly and a new cultivation area was discovered in the Brazil-Colombia-Peru border triangle.

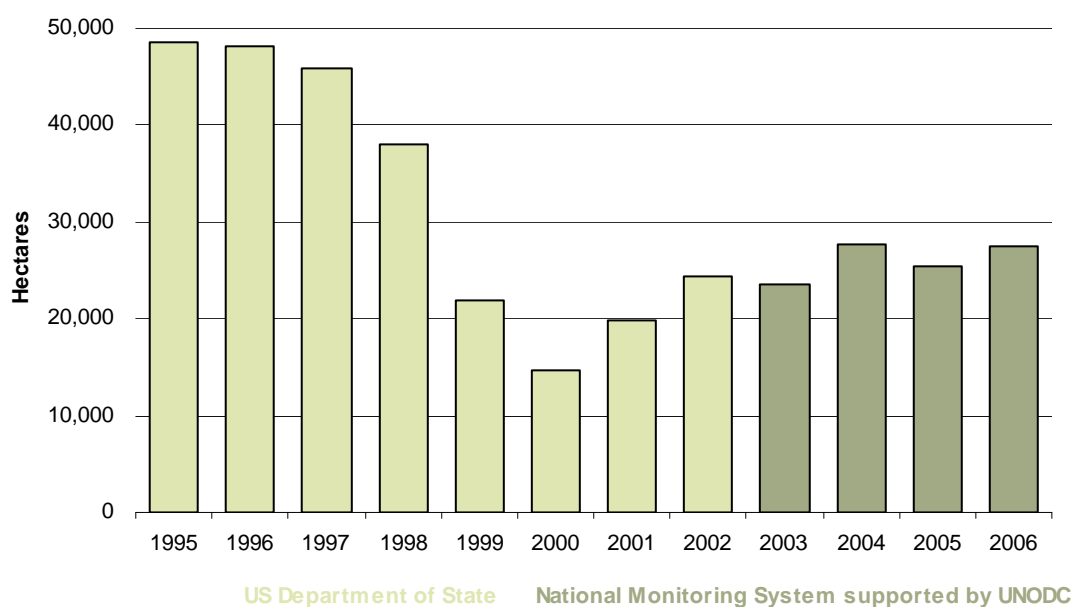
Eradication of coca bush, which in Peru is done manually, was slightly higher than in 2005 and reached 12,688 hectares, the second highest eradication figure reported by the Government.

Figure 3: Coca cultivation in Peru (hectares), 1995 to 2006

In Bolivia, the area under coca cultivation increased by 8 per cent compared to 2005, and reached 27,500 hectares in 2006. This increase offsets the decrease achieved between 2004 and 2005, when coca cultivation declined by 8 per cent from 27,700 hectares to only 25,400 hectares. The total estimate also included 12,000 hectares of coca bush permitted by Bolivian Law No. 1008 for traditional purposes such as leaf chewing, medicinal preparations and coca tea. Overall, the area cultivated with coca bush in Bolivia remained much lower than in the early and mid-1990s, when coca was grown on over 45,000 hectares.

As in previous years, the Yungas of La Paz constituted the largest coca cultivating region in Bolivia with over two thirds of the area under coca bush, followed by Chapare, with just under one third of the area. Still, most of the total coca area increase of 2,100 hectares took place in Chapare, where the coca cultivation area increased by 19 per cent, or 1,300 hectares, whereas the Yungas of La Paz accounted for only 800 hectares of the total increase.

The Government of Bolivia reported a decrease of the area eradicated by 17 per cent to only 5,070 hectares in 2006. Practically all the eradication took place in the region of Chapare.

Figure 4: Coca cultivation in Bolivia (hectares), 1995 to 2006

2 POTENTIAL COCAINE PRODUCTION

The overall potential production of cocaine reached 984 metric tons in 2006, about the same as a year earlier, with levels amounting to 610 metric tons in Colombia, 280 metric tons in Peru and 94 metric tons in Bolivia. The level of overall potential production is practically unchanged from the levels of a decade ago. Unlike coca cultivation, which saw a strong decrease since the peak in the year 2000, world cocaine production remained at a high level. The introduction of improved coca cultivation techniques in recent years including the use of industrial fertilizers, pesticides, herbicides, and irrigation, as well as the introduction of new varieties and higher plant densities resulted in significantly higher coca leaf yields per hectare. In addition, the conversion process from coca leaf to cocaine HCl is thought to have undergone improvements, and it is suspected that clandestine coca processing laboratories are more efficient now than they were several years ago. However, due to the illicit nature of cocaine production, information on changes in the conversion process is difficult to obtain.

In 2006, the potential production of cocaine HCl in Colombia decreased by 5 per cent or 30 metric tons to 610 metric tons. As a consequence of this decrease and simultaneous production increases in Bolivia and Peru, Colombia's share of the world cocaine production fell from 65 per cent in 2005 to 62 per cent in 2006.

In 2006, Peru accounted for 28 per cent of the global cocaine production. Based on updated information on the amount of coca leaf necessary to produce one kilogram of cocaine HCl, the total potential cocaine production in 2006 amounted to 280 metric tons, which is an increase of 8 per cent compared to 2005. While this is the highest production figure since 1998, it is still only about half the amount registered during the cocaine production peak in Peru in 1992.

Based on new field research on the coca leaf yield in the Yungas of La Paz, the potential production of cocaine HCl in Bolivia in 2006 amounted to 94 metric tons, an increase by 18 per cent compared to the production estimate of 80 metric tons in 2005. The cocaine production estimates for the years 2004 and 2005 were revised using the new yield results. The increase in cocaine production is much more pronounced than the coca cultivation increase due to the fact that most of the area increase took place in Chapare, where coca leaf yields are more than twice the amount recorded in the Yungas of La Paz.

Figure 5: Global potential cocaine production (metric tons), 1995 to 2006

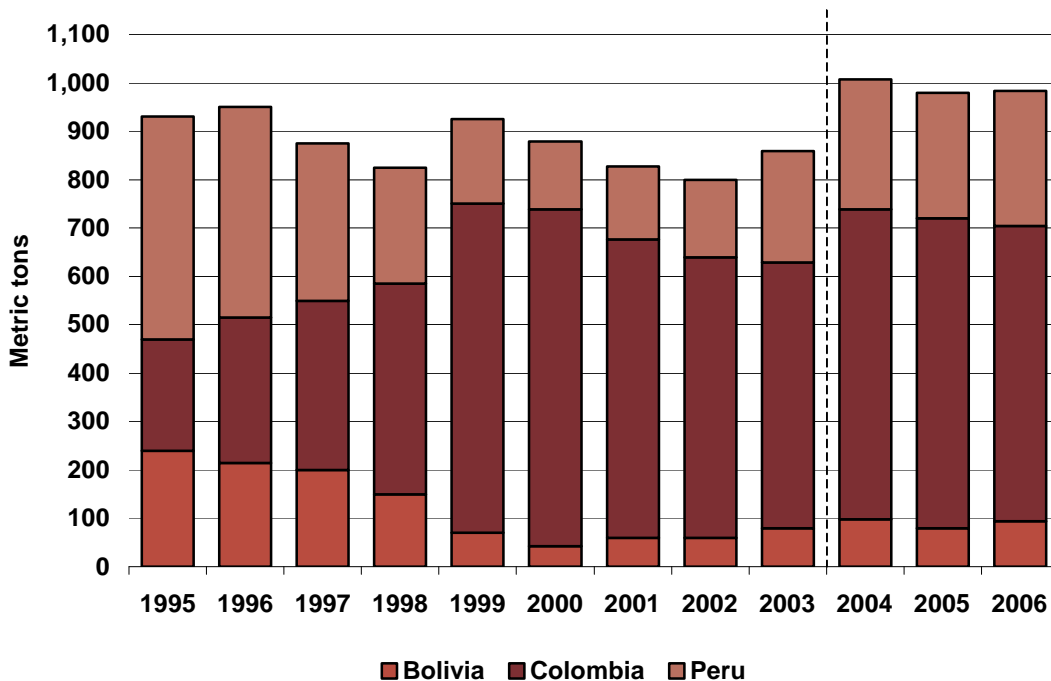


Table 2: Global potential cocaine production (metric tons), 1995 to 2006

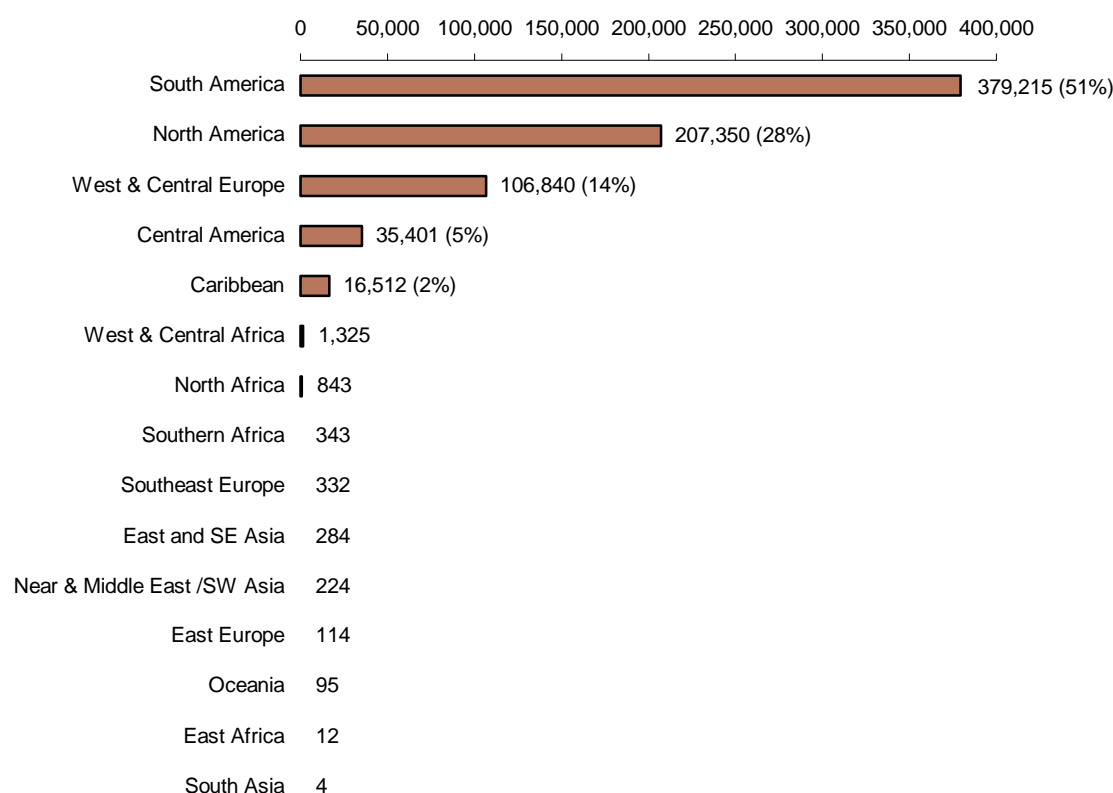
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	% change 2005-2006
Bolivia	240	215	200	150	70	43	60	60	79	98	80	94	18%
Colombia	230	300	350	435	680	695	617	580	550	640	640	610	-5%
Peru	460	435	325	240	175	141	150	160	230	270	260	280	8%
Total	930	950	875	825	925	879	827	800	859	1,008	980	984	0.4%

Source: UNODC World Drug Report 2007.

Note: Production estimates for Bolivia in 2004 and 2005 and for Peru from 2003 to 2005 were revised based on updated information available. Colombian cocaine production estimates for 2004 and later are not directly comparable with previous years.

3 COCAINE SEIZURES AND CLANDESTINE LABORATORIES

Global seizures of cocaine (base and HCl) increased by 29% to 749 metric tons in 2005, topping the record amount of 579 metric tons seized in 2004. Seizures increased in all the major regions, most noticeably in South America, where the majority of all seizures continued to take place, and in West and Central Europe.

Figure 6: Global cocaine seizures by region (kg and % of total), 2005

Colombia alone accounted for 29 per cent of global seizures in 2005, which reflects the strong enforcement efforts undertaken by the Colombian authorities. In 2006, cocaine seizures reported by the Government show a decrease in cocaine HCl and cocaine base seizures but an increase in coca leaf and coca paste seizures. However, seizures in Colombia continued to have a large component of cocaine HCl. In 2006, out of a total of 177 metric tons cocaine HCl and base seized, 127 metric tons were cocaine HCl.

In recent years, the Pacific cocaine trafficking route seems to have gained importance over the Atlantic route. In 2006, 81 per cent of all cocaine HCl seized by Colombian authorities at sea or maritime ports was seized in the Pacific corridor.

In 2006, seizures of cocaine base and HCl in Peru decreased by 10 per cent from 22 metric tons in 2002 to only 20 metric tons in 2006. Similar to the composition of seizures in Colombia, a considerably part of the seizures consisted of cocaine HCl (25% in 2006).

In Bolivia, the amount of cocaine HCl and base seized has been increasing since 2001 and amounted to 14 metric tons in 2006, a 27 per cent increase compared to 2005. Typically, in Bolivia, a relatively small portion of the seizures is cocaine HCl, and the vast majority is coca paste and cocaine base.

Ecuador, sandwiched between the two large cocaine producers Colombia and Peru along the Pacific coast, is thought to be an important transit country for cocaine. Seizures of 43 metric tons in 2005 and 38 metric tons in 2006, which in both years surpassed the combined seizures of Bolivia and Peru, confirm this assumption.

In 2005, Governments reported the destruction of 5,737 clandestine coca processing laboratories globally (excluding coca maceration pits), a four-fold increase since 2000, when only 1,314 destroyed laboratories were reported. In addition to clandestine laboratories destroyed, the Governments of Bolivia and Peru reported the destruction of large numbers of coca maceration pits.

Bolivia, Colombia and Peru reported over 99% of all clandestine coca processing laboratories destroyed worldwide in 2005, which reflects that almost the complete cocaine production chain, from coca paste to cocaine base and finally cocaine HCl, takes place close to the cultivation areas in Bolivia, Colombia and Peru. An analysis by type of laboratory reveals that laboratories in Bolivia and Peru, with very few exceptions, produced coca paste and cocaine base, whereas in Colombia a substantial number of clandestine laboratories produced cocaine HCl. Preliminary figures for 2006 show a similar pattern. Out of 2,065 coca processing laboratories destroyed in Colombia in 2006, about 10% (202) were cocaine laboratories, while in Bolivia, only 3 out of a total of 4,070 laboratories were exclusively processing cocaine.

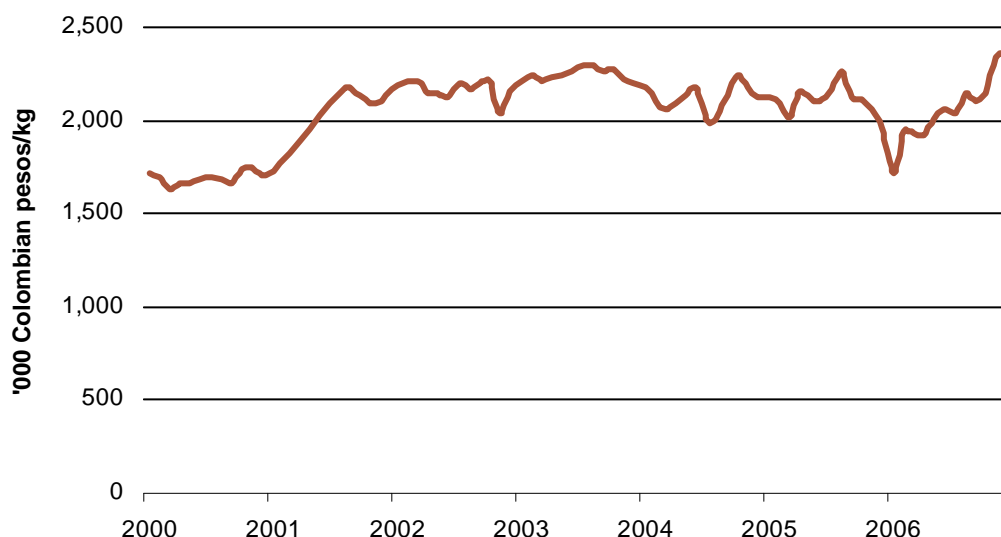
The discovery of clandestine cocaine laboratories outside the coca cultivating countries demonstrates that a small amount of cocaine is produced in other countries as well. However, a large majority of the 210 clandestine cocaine laboratories destroyed in 2005 worldwide were located in Colombia (163), a further 33 in other South American countries, and only 14 in other parts of the world, such as Spain (11), France, South Africa and the United States of America (one each).

4 FARM-GATE PRICES OF COCA PRODUCTS

Overall, prices for coca-related products in Colombia have been remarkably stable over the last five years in the case of coca paste and for an even longer period in the case of cocaine HCl. While wholesale prices for cocaine HCl in Colombian pesos fell for the second consecutive year, it was the first time in three years that it fell in US dollars. It is noteworthy that over the last 16 years, the national average cocaine HCl prices in US dollar terms have remained in a relatively narrow range between US\$ 1,350 and US\$ 1,860 per kg. As most of the cocaine HCl from Colombia is meant for export, US dollar prices for cocaine HCl may give a good insight into the dynamics of the international illicit drug market, as far as prices are concerned.

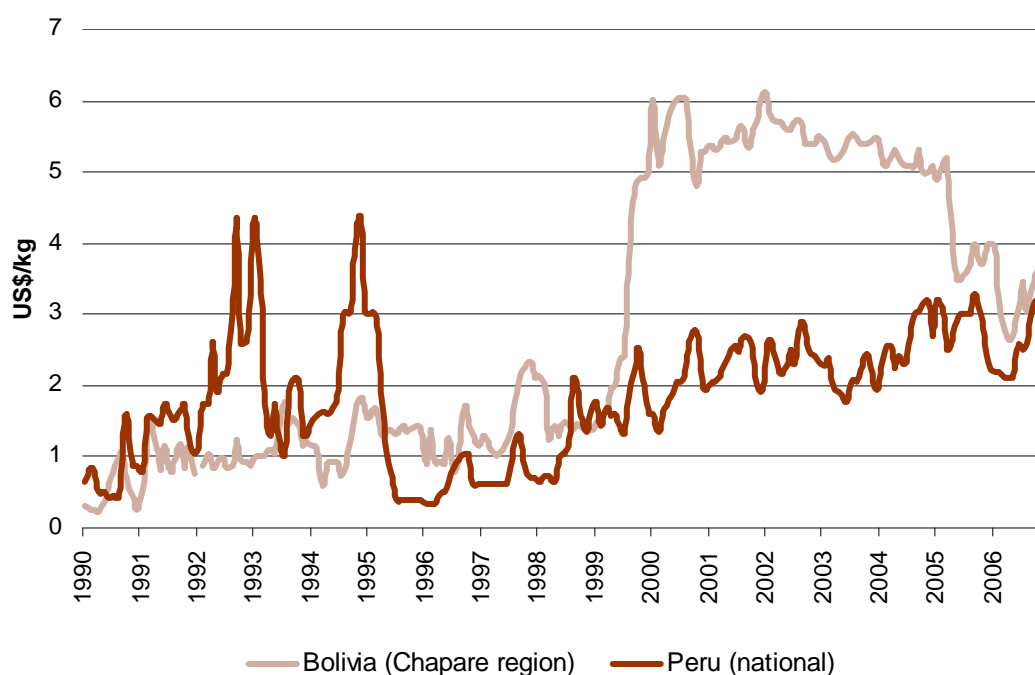
In Colombia, the yearly average price for coca paste (US\$ 879/kg) and cocaine HCl (US\$ 1,762/kg) in 2006 decreased by 2 and 4 per cent respectively, compared to 2005. However, the annual average hides a price increase by 38% from a five-year low of 1,714,000 pesos in January 2006 to 2,360,000 pesos in December 2006, which is the highest monthly average observed since the start of price monitoring in 2000. The monthly fluctuations in the price of coca paste can partly be attributed to the eradication campaigns leading to a temporary breakdown of the local illicit market in the affected regions.

Figure 7: Monthly average farm-gate prices of coca paste in Colombia ('000 COP/kg), 2000 to 2006



In Peru, farm-gate prices for sun-dried coca leaf declined from a national average of US\$ 2.9/kg in 2005, to only US\$ 2.5/kg in 2006. This decline was observed in all cultivation regions. The monthly average prices for sun-dried coca leaf at the farm-gate in 2006 remained in the price range of US\$ 2-3/kg observed since 2001. However, regional and seasonal price differences continued to be present. In 2006, wholesale prices for coca paste and cocaine HCl fell by 14 per cent and 8 per cent respectively compared to 2005, similar to the prices for sun-dried coca leaf.

Figure 8: Monthly average farm-gate prices of sun-dried coca leaf in Bolivia and Peru (US\$/kg), 1990 to 2006



In Bolivia, farm-gate prices for sun-dried coca leaf fell below the already low prices of 2005 and remained at an average of US\$ 3.9/kg well below the price level of over US\$ 5/kg reached 2000 to

2004. The even sharper decrease in price of 22 per cent in Chapare can be attributed to the greater availability of coca leaf on the illicit market due to higher production, despite government efforts to prevent coca leaf trading outside the market authorized by the government. Prices for coca leaf in Bolivia continued to be considerably higher than in neighbouring Peru. It is interesting to note that coca leaf prices in Bolivia and Peru followed a roughly similar trend during the last two years.

5 FARM-GATE VALUE OF COCA CULTIVATION

Farm-gate values of coca cultivation in Bolivia and Peru are based on potential sun-dried coca leaf production. For Colombia, the farm-gate value is based on the potential production of each product sold by the farmers (fresh coca leaf, coca paste or cocaine base). The farm-gate values constitute a gross value, without taking into account the expenses farmers incur for herbicides, pesticides, fertilizers, wages and other agricultural inputs.

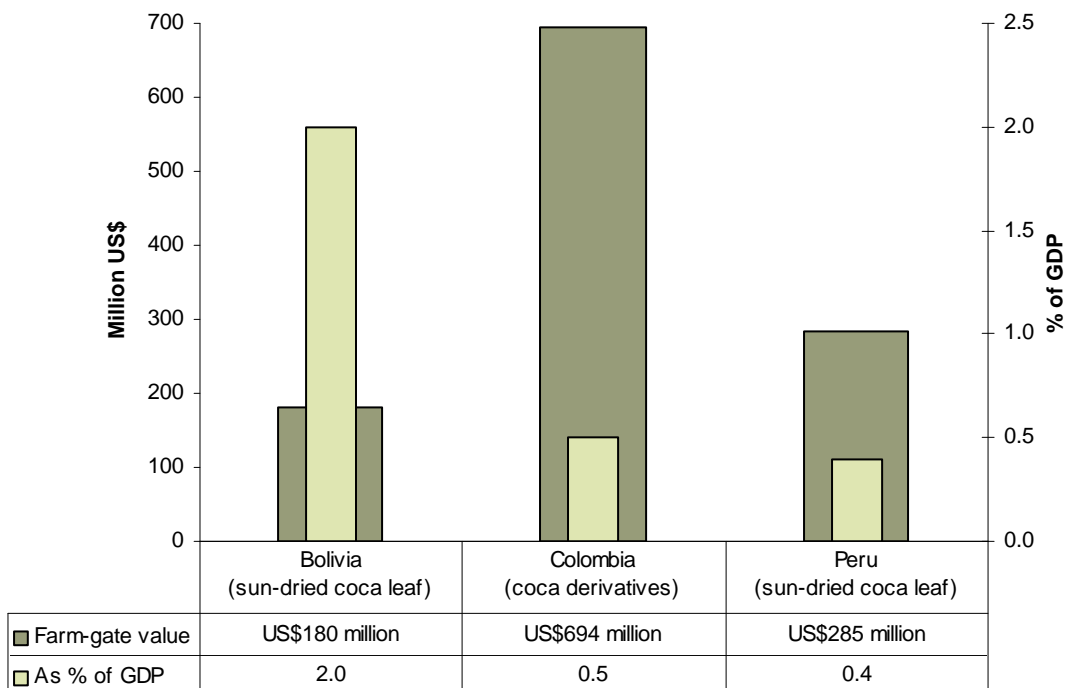
In 2006, the farm-gate value of coca products in Colombia decreased by 18 per cent from US\$ 843 million in 2005 to only US\$ 694 million in 2006. This was due to an overall lower production of coca leaf as a consequence of the reduced cultivated area in combination with a decrease in farm-gate prices of coca products.

In Peru, the increased coca leaf production could partly compensate the price decrease of sun-dried coca leaf. The farm-gate value of coca leaf still decreased by 7 per cent and reached only US\$ 285 million in 2006.

In Bolivia, the farm-gate value of sun-dried coca leaf remained with US\$ 180 million at the 2005 level, despite a strong production increase by 12 per cent. The main reason was the sharp decline in farm-gate prices of coca leaf.

By and large, the economic importance of the farm-gate values, expressed as a proportion of the GDP, remained unchanged in Bolivia and Peru. In Colombia, the percentage figure of the farm-gate value as a proportion of the GDP fell from 0.7 per cent in 2005 to only 0.4 per cent in 2006. Both, the growth of the Colombian economy and a declining farm-gate value contributed to this development.

Figure 9: Potential farm-gate value of coca cultivation, 2006



Source: GDP of 2006 as reported/estimated by the respective Government.

PART 2. BOLIVIA

FACT SHEET – Bolivia Coca Survey for 2006

	2005	Variation on 2005	2006
Coca cultivation	25,400 ha	+8%	27,500 ha
<i>Of which</i>			
<i>in the Yungas of La Paz</i>	18,100 ha	+4%	18,900 ha
<i>in Chapare</i>	7,000 ha	+19%	8,300 ha
<i>in Apolo</i>	300 ha	0%	300 ha
<i>Of which permitted by Bolivian law 1008</i>	12,000 ha		12,000 ha
<i>non-permitted by Bolivian law 1008</i>	13,400 ha	+16%	15,500 ha
<i>Of which in national parks</i>	1,950 ha	+18%	2,298 ha
Average annual sun-dried coca leaf yield			
in Chapare	2,764 kg/ha		2,764 kg/ha
in the Yungas of La Paz	1,300 kg/ha		1,317 kg/ha
in the Yungas, traditional coca growing areas	1,220 kg/ha		1,220 kg/ha
Production of sun-dried coca leaf	43,000 mt	+12%	48,000 mt
Potential production of cocaine	80 mt	+18%	94 mt
in % of global cocaine production	8%		10%
National weighted average farm-gate price of coca leaf (outside state-authorized market)	US\$ 4.3/kg	-10%	US\$ 3.9/kg
Chapare average farm-gate price of coca leaf	US\$ 4.1/kg	-27%	US\$ 3.2/kg
Total farm-gate value of coca leaf production	US\$ 180 million	0%	US\$ 180 million
GDP ⁴	US\$ 8.4 billion	+3.5%	US\$ 8.7 billion
Farm-gate value of coca leaf production in per cent of GDP	2.10%		2.00%
Value of agricultural sector GDP	US\$ 1.5 billion		US\$ 1.37 billion
Farm-gate value of coca leaf production in % of value of 2006 agricultural sector	12%		13%
Reported seizure of cocaine paste	10,152 kg	+26%	12,779 kg
Reported seizure of cocaine hydrochloride	1,300 kg	+1%	1,309 kg

⁴ GDP of the respective year as reported by the Government.

ABBREVIATIONS

Bs.	Bolivianos (Bolivian Currency)
CONALTID	Bolivian National Council for Fighting against Drugs
DIGCOIN	Bolivian National Direction of Coca Leaf Control and Industrialization
DIGECO	Bolivian National Direction of Coca Leaf Commercialization (up to 2005)
DIGPROCOCA	Bolivian National Direction of Development for Coca Growing Areas
DIRECO	National Direction of Agricultural Re-conversion (up to 2005)
FELCN	Special Force against Drug Trafficking
GCP	Ground Control Point
GIS	Geographical Information Systems
GPS	Global Positioning System
ICMP	UNODC Illicit Crop Monitoring Programme
UNODC	United Nations Office on Drugs and Crime

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This report and other ICMP survey reports can be downloaded from:

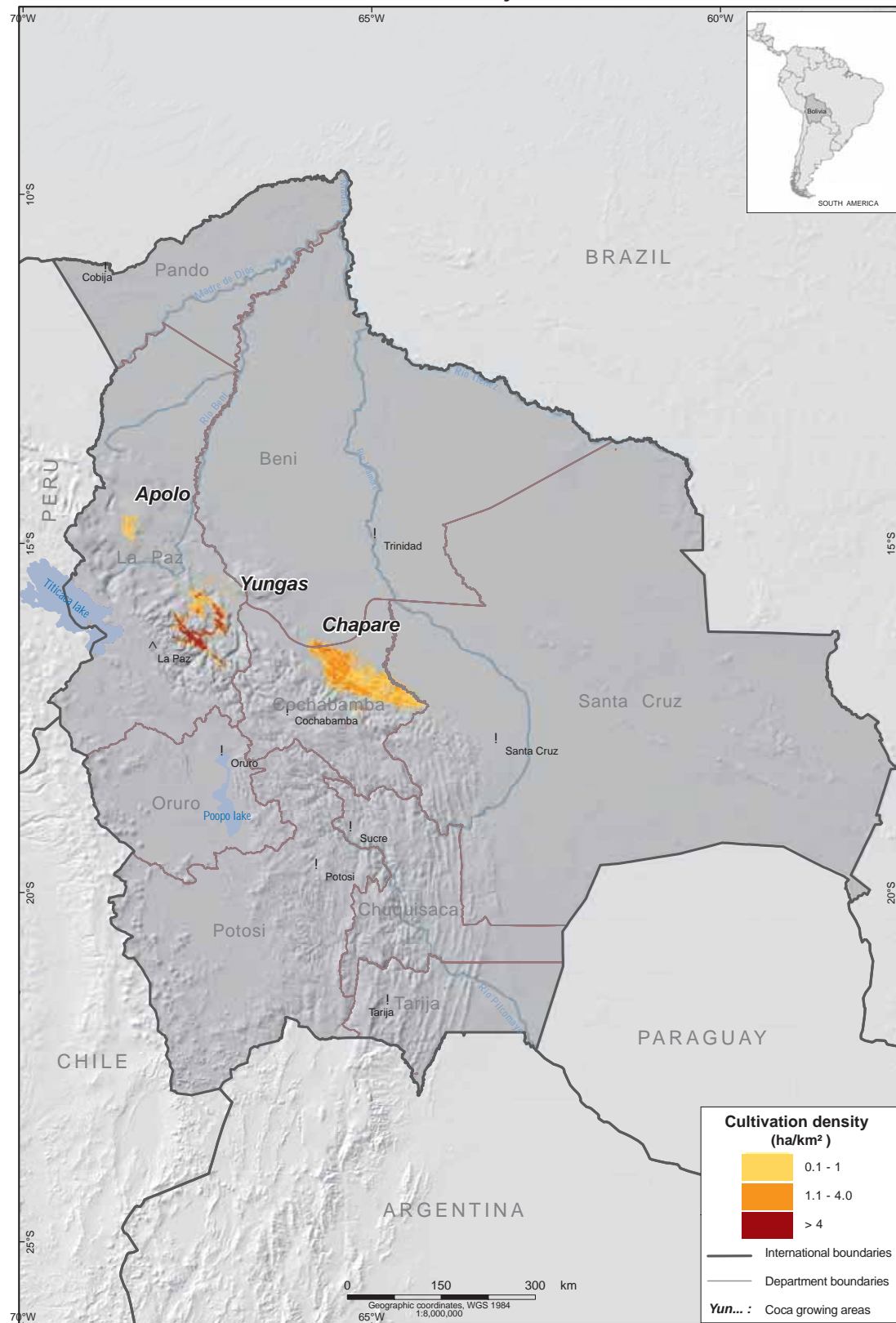
www.unodc.org/unodc/en/crop_monitoring.html

Photo credits: UNODC BOL/F57 project or otherwise indicated.

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Map 6: Coca cultivation density in Bolivia, 2006



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

1 INTRODUCTION

The objectives of UNODC's Illicit Crop Monitoring Programme (ICMP) are to establish methodologies for the collection and analysis of data on illicit crops and to improve Governments' capacity to monitor these crops in the context of the strategy adopted by Member States at the General Assembly Special Session on Drugs in June 1998. ICMP is currently active in seven countries: Afghanistan, Bolivia, Colombia, Lao PDR, Morocco, Myanmar and Peru.

The Bolivian Government and UNODC launched the project "Land use management and monitoring system in the Yungas of La Paz" in October 2001. Initially, the project focused only on the Yungas of La Paz, but since 2003 it has extended its scope to provide estimates on coca cultivation at the national level. This report presents the project's findings and methodology for 2006.

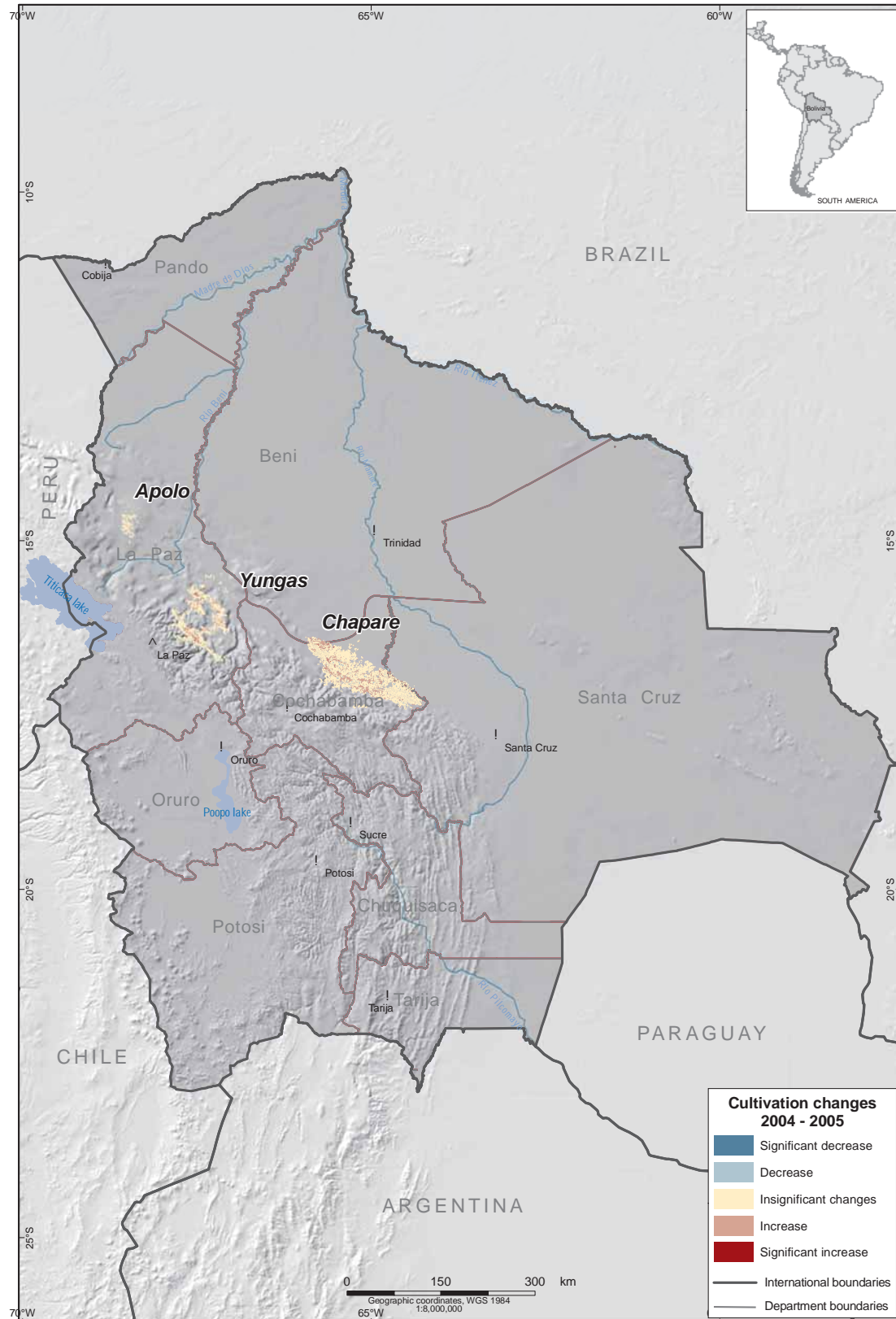
During 2006, the project was implemented in cooperation with the National Direction of Development for the Coca Growing Regions (DIGPROCoca, former DIRECO), Vice-Ministry of Coca and Integral Development. DIGPROCoca provided logistical support during the implementation of ground activities, including the collection of a large number of ground control points, mainly in the Chapare area. The Bolivian National Government, through the National Council of Fight against Illicit Trafficking of Drugs (CONALTID) uses the information provided by this project for planning and implementing its strategy for the fight against illicit drug trafficking.

Coca cultivation decreased significantly in Bolivia at the end of the 1990s, following a significant reduction in the area under coca cultivation in the Chapare region. Bolivia is now the third largest coca producer worldwide, far behind Colombia and Peru. Coca cultivation is concentrated in the departments of La Paz (in the areas of the Yungas of La Paz and Apolo) and in the Chapare area (department of Cochabamba).

Bolivian Law 1008 ("Law on the Regime Applicable to Coca and Controlled Substances", 1988) permits up to 12,000 ha of traditional coca cultivation for traditional consumption and other legal uses. Most of this area is located in the Yungas of La Paz. In addition, in October 2004, the Bolivian Government temporarily authorized the cultivation of 3,200 ha of coca in the Chapare region. Law No 1008 does not provide a precise definition of the geographic limits of the traditional coca growing areas, however, the Bolivian Government is preparing a study which is intended to lead to legal delineations of the areas where coca for traditional use will be cultivated.

The National Government is also planning to develop a study to determine the national coca leaf demand for traditional purposes.

Map 7: Coca cultivation change 2005 - 2006, Bolivia



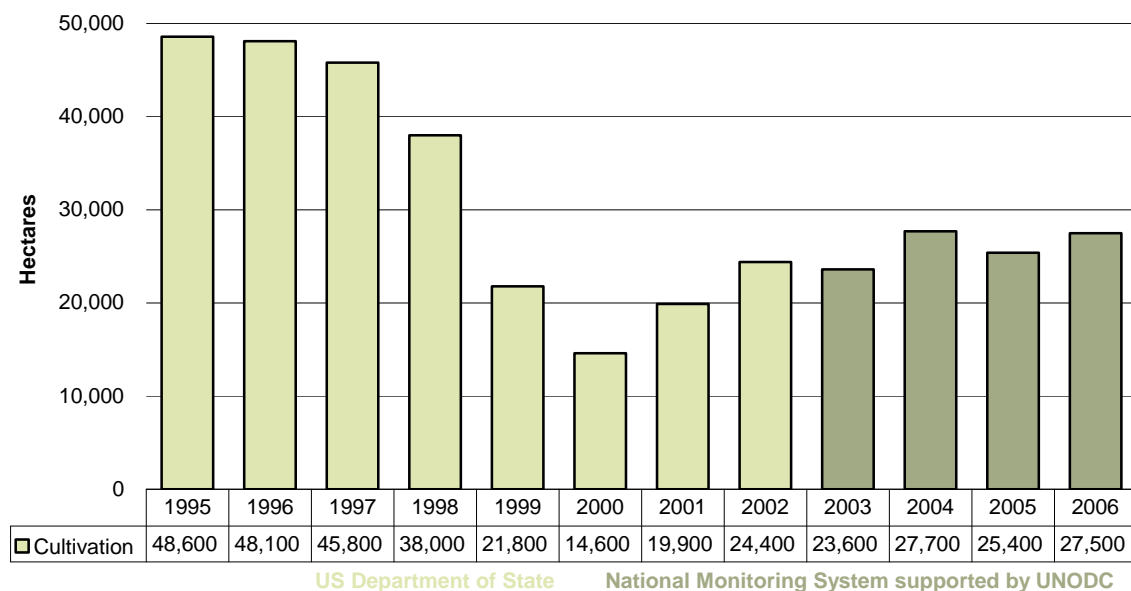
Source: Government of Bolivia - National monitoring system supported by UNODC.
The boundaries and names shown and the designation used on this map do not imply official endorsement or acceptance by the United Nations.

2 FINDINGS

Coca cultivation

In 2006, the total area under coca cultivation in Bolivia was estimated at 27,500 ha, an increase of 8% over last year's estimate of 25,400 ha. The increase at the national level was due to the increase in the main cultivation regions, Yungas of La Paz and Chapare. In the Chapare region, the increase occurred mainly in the North-West part, in the surroundings of and inside the Isiboro Secure National Park. The significant increase inside the Park could be attributed to the absence of eradication during 2006 in this isolated area (see map 10). In the Yungas of La Paz, low levels of eradication combined with migration processes from the impoverished areas of Bolivia to the Yungas of La Paz are the reason for a continued increasing trend since 2002.

Figure 10: Coca cultivation in Bolivia, 1996 – 2006 (ha)



At the global level, the increases in Bolivia and Peru were more than offset by an even stronger decrease in Colombia, and coca cultivation in the Andean region declined by 2% to 156,900 ha. Coca cultivation in Bolivia represented 18% of the global coca cultivation in 2006, compared to 16% in 2005. Bolivia remained the third largest coca cultivator, behind Colombia and Peru.

Regional analysis

An increase in coca cultivation at the national level, from 25,400 ha to 27,500 ha or 8% is the result of the combined increase in the Chapare and Yungas areas.

In most of the Chapare region, farmers are cultivating an average of 0.16 ha of coca, locally called “cato”, which is the surface allowed according to an agreement reached between the Government and social organizations of coca farmers in October 2004. Nevertheless, in some isolated regions, bigger fields were found. Unlike what happened in the year 2005, the eradication efforts in Chapare were followed by a replanting, mainly in the Isiboro Secure National Park.

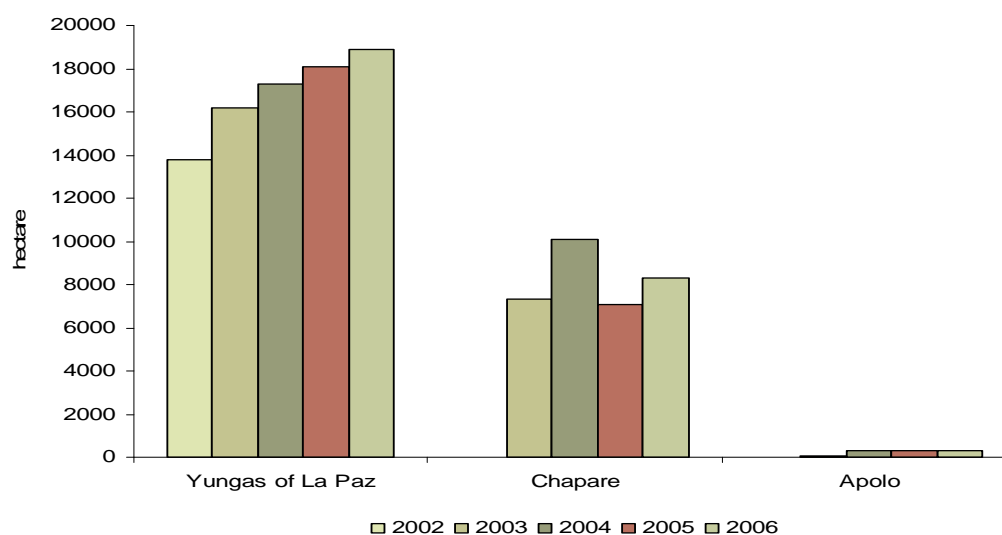
Aerial photographs and geo-videos taken over Chapare during the survey clearly show the trend to cultivate coca on fields with the size of one *cato* in most parts of this region.

In both the Yungas and Chapare regions, new cultivation occurs mainly in isolated places, where controls and eradication are difficult to implement.

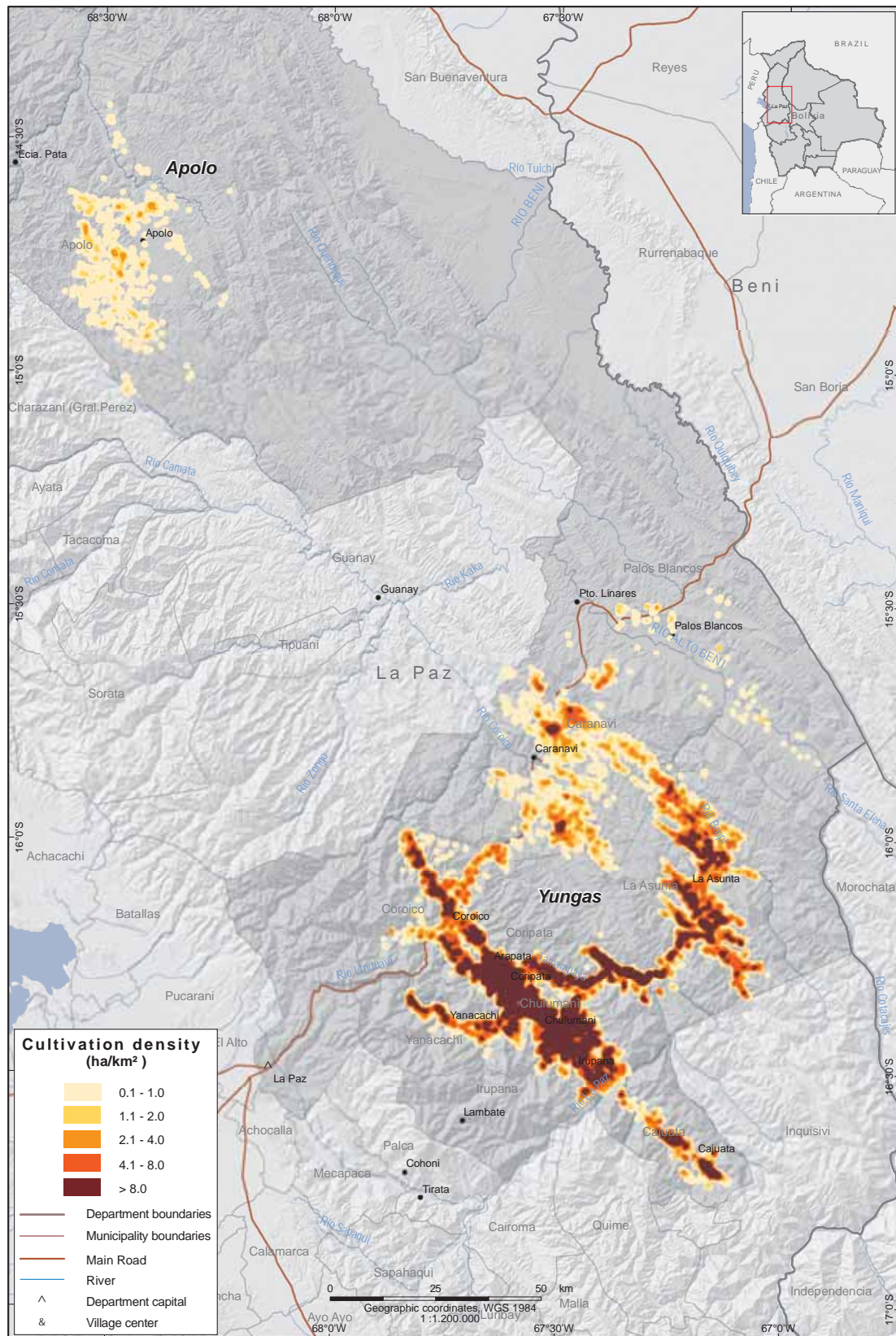
Table 3: Coca cultivation estimates by region, 2002 – 2006 (ha)

Region	2002	2003	2004	2005	2006	% change 2005-2006	% of 2006 total
Yungas of La Paz	13,800	16,200	17,300	18,100	18,900	4%	69%
Chapare	n.a.	7,300	10,100	7,000	8,300	19%	30%
Apolo	n.a.	50	300	300	300	0%	1%
Country total		23,550	27,700	25,400	27,500	8%	100%

Figure 11: Coca cultivation estimates by region, 2002 – 2006 (ha)



Map 8: Coca cultivation density in the Yungas of La Paz and Apolo, Bolivia, 2006



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

Coca cultivation in the Yungas of La Paz

The Yungas of La Paz, situated at about 150 km from the city of La Paz, at the eastern side of the Andes Range, is a region of uneven relief with steep slopes, turbulent rivers and elevations ranging from 300 to 4,000 meters above sea level. Significant climatic variations are observed even over short distances. Coca bush is predominantly cultivated on narrow terraces built on high gradient hills.

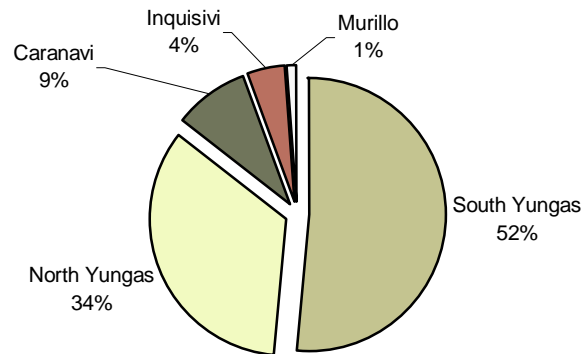


Coca cultivation in the municipality of La Asunta

The survey revealed 18,900 ha of coca cultivation in the Yungas of La Paz in 2006, representing an increase of 4% compared with the 18,100 ha found in 2005. Most of the cultivation continued to take place in the provinces of South Yungas and North Yungas, accounting respectively for 52% and 34% of the regional total. The largest annual increase (24%) was observed for third year in a row in Caranavi province, but this province only accounted for 9% of the regional total in 2006. It has been the fifth consecutive annual increase observed by the monitoring project in the Yungas of La Paz. Between 2002 and 2006, coca cultivation increased by 37% in this region.

Table 4: Distribution of coca cultivation in the Yungas of La Paz, 2002 - 2006 (ha)

Province	2002	2003	2004	2005	2006	% change 2005-2006	% of 2006 total
South Yungas	7,182	8,356	8,867	9,395	9,753	4%	52%
North Yungas	5,187	5,914	6,166	6,257	6,432	3%	34%
Caranavi	491	889	1,248	1,381	1,714	24%	9%
Inquisivi	741	801	805	807	809	0%	4%
Murillo	151	210	217	223	225	1%	1%
Rounded total	13,800	16,200	17,300	18,100	18,900	4%	100%

Figure 12: Distribution of coca cultivation in the Yungas of La Paz, 2006 (ha)

Bolivian Law 1008 (“Law on the Regime Applicable to Coca and Controlled Substances”, 1988) permits up to 12,000 ha of traditional coca cultivation for traditional consumption and other legal uses. Most of this area is located in the Yungas of La Paz, although the law does not provide for a geographic delimitation of the traditional coca cultivation area. Most of the coca leaf produced in the Yungas of La Paz is traded through the coca market, controlled by DIGCOIN, of Villa Fatima in La Paz-city.

Only a small amount of coca fields were eradicated in Yungas in 2006. In this region, once again, it was observed that there were settlements emerging, mainly populated with people coming from the Altiplano (La Paz, Potosi, Oruro, etc). These new settlements were established in previously uninhabited areas of La Asunta and Caranavi, and their primary agricultural activity was coca cultivation.

A study on coca leaf yield conducted by UNODC and the Government in the Yungas in 2006 confirms that farmers were using more sophisticated agricultural techniques in their coca fields, employing more fertilizers, pesticide and mechanical irrigation to improve the yield of their coca fields. In Caranavi, new coca fields established at the expenses of the primary forest or coffee plantations, benefited from higher yields due to the richer soils.

Figure 13: 3-D view in South Yungas of La Paz, 2006




3-D Visualization of satellite image showing coca cultivation in steep slopes




Photo corresponding to the 3-D visualization


Figure 14: Example of the evolution of the coca cultivation in La Asunta Chica

In 2002

 coca fields in 2002

In 2006

 coca fields in 2002

 new coca fields 2003-2006



Coca cultivation techniques in the Yungas of La Paz

1. Burning of land and soil preparation: The burning of land often takes place during the dry season (May to August), but it can also happen until the month of December if the weather conditions are suitable.



2. Terraces construction: Most of the coca fields are established on wuchus (terraces) to avoid erosion and soil nutrients loss. This practice prolongs the life of the crop. The width of the terraces varies from forty-five centimeters to one meter, depending on the slope. The lines of furrows for coca cultivation are established transversally to the slope direction. This practice is widely used in traditional areas, while in the rest of the Yungas, terraces are not built.



The width and shape of the wuchus varies according to the slope and structure of the terrain.

3. Seedling and transplant: The coca seeds are obtained from plants of 5 years old or older. The seeds are settled in a seedling nursery of rich soil and abundant irrigation. They are protected from the sun for about 4-6 weeks before their transplantation to the field.

Coca seeds



Young plants are carefully transplanted into the new field



4. Young crop and first harvest: The small plants are carefully planted in the field, at a distance of 20 cm between each other. During the first few days, they are continuously irrigated. A new crop produces its first harvest usually 12 months after the transplantation, but there have been reports of fields harvested as soon as 8 months after transplantation thanks to the use of fertilizer.



In the Yungas of La Paz, harvest of coca fields is mainly done by women and children.

5. Maintenance: In the Yungas of La Paz, a phytosanitary treatment is applied to coca bushes using fertilizers, and pesticides. Irrigation is also widely used. Typically, the pesticides are applied to the bushes right after the harvest, in order to protect the crop from a variety of plagues, including larvae, fungus and ants. At 4-5 years old, the plant is totally pruned, leaving only the base of the trunk. This practice, known as *pillu*, greatly increases the yield of the crop starting from the next harvest, which is produced after 6-8 months. The life of a coca field is about 30 years.

*-



The intensive use of chemical pesticides, and foliar fertilizers may produce coca leaves which are not suitable for traditional consumption like *Akulliku* (mastication) and tea preparation.

The bottom photo shows organic fertilizer that was applied to coca plants 3 months after pruning.



Mechanical irrigation is widespread in coca fields.



Example of *pillu* (pruning) in a more than 20 year old coca field. The large trunks at the base reveal that several *pillus* have been practiced to this plants



6. Drying and transport of the leaves: Drying is done carefully to protect the leaves and maintain their quality. After the harvest, the fresh coca leaves are stored for at least one night in the dark and after that spread for sun drying. In the traditional area, the leaves are spread over a special floor built of dark stones called *cachi*. The *cachi* accelerates considerably the time of drying. In other areas, the leaves are spread over agricultural nets. If the coca leaves are spread right after the harvest, they become damaged and their value reduces drastically. If rain comes over the drying coca leaves, or the farmer picks them up before complete drying, the leaves are also damaged.



Coca leaves sun-drying in a *cachi*



Dried coca leaves being packed for further transport and sale

Coca cultivation in Apolo

Apolo is located at the northern part of the department of La Paz, on the eastern edge of the Andean mountain range. With relatively dry weather conditions and poor soils, coca fields in Apolo often have a low yield and are cultivated for only for about three to five years.

In 2004, DIRECO conducted a cadastral survey of coca cultivation in the Apolo region, measuring in situ all the coca fields located in the region. The DIRECO survey revealed that coca cultivation reached 289 ha in 2004. The UNODC/Government project monitored Apolo completely for the first time in 2004, finding 273 ha of coca cultivation.

In 2006, no imagery was acquired in the Apolo region. A field verification was undertaken in September. Some increase in coca cultivation was observed, mainly in the southern part of the Province Franz Tamayo, in areas with fragile ecosystems, while in other parts of Apolo, the team found some abandoned coca fields. New coca fields were located in areas where there used to be primary forest, on both sides of the Camata River, along the border of the provinces Franz Tamayo and Bautista Saavedra. These new coca fields do not represent a significant cultivated surface yet; however, due to the risk of a potential expansion, the project will continue monitoring this area in the coming years.

Table 5: Coca cultivation in Apolo region, 2003 and 2006 (ha)

Province	Municipality	2003	2004	2005	2006	% change 2005 - 2006
Franz Tamayo	Apolo	50	300	300	300	0%

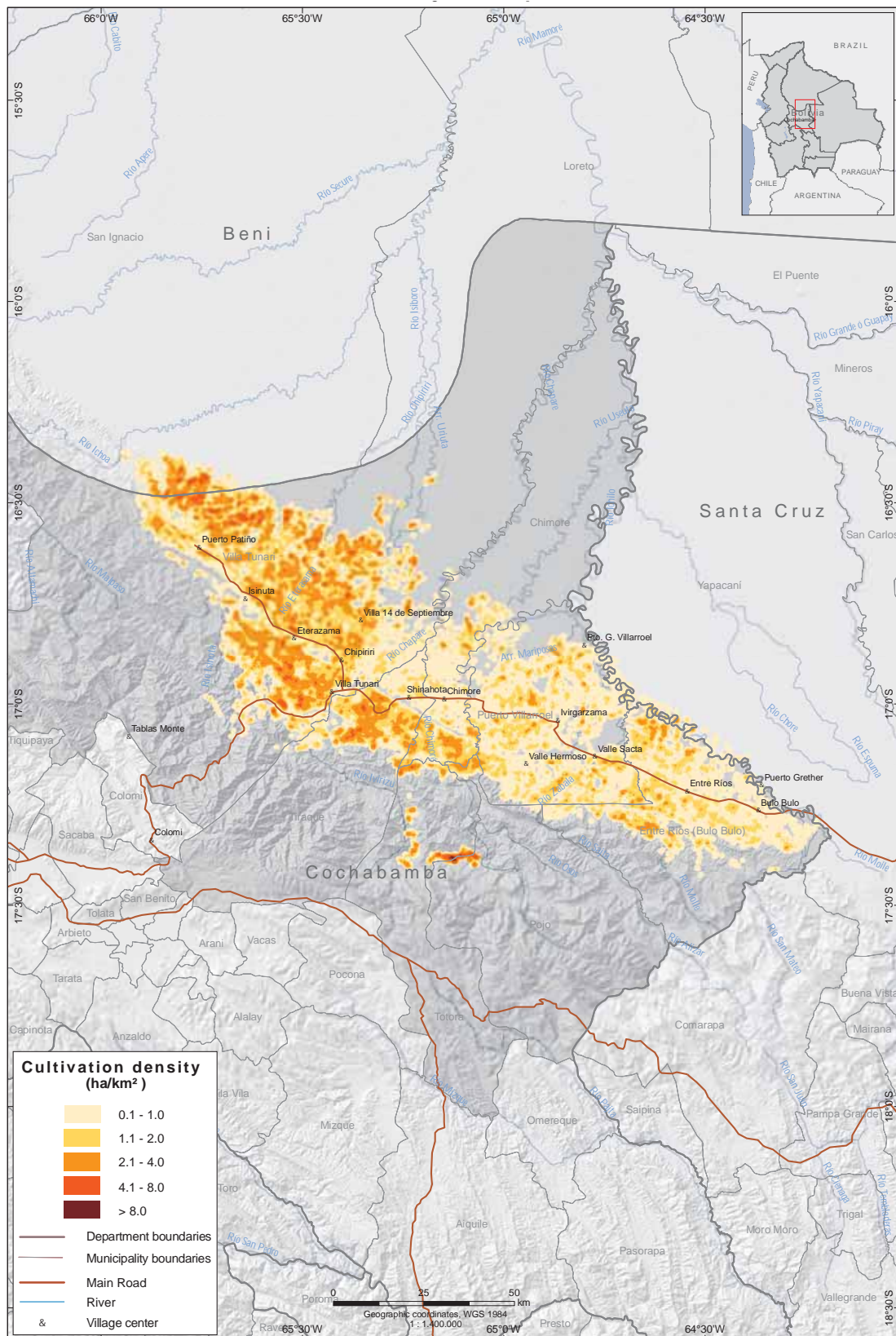
Coca cultivation in Apolo region is traditionally associated with cassava to take advantage of the same furrow for two different crops. The coca fields in central Apolo are scattered and relatively small (about 200 m²) compared to the new coca fields found in the southern part or elsewhere in the country. Terraces are not used. The coca cultivation techniques and coca leaf sun drying are similar to techniques used in the Yungas area of La Paz.

The northern part of Apolo is part of the Madidi National Park, the largest biosphere reserve in Bolivia. Only a few dispersed and small coca fields were found on the western side of the Madidi Park. In Apolo, coca cultivation is considered traditional according to law 1008. No eradication is undertaken in this area.



Expansion of coca cultivation at the southern part of Franz Tamayo Province, along the Camata River

Map 9: Coca cultivation density for Chapare, Bolivia 2006



Source: Government of Bolivia - National monitoring system supported by UNODC.
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Coca cultivation in Chapare

The Chapare region is situated in Cochabamba department, and the region is also referred to as the Cochabamba tropics, extending over the provinces of Chapare, Carrasco and Tiraque. In contrast to the Yungas of La Paz, Chapare region has moderate slopes and huge rivers. Elevations vary from 300 to 2500 meters, with coca cultivated between 300 and 1000 meters. The highest mountains are located in the south and the country's large tropical savannas begin in the northern part of Chapare. Temperatures are tropical and the area records the highest precipitation levels in Bolivia.

In the 1990s, the Chapare region held the largest amount of coca cultivation, but following sustained eradication efforts and alternative development programmes, cultivation decreased dramatically.

Table 6: Distribution of coca cultivation by province in Chapare region, 2003-2006 (ha)

Province	2003	2004	2005	2006	% change 2005-2006	% of 2006 total
Chapare	4,250	5,844	4,094	4,857	19%	59%
Carrasco	2,864	3,520	2,312	2,791	21%	34%
Tiraque	214	723	605	691	14%	8%
Rounded Total	7,300	10,100	7,000	8,300	19%	100%

The 2006 survey found 8,300 ha of coca cultivation in Chapare, representing an increase of 19% compared to the 7,000 ha found in 2005. The increase is mainly due to the planting of new coca bushes inside the Isiboro Secure National Park, where no eradication was undertaken during 2006. In Chapare, the average field size is around 0.16 ha. This is in line with an agreement signed between the coca farmers and Government in October 2004, which temporary authorizes 3,200 ha of coca cultivation in Chapare, and the current Government policy of authorizing one *cato* (0.16 ha) of coca per household. The aerial photographs and field missions revealed that a significant number of coca fields were the size of a *cato*.



Aerial photo with interpreted coca fields of *cato* size

Between 2005 and 2006, coca cultivation increased in all three provinces of Chapare. It should be noted that political boundaries are not properly defined between the departments of Cochabamba and Beni. For this reason, although some coca cultivation might actually be located in Beni Department, all the coca fields identified during the survey along the undefined departmental border were counted as part of the municipality of Villa Tunari, in the Department of Cochabamba.



Coca field of *cato* size

In past years, farmers in Chapare used to intersperse or hide coca bushes in order to avoid detection and eradication. These practices are not very common nowadays because of the “cato” policy, and most coca fields were found were free of association with other crops. It is generally accepted that coca cultivation is done with much more care in Yungas than in Chapare, and the techniques of cultivation differ from the ones used in Yungas. For example, the seedbeds in Chapare are usually not covered.



Encircled in red are seedlings prepared for transplantation in recently cleared field

Since the terrain is flat, there is no need to build terraces. The coca bushes in Chapare are bigger than in Yungas. The practice of pruning coca bushes does not exist. This could be due to the intensive eradication of the past years, resulting in most of the coca fields being younger than four years old.



Harvesting a coca field free of association or coverage

Association with other crops or coca cultivated under canopy was a common practice in past years, but it is now only present in certain areas of Chapare. The association of coca with other crops is sometimes done to take advantage of the same open space, or coca is placed under leguminous trees, which fix nitrogen in the soil, resulting in an improved yield.

In Chapare, the coca leaves are also sun-dried on bare floor before commercialization, but not with the same care as in the Yungas. According to FELCN, part of the production is marketed outside the region and another part is used for local consumption (chewing and medicines).

Coca bushes in Chapare may last on average 30 years if they can develop undisturbed. Isolated, scattered old plants of big dimensions have been observed, still yielding substantial quantity of coca leaves. Fertilizers and pesticides are also widely used in the Chapare.

Coca yield and production

In December 2005, UNODC started a new coca yield study in the Yungas of La Paz. The survey was implemented jointly by the UNODC Illicit Crop Monitoring Programme through its experts in Bolivia and in Vienna. The field work was implemented by researchers from the Unidad Academica Campesina (UAC) of Carmen Pampa, Yungas de La Paz.

During the survey, samples of sun-dried coca leaf were weighted from 98 coca parcels selected randomly across the region. To determine the sun-dried coca yield in the Yungas of La Paz, the Bolivian survey is based on a "Multistage Stratified Area Frame Sample Design".

Sampling frame

As in any survey, the quality of the data collected from the sample surveys depends to a large extent on the quality of the sampling frame from which the sample is to be selected. The sampling frame was constructed according to the principles of the Area Sampling Frame methodology. The basis for the construction of the frame was the coca fields interpreted during the 2004 Coca Cultivation Survey in the Yungas in Bolivia. Within the limits of coca cultivation interpreted in this survey, the frame was divided in a collection of one km² grids.

Stratification

Most surveys estimating crop production are based on stratified multistage cluster designs. Stratification divides the units in the population into mutually exclusive and collectively exhaustive subgroups or strata. Separate samples are then independently selected from each stratum. The main purpose of stratification is to improve the precision of the survey estimates. Therefore, the construction of the strata should be such that units in the same stratum are as homogeneous as possible and units in different strata are as heterogeneous as possible with respect to one or more characteristics of interest to the survey.

Based on previous experience acquired on site by the project team and by the researchers of Carmen Pampa University, the variables that have been considered for stratification were slope and altitude. These two variables were combined and used as the basis for the stratification of the sampling frame.

Sample size and sampling allocation

The sample size was decided taking into account the desired precision of the estimates, the constraint of verification of all steps of the survey, the necessity to obtain estimates at the regional level, and the availability of the field researchers to reach the fields. The precision of an estimate is measured by its standard error. The degree of precision required for the coca yield was set at about +/- 10% of the true value with a 95 per cent probability that it contains the true value.

The sample size was defined so that a thorough verification process could be performed at any time and at every step of the implementation. This assured the high quality of the data collected and the confidence of the estimates generated.

The table below summarizes the sample frame along the different strata.

Table 7: Coca yield stratification in the Yungas of La Paz

Stratum	Strata definition		Grids	Coca hectares (2004)	Number of coca polygons	No. of samples
	Elevation (m)	Slope (Degrees)				
1	300-1000	0-15	490	1,455	3,890	10
2	300-1000	15-38	11	47	109	10
3	1000-2000	0-15	1,563	10,418	28,124	45
4	1000-2000	15-38	496	3,580	8,246	15
5	> 2000	0-15	170	780	2,368	10
6	> 2000	15-38	163	599	2,080	10
Total			2,893	16,880	44,817	100

**Measuring a sample coca field****Weighting a sample of recently harvested fresh leaves*****New findings on coca yield in the Yungas of La Paz***

The averages presented in this section are derived from the field survey, and correspond to the simple averages found in the survey sample, extrapolated to the full extent of the sampling frame.

From the analysis of the collected data, the annual sun-dried coca leaf yield was estimated at 1,300 kg/ha. The highest annual sun-dried coca leaf yield was found in stratum 1 (elevation between 300 and 1,000 meters, and slope less than 15 degrees), and the lowest annual sun-dried coca leaf yield was found in stratum 5 (elevation greater than 2,000 meters and slope less than 15 degrees). The complete averages are described below.

Table 8: Yield results in the Yungas of La Paz for 2005 and 2006

Strata	Coca surface (ha)		% Increase	No. of samples	2005 weighted average yield mt/ha/Year	2006 weighted average yield mt/ha/year	Estimated potential amount of sun-dried coca leaf (mt)	
	2005	2006					2005	2006
1	1,480	1,900	28%	6	2.17	2.17	3,211	4,123
2	48	50	4%	0	1.29	1.29	62	65
3	10,594	10,700	1%	71	1.25	1.25	13,242	13,375
4	4,102	4,200	2%	12	1.21	1.21	4,963	5,082
5	1,111	1,200	8%	6	0.82	0.82	911	984
6	765	850	11%	3	1.49	1.49	1,140	1,267
	18,100	18,900	4%	98	1.300	1.317	23,530	24,895

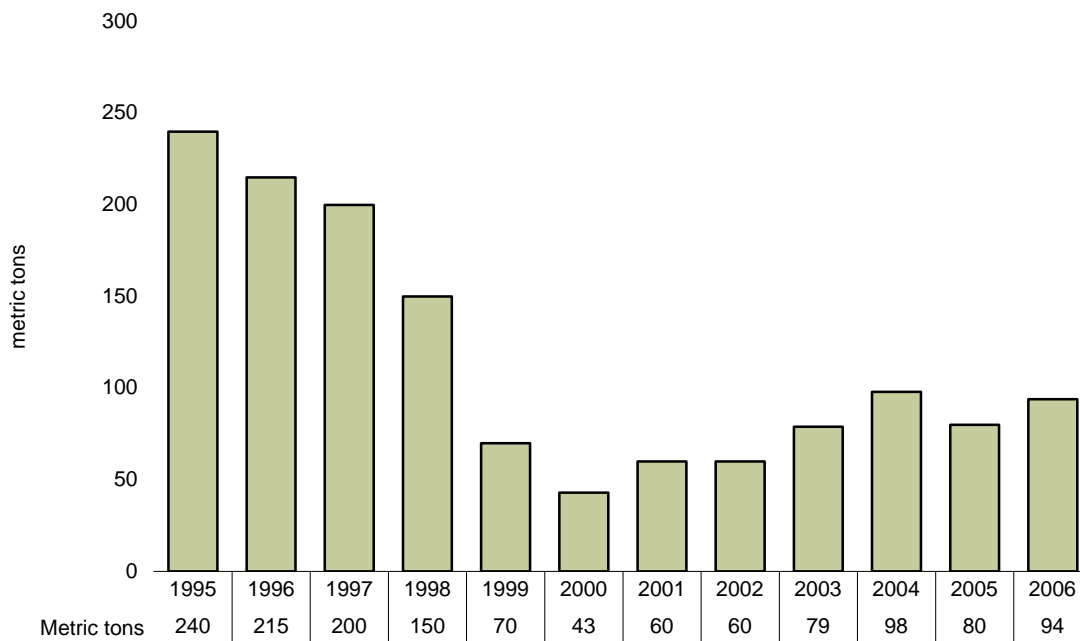
The analysis of the yield survey data concluded that the estimated production of sun-dried coca leaf in the Yungas is approximately 24,895 metric tons in 2006. This would represent an increase of 6% in comparison to 2005, if 2006's annual sun-dried coca leaf yields are applied to the coca cultivation areas estimated in 2005 (the estimated production of sun-dried coca leaf would amount to 23,530 metric tons in 2005).

Law 1.008 authorizes 12,000 ha of coca cultivation in the traditional region. This area is dispersed among the strata 3, 4, 5 and 6. Therefore the weighted sun-dried coca leaf yield for this region in 2006 is estimated at 1.22 metric tons/ha/year. The total estimated production of sun-dried coca leaf under this law is estimated at 14,660 metric tons in 2006.

In the absence of a detailed study on coca leaf in Chapare, coca leaf production in that region was estimated from yield estimates previously used by UNODC, i.e. information from the United States Government obtained under the Operation Breakthrough. Thus, sun-dried coca leaf production in Chapare was estimated at 22,941 metric tons.

Using the above findings, the total potential production of cocaine in the country is estimated at about 80 metric tons of cocaine in 2005 and 94 metric tons in 2006, which represents an increase of 17% from 2005 to 2006.

It should be noted that this estimate represents the potential coca leaf and cocaine production. Due to lack of data, it does not take into account the so far unknown amount of coca leaf from Chapare region destined for local consumption (chewing and medicinal preparation).

Figure 15: Potential cocaine production in Bolivia, 1995 – 2006 (metric tons)

Source: UNODC World Drug Report 2007

In 2006, potential cocaine production in Bolivia accounted for 10% of the global potential cocaine production of 984 metric tons. Although there is an increase compared to 2005, the percentage is much lower than in the mid nineties, when Bolivia accounted for about a quarter of the global cocaine production.

Coca prices and trading

In Bolivia, sun-dried coca leaf trade is regulated by the National Directorate of Coca Leaf Commercialization and Industrialization DIGCOIN (former DIGECO) that controls the quantity and prices of coca leaf traded in the two market facilities authorized by the Government: The market of Villa Fatima in La Paz city and the market of Sacaba in Cochabamba department, close to Cochabamba city.

Of the 13,209 metric tons of coca leaves that fell under the control of DIGCOIN in 2006, the largest amount, 12,960 metric tons or 98%, was traded in Villa Fatima, and the remaining 249 metric tons in Sacaba. Prices of coca leaves in Villa Fatima market were higher than in Sacaba market, with respective annual averages of 32 Boliviano/kg (US\$ 4.0/kg) and 25 Bs./kg (US\$ 3.1/kg). The annual average weighted price for coca leaves on these two markets was 31 Boliviano/kg (US\$ 3.9/kg) in 2006.

Table 9: Reported monthly price of coca leaf marketed through DIGCOIN, 2006

Month	Chapare: Sacaba market	La Paz: Villa Fatima market	Weighted average	
	Price Bs./kg	Price Bs./kg	Bs./kg	US\$/kg
January	27	34	34	4.2
February	26	36	35	4.4
March	24	35	35	4.4
April	23	30	30	3.7
May	19	27	27	3.3
June	28	33	33	4.1
July	28	34	34	4.2
August	22	34	34	4.2
September	28	19	19	2.4
October	28	36	36	4.5
November	22	32	32	4.0
December	22	28	28	3.5
Total	25	32	31	3.9

Source: DIGCOIN

In 2006, DIGCOIN introduced a new way to trade coca leaves by authorizing the direct exchange and sale of coca leaves from coca producers to traditional consumers. According to DIGCOIN, about 196 metric tons of coca leaves have been exchanged under this scheme, out of which 121 metric tons were from Yungas of La Paz, and the remaining 75 metric tons from the Cochabamba Tropics.

Including this new way of trading, a total of 13,081 metric tons were traded from the Yungas, and 324 metric tons from the Chapare. According to the yield study, this is equivalent to an area of 9,931 ha of coca grown in the Yungas of La Paz and 117 ha in the Chapare.

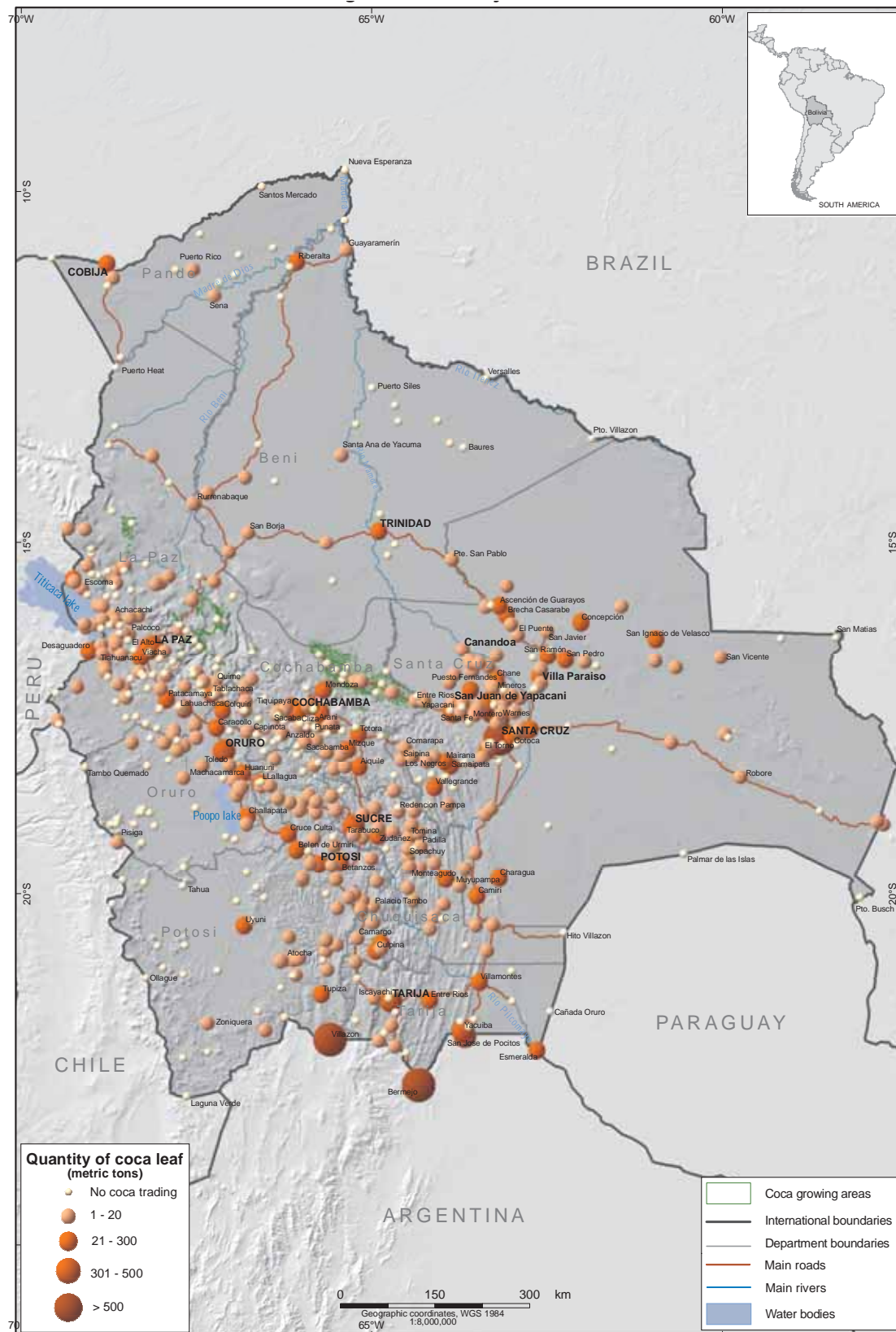
Each trader is authorized by DIGCOIN to trade up to 500 pounds (227 kg) of sun-dried coca leaf per month. DIGCOIN's authorization specifies where the coca leaves are bought (Villa Fatima or Sacaba) and the point of final destination for its retailing. Coca leaf is retailed in packages of maximum 15 pounds (6.8 kg).

The following map shows the distribution of traded coca leaves throughout the country according to the DIGCOIN registry. As in 2005, in 2006, most of the coca leaves ended up in Santa Cruz department, followed by the departments of Tarija, La Paz and Potosi. In Santa Cruz, coca leaves are supplied mostly for the workers of large scale industrial farms of soy beans and sugar canes who use to chew it. Coca chewing is also widespread among miners of the departments of La Paz, Potosi and Oruro. Although not documented, it is likely that an increasing quantity of coca leaves traded in the southern of the country is smuggled to neighboring Argentina.

The total value of the coca leaves traded through the control of DIGCOIN amounted to 415 millions Boliviano or US\$ 51.2 millions in 2006, with no significant variation compared to 2005.

Including the new ways of coca commercialization, between 2005 and 2006, the volume of trade increased by 4% (from 12,872 mt to 13,422 mt), while the average annual prices decreased by 8% (from Bs. 35/kg to Bs. 32/kg). It seems that this market responded to the economic law of supply and demand: when the quantity available for trade increases, prices tend to decrease.

Map 10: Coca leaf trading authorized by DIGCOIN, 2006



Source: Government of Bolivia - DIGECO - National monitoring system supported by UNODC. The boundaries and names shown and the designation used on this map do not imply official endorsement or acceptance by the United Nations.

Farm-gate prices of sun-dried coca leaf have been collected in Chapare on a monthly basis by DIGPROCOCA (former DIRECO) since 1990 and by the UNODC monitoring project in the Yungas of La Paz since 2004. Average annual prices for coca leaf were higher in the Yungas of La Paz with 36 Boliviano/kg (US\$ 4.4/kg) than in the Chapare with 26 Boliviano/kg (US\$ 3.2/kg).

Table 10: Monthly sun-dried coca leaf price in the Yungas of La Paz, 2006

Month	Municipality of Coripata	Municipality of Chulumani	Municipality of La Asunta	Municipality of Caranavi	Average	
	Bs./kg	Bs./kg	Bs./kg	Bs./Kg	Bs./kg	US\$/kg
Jan	35	34	37	37	36	4.4
Feb	35	33	37	37	36	4.4
Mar	34	33	37	37	36	4.4
Apr	33	34	36	37	35	4.4
May	33	35	36	38	36	4.4
Jun	36	35	38	38	37	4.6
Jul	36	35	38	38	37	4.5
Aug	36	35	38	37	36	4.5
Sep	34	34	37	37	36	4.4
Oct	34	34	37	37	35	4.4
Nov	36	34	37	37	36	4.4
Dec	33	34	37	37	35	4.4
Annual average	35	34	37	37	36	4.4

Source: UNODC monitoring project

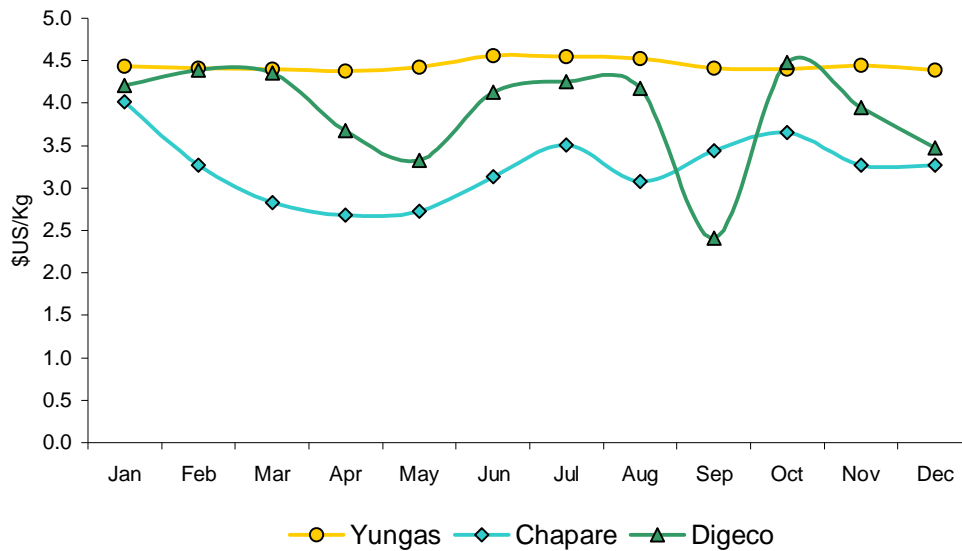
Compared to 2005, in 2006, sun-dried coca leaf prices decreased slightly to Bs. 36/kg in the Yungas.

Table 11: Reported monthly sun-dried coca leaf prices in the Chapare, 2006

Month	Bs./kg	US\$/kg
January	32.4	4.0
February	26.4	3.3
March	22.9	2.8
April	21.7	2.7
May	2.0	2.7
June	25.4	3.1
July	28.4	3.5
August	24.9	3.1
September	27.7	3.4
October	29.5	3.7
November	26.5	3.3
December	26.5	3.3
Annual average	26.2	3.2

Source: DIGPROCOCA

For second year in a row, coca leaf prices in Chapare region decreased, from Bs. 33/kg in 2005 to Bs. 26.2 in 2006 (-26%). The decrease in prices can be attributed to the increase in the offer, and also to the increased interdiction efforts in the region that disturbed the coca market and made it less attractive for coca leaf buyers.

Figure 16: Monthly sun-dried coca leaf price in the Yungas of La Paz and Chapare, 2006

Sources: UNODC monitoring project//DIGPROCOCA/ DIGCOIN

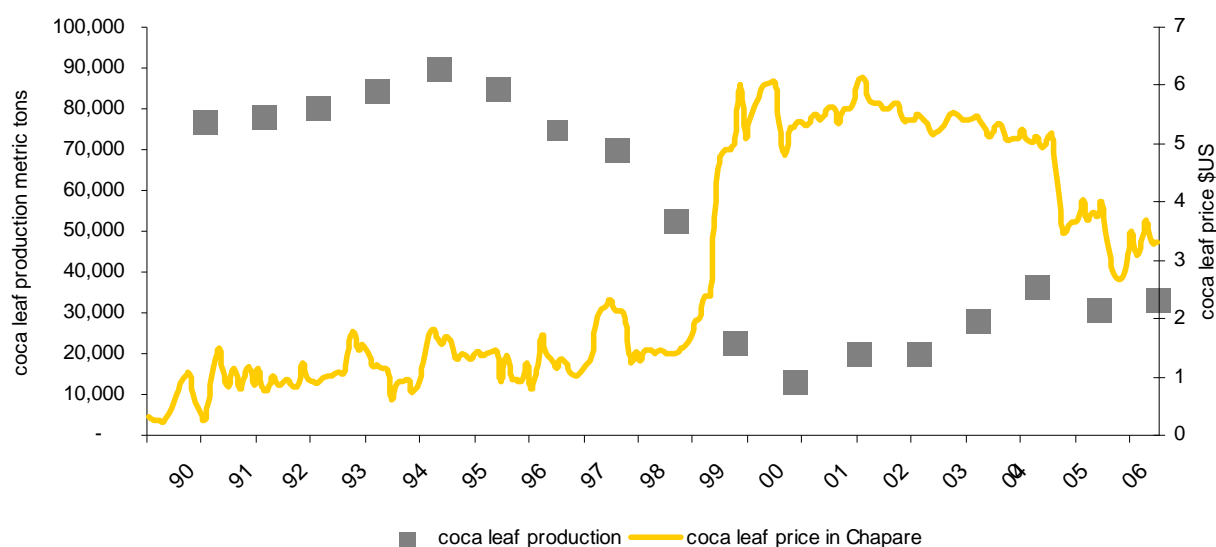
Weighted by production, the annual average price for coca leaf on the market controlled by DIGCOIN was US\$ 4.0/kg. Outside this market, the price was slightly higher, US\$ 4.1/kg. However, during the dry season when less coca leaves were available, prices from the markets controlled by DIGCOIN were similar and even larger than prices on other markets.

Prices of coca leaves have not been systematically recorded for Apolo. Anecdotal information reported much lower prices in Apolo than elsewhere in the country, ranging from US\$ 2.5 to US\$ 2.8/kg in 2005. The reason for lower prices in Apolo could be attributed to the remoteness of the region, far from the main trading centers. The low coca leaf production in Apolo (281 mt) was rather negligible compared to the national total, and therefore was not taken into account in the establishment of the national annual price estimate.

The long term trend of prices can be appreciated with prices of coca leaves from Chapare collected by DIRECO since 1990. Following a strong price rise in 1999 – in line with a strong increase in eradication – sun-dried coca leaf prices reached a peak of US\$ 5.7 /kg in 2000. Since then, prices fell to the lowest level since 1998 to \$US 3.2/kg in 2006. However, coca leaf prices in Bolivia continued to be substantially higher than in neighboring Peru (US\$ 2.5/kg).

Table 12: Reported monthly prices of sun-dried coca leaf in Chapare (US\$/kg)

Month	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	1.0		0.9	1.4	0.9	1.1	1.3	2.0	5.9	5.4	5.7	6.1	5.4	5.3	4.9	4.0
February	0.8	1.4	0.9	1.3	1.3	1.2	1.5	2.4	6.0	5.5	5.6	5.8	5.3	5.1	5.1	3.3
March	0.9	1.8	0.7	1.3	0.8	1.4	1.5	2.4	6.0	5.6	5.6	5.7	5.2	5.2	5.2	2.8
April	1.2	1.5	0.8	1.4	1.1	1.9	1.4	3.7	6.0	5.6	5.7	5.7	5.2	5.3	4.4	2.7
May	0.9	1.5	1.2	1.4	1.7	2.2	1.5	4.8	5.3	5.3	5.7	5.6	5.3	5.2	3.5	2.7
June	0.9	1.4	1.6	1.4	1.4	2.2	1.4	4.9	4.8	5.6	5.4	5.6	5.4	5.1	3.5	3.1
July	0.9	1.2	1.8	1.4	1.3	2.3	1.4	4.9	5.3	5.6	5.4	5.7	5.5	5.1	3.6	3.5
August	1.0	1.2	1.7	1.4	1.2	2.1	1.4	5.0	5.3	5.7	5.4	5.7	5.5	5.1	3.7	3.1
September	1.0	1.1	1.5	0.9	1.3	2.1	1.5	6.0	5.4	6.1	5.5	5.4	5.4	5.3	4.0	3.4
October	1.0	1.1	1.7	1.4	1.2	2.0	1.5	5.1	5.3	6.1	5.4	5.4	5.4	5.0	3.7	3.7
November	1.1	0.6	1.5	0.9	1.1	1.3	1.7	5.4	5.3	5.8	5.3	5.4	5.4	5.0	3.8	3.3
December	1.0	0.9	1.3	0.9	1.0	1.4	2.0	5.7	5.5	5.7	5.2	5.5	5.5	5.1	3.7	3.3
Annual Average US\$/kg	1.0	1.2	1.3	1.3	1.2	1.8	1.5	4.4	5.5	5.7	5.5	5.6	5.4	5.2	4.1	3.2

Figure 17: Prices in Chapare since 1990

The estimation of the total farm-gate value of coca leaf production in Bolivia included the total value of the market controlled by DIGCOIN, and the farm-gate value of coca leaves outside this market in 2006, amounted to a rounded value of US\$180 million.

Table 13: Estimation of the total farm-gate value of coca leaf production in Bolivia, 2006

Region	Coca weighted average Price US\$/kg		Coca Production (metric tons)			Total coca leaf value (US\$)		
	Authorized market	Outside authorized market	Total production	Authorized market	Outside authorized market	Authorized market	Outside authorized market	Total value
Yungas	3.9	4.4	24,895	12,960	11,935	50,544,000	52,514,000	103,058,000
Chapare	3.1	3.2	22,941	249	22,692	771,900	72,614,400	73,386,300
Rounded Total			48,000		35,000	52,000,000	126,000,000	180,000,000

The decrease of coca value in 2006, in spite of the increase in the production, is due to the decrease in prices in both, Yungas and Chapare regions.

The total farm-gate value of coca leaf production in 2006 was thus equivalent to 2.0% of the projected Bolivian GDP⁵ of US\$ 8.7 billions for 2006, or 13% compared with the projected value of the licit agricultural sector of US\$ 1.1 billions in 2006. These figures suggest that, for the country as a whole, coca production still has an impact on the Bolivian economy, and continues to play an important role within the coca producing regions.

The FELCN also reported street prices of cocaine paste and cocaine of unknown purity from the major cities and coca growing regions in Bolivia.

Table 14: Reported prices of cocaine base and cocaine HCL, Bolivia, 2006 (US\$/kg)

City	Cocaine base	Cocaine HCL
La Paz	950	2,000
Cochabamba	1,550	1,760
Santa Cruz	1,200	1,850
Region		
Yungas of La Paz	800	1,100
Chapare	1,000	1,500

Source: FELCN

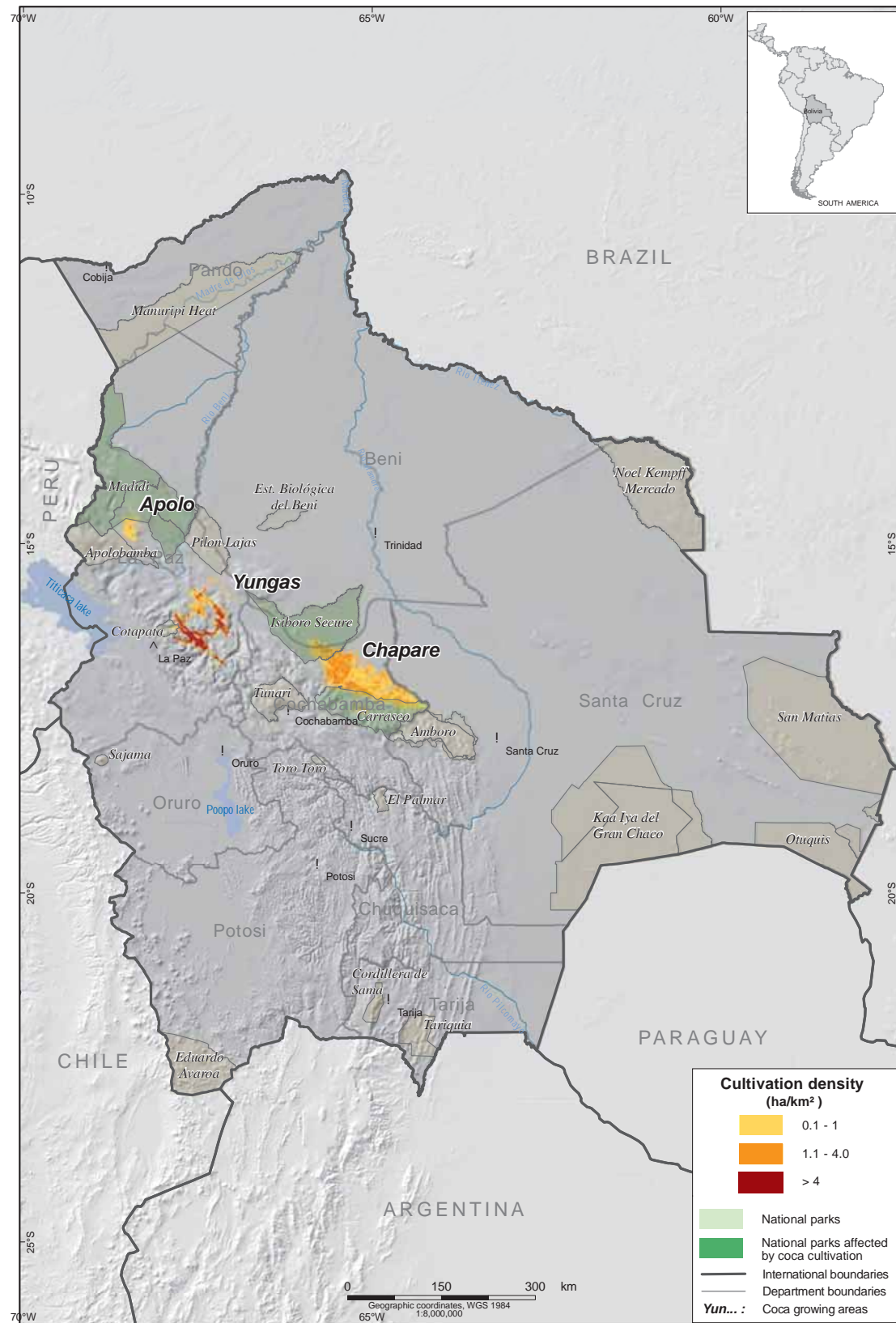
It is interesting to note that prices for coca leaf and its derivatives were consistently higher in Bolivia than in neighboring Peru.

Table 15: Prices for coca leaf and its derivatives in Peru and Bolivia, 2006 (US\$/kg)

Products	Peru	Bolivia
Coca leaf	2.52	4.1
Cocaine base (in coca producing regions)	550	900
Cocaine HCl	823	1,800

⁵ Source: INE 2006

Map 11: Coca cultivation and National Parks, Bolivia 2006



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

Coca cultivation in National Parks

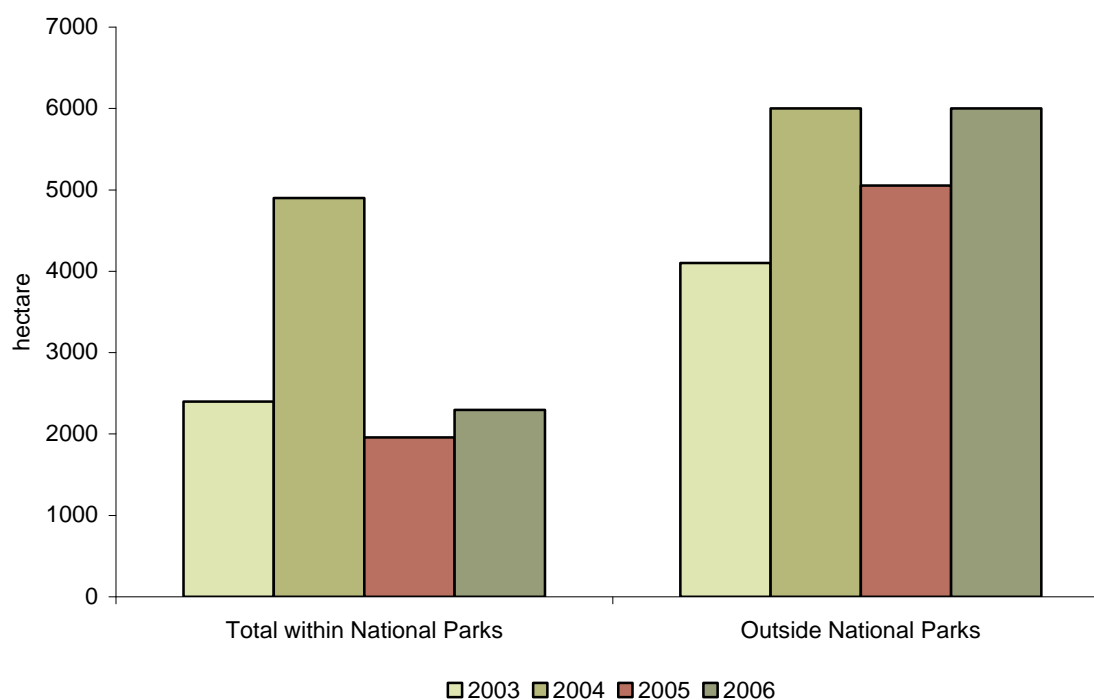
There are 21 protected areas and national parks in Bolivia, totaling an area of 165,000 sq km, representing 15% of the national territory. In 2006, once again coca cultivation was found in three national parks. In the national park of Madidi, Apolo region, only about 10 hectares of coca cultivation were found. A much larger amount of 1,950 ha of coca cultivation was found in the two national parks Isiboro Secure and Carrasco, in Chapare region. Coca cultivation within these two National Parks represented 28% of the coca cultivation of Chapare region.

Between 2004 and 2005, coca cultivation decreased by 52% in the areas of the National Parks. However, between 2005 and 2006, an important increase occurred in the Isiboro Secure National Park. Ecosystems of the National Parks are particularly fragile and the deforestation for the establishment of coca cultivation causes irreversible damage to their environment.

Table 16: Coca cultivation estimates by national parks in Chapare 2003 – 2005 (ha)

Area	2003	2004	2005	2006	% change 2005 - 2006	% of 2006 total
Isiboro Secure Nacional Park	1,605	2,807	1,161	1,451	25%	17%
Carrasco National Park	778	1,257	781	837	7%	10%
Madidi National Park	n.a.	10	10	10	0%	0%
Total within National Parks	2,383	4,074	1,952	2,298	18%	28%
Outside National Parks	4,917	6,026	5,053	6,002	19%	72%
Rounded Total	7,300	10,100	7,005	8,300	18%	100%

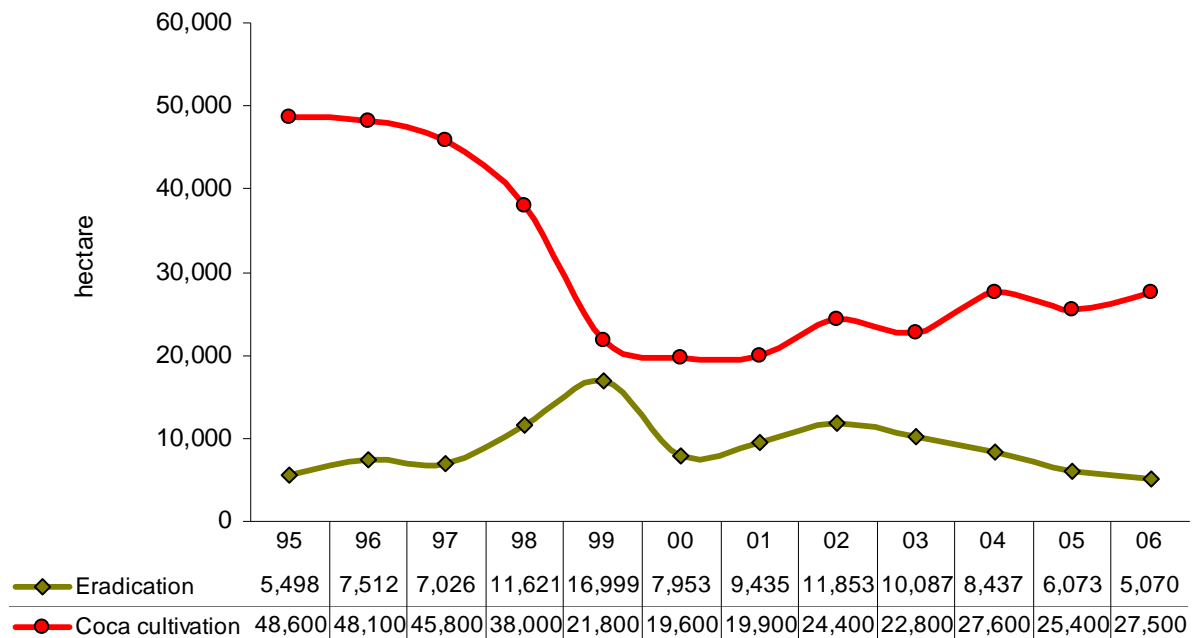
Figure 18: Distribution of coca cultivation in Chapare region inside and outside national parks, 2003 – 2006 (ha)



Reported eradication

In 2006, the Bolivian Government reported the eradication of 5,070 ha of coca fields. Ninety-nine percent of this total has been eradicated in Chapare, and only one percent in Yungas of La Paz. Eradication decreased by 17% compared to the level of eradication in 2005. This is the lowest level of eradication in the past 10 years. In Bolivia, the eradication of coca cultivation is exclusively manual, and no chemical or spraying agents are used.

Figure 19: Reported eradication and coca cultivation in Bolivia, 1995 – 2006 (ha)



Sources: For coca cultivation: UNODC; for eradication: DIGPROCOCA



Manual eradication of a coca field in Chapare

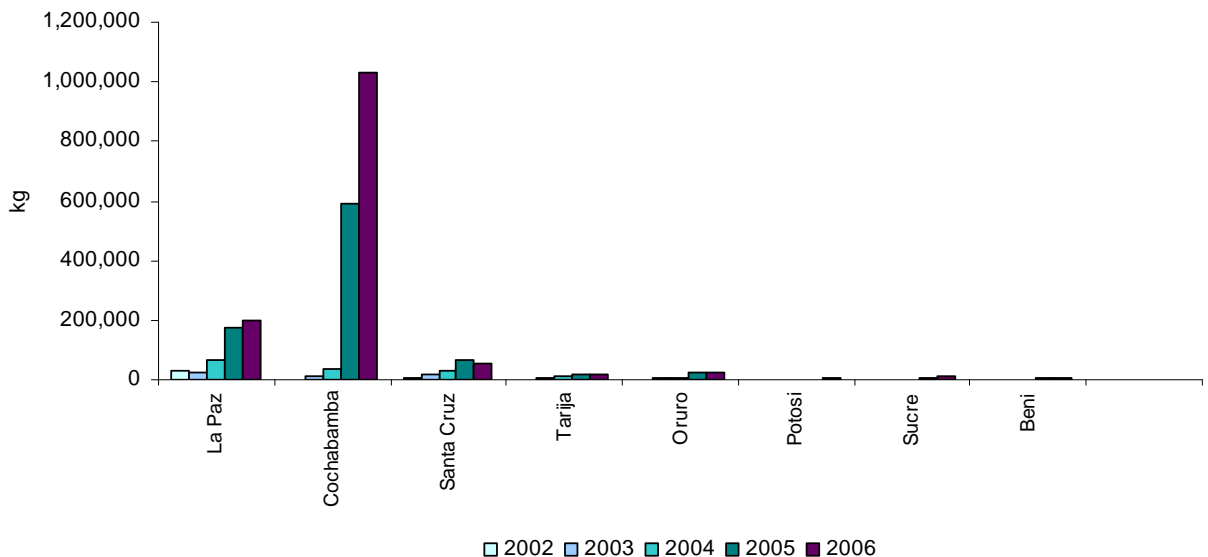
Reported seizures

DIGCOIN controls the trade of coca leaves within the country, which also includes control over the transport of coca leaves. Coca leaves are seized if transported without license or outside the authorized route specified in the license. In 2006, DIGCOIN captured 1,343 metric tons of coca leaves, representing a significant increase of 52% compared to the reported seizure of 886 metric tons in 2005. The increase in seizure of coca leaf can be attributed to the strengthening of DIGCOIN's special force for the control of coca leaves (Grupo Especial de Control de la Hoja de Coca, GECC), which included the control of additional roads, and improvement in equipment and infrastructure.

Table 17: Reported seizure of coca leaves, 2002 – 2006 (kg)

Department	2002	2003	2004	2005	2006
La Paz	31,291	22,375	66,396	172,331	197,854
Cochabamba	214	11,105	37,748	591,803	1,030,834
Santa Cruz	7,343	20,828	30,441	68,508	52,018
Tarija	1,407	4,451	10,183	16,499	19,604
Oruro	1,205	4,682	6,120	24,814	21,913
Potosi	357	1,321	1,942	1,509	4,010
Sucre	0	1,450	1,448	3,229	11,780
Beni	728	600	904	7,525	4,778
Pando	0	0	0	50	271
Total	42,544	66,811	155,182	886,268	1,343,062

Figure 20: Reported seizure of coca leaves, 2003 - 2006 (kg)



The Special Force for the Fight against Drugs (FELCN) reports annually on drugs seizures. Between 2005 and 2006, there was a significant increase of 36% in reported seizure of cocaine base. The peak in seizure of cocaine HCL in 2003 was due to an exceptional operation conducted by FELCN. The graph also shows that seizure of cocaine base increased steadily since 2001. The same trend can be seen in the report of destruction of maceration pit and clandestine coca paste or cocaine laboratories.

Table 18: Reported seizure of drugs in Bolivia, 1997 – 2006 (kg)

Product	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Cocaine base	10,848	8,906	6,905	5,044	4,280	4,741	6,934	8,189	10,152	12,779
Cocaine HCL	1,477	2,440	802	555	334	362	5,969	531	1,300	1,309
Heroin	2.9	0.8	0	0	0	0	0	0	0	0
Cannabis	3,617	320	2,160	3,745	7,055	8,754	8,510	28,200	31,390	125,356

Source: FELCN

Figure 21: Reported seizure of cocaine base and cocaine HCL, Bolivia, 1997 – 2006 (kg)

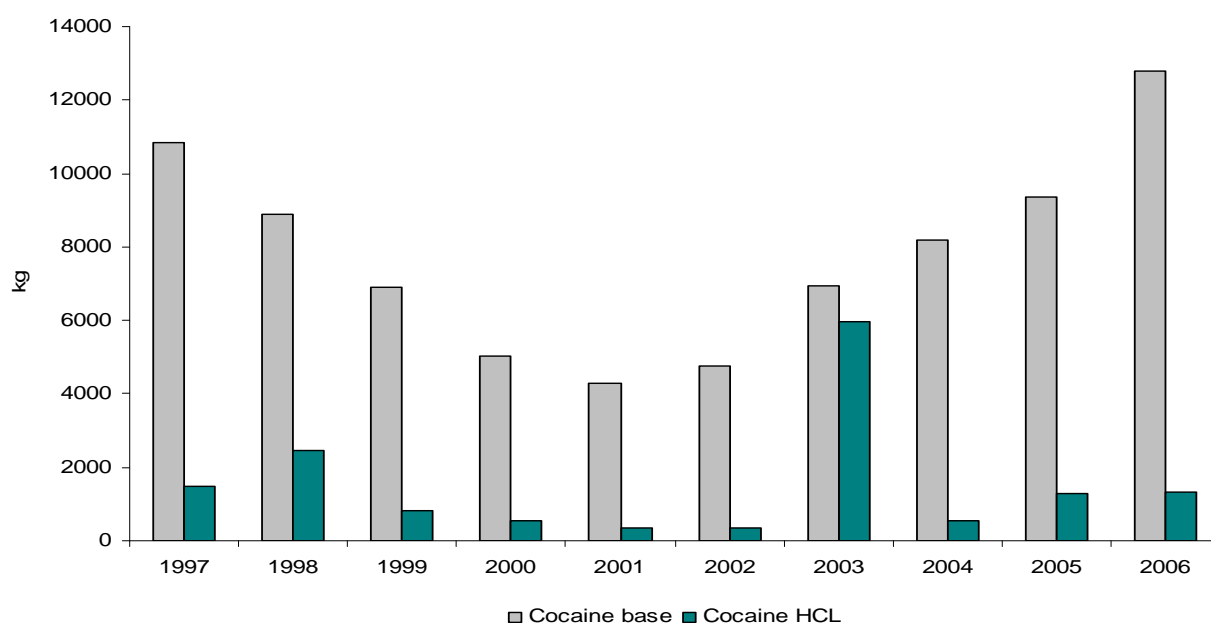
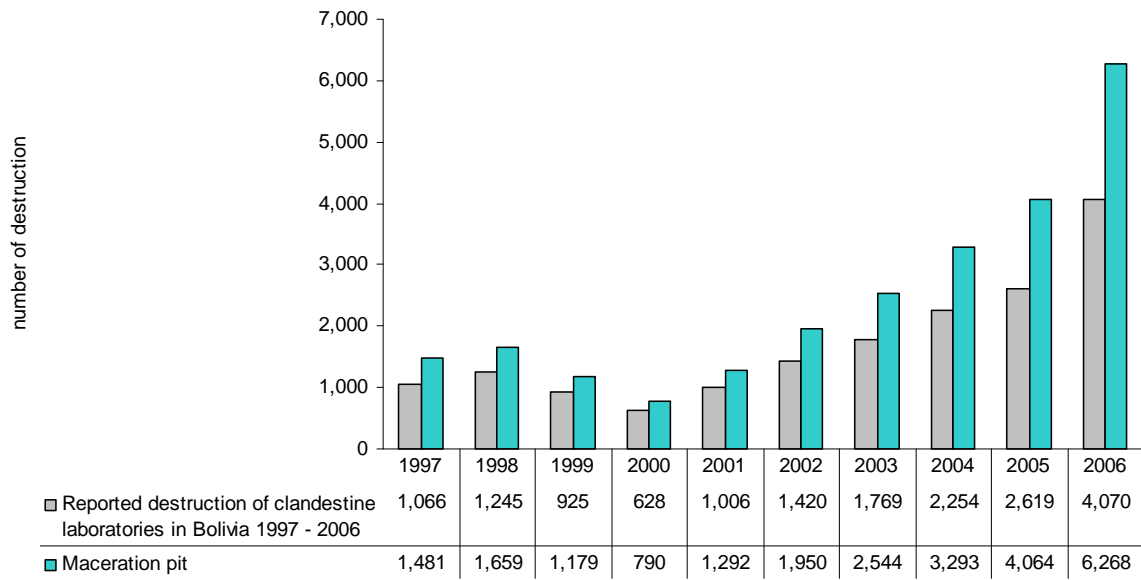


Table 19: Reported destruction of clandestine laboratories and macerations pits, 1998 - 2006

Type	1998	1999	2000	2001	2002	2003	2004	2005	2006
Coca paste and/or cocaine labs.	1,245	925	628	1,006	1,420	1,769	2,254	2,619	4,070
Precursors laboratories	15	8	3	2	6	0	3	2	2
Cocaine laboratories only	4	3	17	3	1	0	4	3	3
Maceration pits	1,659	1,179	790	1,292	1,950	2,544	3,293	4,064	6,268

Figure 22: Reported destruction of clandestine laboratories and macerations pits



PART 3. COLOMBIA

FACT SHEET – Colombia Coca Survey for 2006

		2005	Variation	2006
Net coca cultivation (rounded total)		86,000 hectares	-9%	78,000 hectares
Of which	Meta-Guaviare region	25,970 hectares	-21%	20,540 hectares
	Pacific region	17,650 hectares	+7%	18,810 hectares
	Putumayo-Caqueta region	13,950 hectares	+23%	17,220 hectares
	Central region	15,630 hectares	-22%	12,130 hectares
	Elsewhere	12,570 hectares	-27%	9,170 hectares
Reported cumulative aerial spraying of coca bush		138,775 hectares	+24%	172,025 hectares
Reported manual eradication of coca bush		31,285 hectares	+33%	41,530 hectares
Average farm-gate price of coca paste		US\$ 910/kg COP 2,109,000/kg	-3%	US\$ 879/kg COP 2,070,000/kg
Total farm-gate value of the production of coca leaf and its derivatives		US\$ 843 million	-19%	US\$ 683 million
in % of GDP ⁶		0.7%		0.5%
in % of GDP of agricultural sector		6%		5%
No. of households involved in coca cultivation		68,600 households	-2%	67,000 households
Annual household gross income from the production of coca leaf and its derivatives		US\$ 12,300	-17%	US\$ 10,194
Potential production of cocaine		640 mt	-5%	610 mt
in % of world cocaine production		65%		62%
Average wholesale cocaine price		US\$ 1,860/kg COP 4,315,000/kg	-5%	US\$ 1,762/kg COP 4,155,000/kg
Reported opium poppy cultivation		1,950 hectares	-48%	1,023 hectares
Potential opium latex production		59 mt	-47%	31 mt
Potential heroin production		2.5 mt	-48%	1.3 mt
Average farm-gate price of opium latex		US\$ 230/kg	+9%	US\$ 251/kg
Average heroin price		US\$ 9,070/kg	+10%	US\$ 9,992/kg
Reported seizures of cocaine		173,265 kg	-27%	127,326 kg
Reported seizures of heroin		745 kg	-41%	442 kg
Reported destruction of clandestine laboratories ⁷		1,953	+16%	2,270

⁶ GDP of the respective year as reported by the Government.

⁷ Includes laboratories processing coca paste/cocaine base, cocaine hydrochloride, heroin, morphine, potassium permanganate, and non-specified.

ABBREVIATIONS

COP	Colombian Pesos
DANE	National Department of Statistics
DEA	US Drugs Enforcement Administration
DIRAN	Colombian Anti-Narcotics Police
DNE	National Narcotics Office
DNP	National Planning Department
GME	Mobile Eradication Groups
ICMP	Illicit Crop Monitoring Programme
INCB	International Narcotics Control Board
IDB	Inter-American Development Bank
NNPS	National Natural Parks System
OAS	Organization of American States
PDA	Alternative Development Programme
PCI	Presidential Programme against Illicit Crops
RSS	Social Solidarity Net
SIMCI	Integrated Illicit Crops Monitoring System
UNODC	United Nations Office on Drugs and Crime.
USAID	United States Agency for International Development
US\$	United States Dollars
mt	Metric tons

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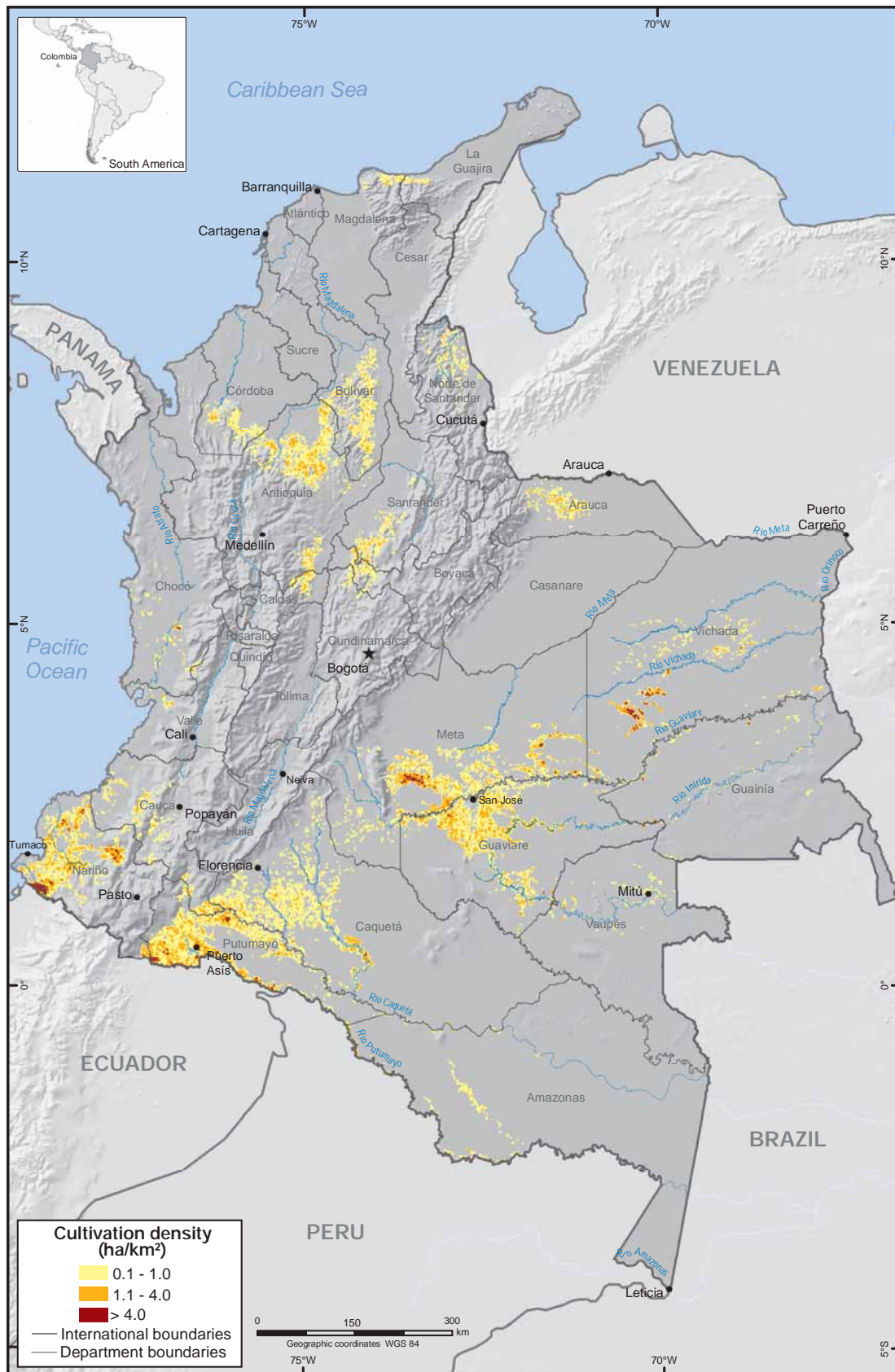
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Map 12: Coca cultivation density in Colombia, 2006



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

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, Lao PDR 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 remains the largest coca-growing country in the world.

UNODC has supported the monitoring of illicit crops since 1999, and has produced eight annual surveys through a special satellite based analysis programme called SIMCI (from the Spanish initials). In October 2006, UNODC signed a new agreement with the Colombian government to continue and expand monitoring and analysis work. In this context, the SIMCI II project facilitates the implementation of additional tasks in the framework of an integrated approach to analyse 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 Geographic Information System support to the government's alternative development projects and its Forest Warden Families Programme.

The new project foresees the creation of an Inter-Institutional Committee permanently assigned to govern the project in order to ensure the transfer of know-how to the national beneficiary institutions. SIMCI II is a joint project between UNODC and the Colombian government, represented by the Ministry of Interior and Justice and the International Cooperation Agency. The national counterpart is 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 cooperates with technicians from the Police Antinarcotics Division (DIRAN) and National Parks Administration. It supports several studies and investigations for government and private institutions, related to land use, environment, licit crops, etc. SIMCI provides to the above-mentioned institutions experts, access to its Spatial Information Data Bank, transfer of technology and guidance to achieve their goals. Organizations that benefited from SIMCI support include the National Directorate for Statistics (DANE), local governments, the National Federation of Coffee Growers, NGOs as well as other UN agencies and projects.

The project has developed technical agreements with several national and foreign Universities, to interchange and share knowledge, for training activities and joint projects. Among them are BOKU University in Austria, Zaragoza University in Spain, Antonio Nariño and other Universities in Colombia.

2 FINDINGS

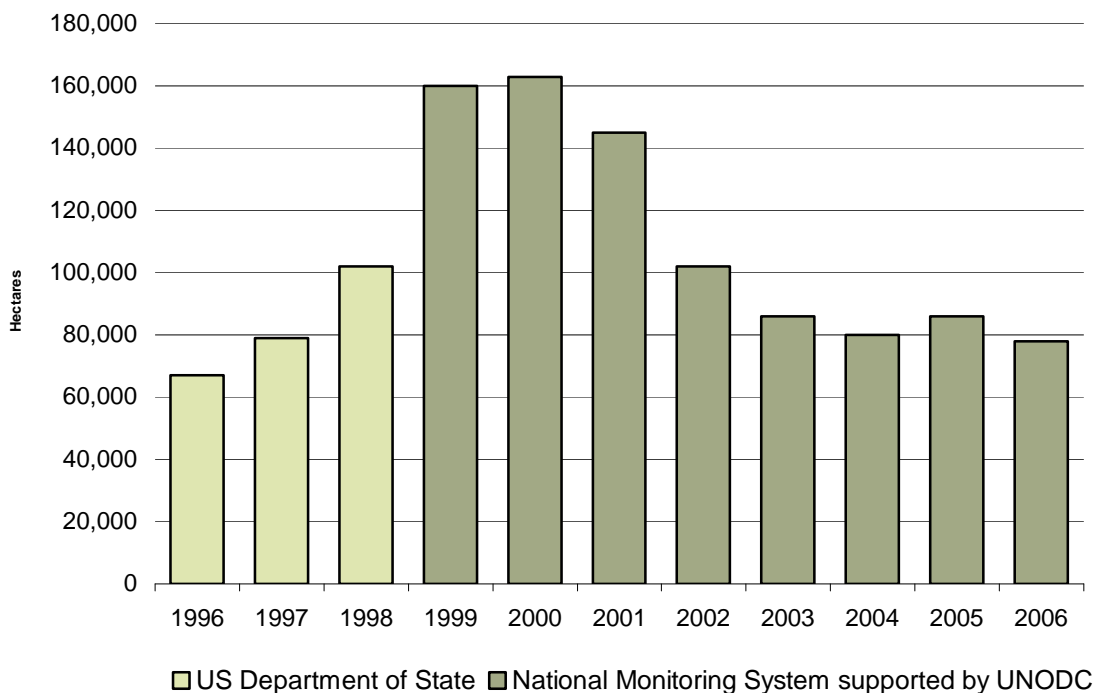
Coca cultivation

National cultivation

In 2006, the total area under coca cultivation in Colombia decreased by 8,000 hectares to 78,000 hectares, a 9% decrease compared to 2005 (86,000 hectares). The area under coca cultivation in 2006 was 52% lower compared to the peak estimate of 163,000 hectares in 2000.

Similarly to the previous four surveys, the 2006 survey represents the situation as of the end of the year, in this case as of December 2006. As was the case last year, the survey covered the whole country and detected coca cultivation in 23 out of 32 departments. In 2006, the area under coca cultivation represents 0.07% of the total national territory.

Figure 23: Coca cultivation in Colombia (hectares), 1996 – 2006



The decrease in coca cultivation between 2005 and 2006 corresponds with a high level of aerial spraying, which reached 172,025 hectares in 2006. In fact, aerial spraying of coca cultivation has remained above 130,000 hectares since 2002. In 2006, the Colombian Government also reported the additional manual eradication of 41,530 hectares of coca cultivation. This level of manual eradication is 10,245 hectares higher than the previous year's record of 31,285 hectares.

Analysis of coca cultivation changes

Coca cultivation is dynamic in Colombia. A range of variables can be associated with increases and decreases of the cultivation area over time. Factors like favourable prices, pressure exerted by armed groups on farmers, economic crises, and temporary crisis situations can all lead to an increase in the cultivated area. On the other hand, factors such as forced eradication, aerial spraying, plant diseases, improved security conditions, and increased alternative livelihood options can contribute to reducing the cultivated area. The coca cultivation survey does not endeavour to assess how or to what extent these factors bring about change in the area under coca cultivation. Rather, it shows the situation on a given date of the year (31st of December).

The multitemporal analysis of coca cultivation is done on imagery of 2005 and 2006 and therefore, concepts like “abandoned” or “new” fields refer exclusively to this period. At the end of the 2005-2006 period, 24% of the fields were the same as identified at the beginning 2006, and

can be considered as “stable”, as well as 16% of the fields that were identified in previous years and abandoned temporarily. 13% of the fields replaced primary forest vegetation and therefore were newly planted during this period. The remaining 48% of the fields replaced other types of vegetation like pastures or bare soil, but could also have been planted and then abandoned in previous years.

Table 20: Stable and new fields of coca bush in 2006

	Stable area 2005-2006		New area in 2006		Total
	In period 2005-2006	In previous years and 2006	Primary forest 2005	Other vegetation 2005	
Area	18,473	12,151	9,998	37,258	77,870
Percentage	24	15	13	48	100

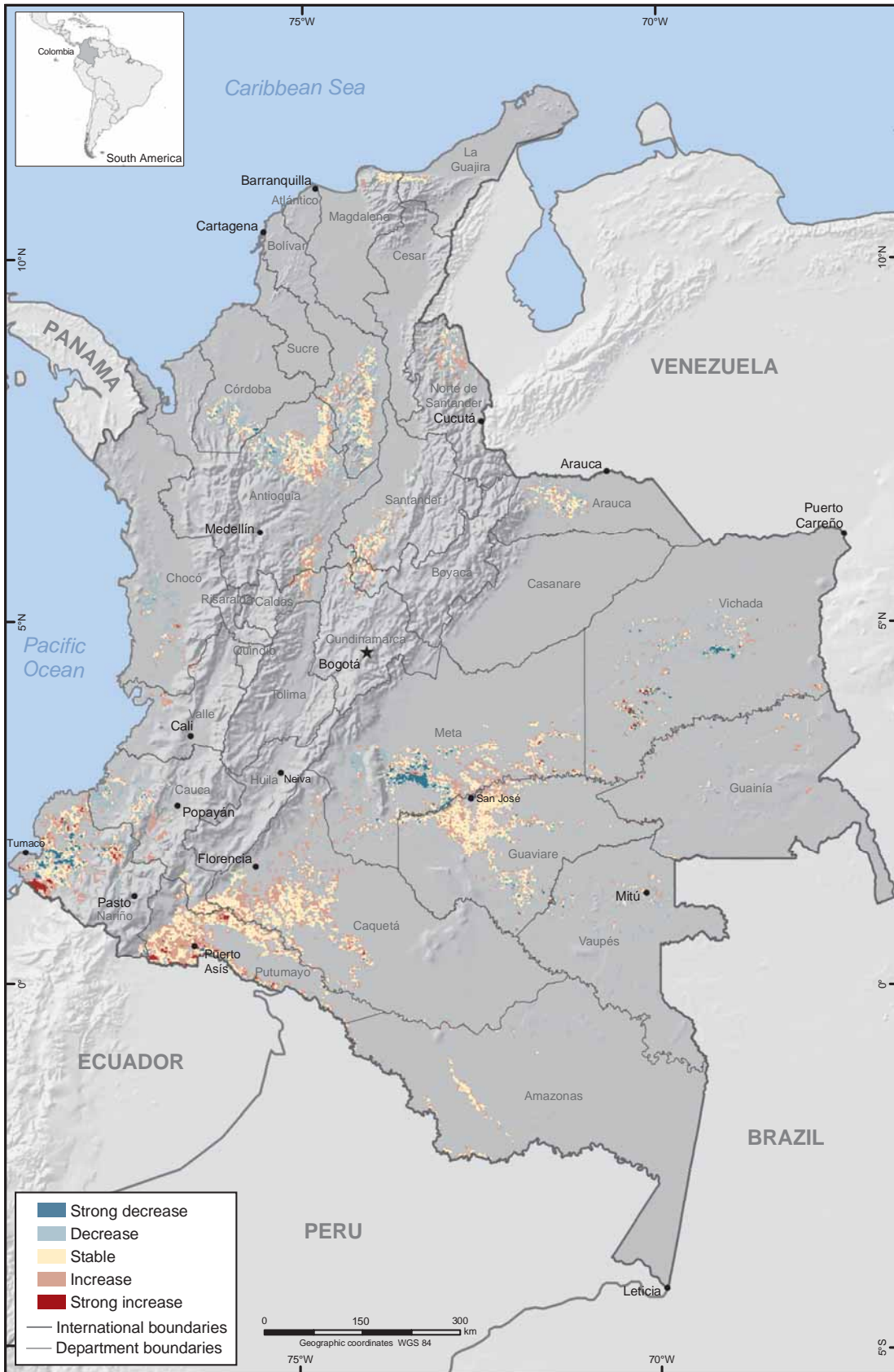
The multitemporal analysis of the last six years showed that 54% of the coca fields identified in 2006 were cultivated with coca in one or more years in this period. The analysis of the data also showed that the average coca field size continued to decrease since 2001 from 2.05 hectares to 1.13 hectares in 2005 and to 0.85 hectares in 2006. A possible explanation could be that farmers reduced the size of their coca fields to avoid detection and aerial spraying.

The ten municipalities listed below had the highest municipalities coca cultivation in Colombia, representing 46% of the national total coca cultivation and 50% of national potential cocaine production. Though the municipality of Tumaco in the Pacific region has the largest coca cultivation area in Colombia (9% of the national total), the municipality of Cumaribo in Orinoco region has the highest potential production of cocaine (11% of the national total) due to the high yield.

Table 21: The ten municipalities with the highest coca cultivation area and cocaine potential production, 2006

Municipality	Department	Coca cultivated area (hectares)	% of coca cultivation area in Colombia	Potential cocaine production (mt)
Tumaco	Nariño	7,128	9.1%	21
Cumaribo	Vichada	5,469	7.0%	58
San Jose del Guaviare	Guaviare	3,814	4.9%	43
Puerto Rico	Meta	3,521	4.5%	40
Mapiripan	Meta	3,311	4.3%	37
El Retorno	Guaviare	2,827	3.6%	32
Puerto Leguizamo	Putumayo	2,551	3.3%	18
Puerto Asis	Putumayo	2,512	3.2%	18
Vista Hermosa	Meta	2,289	2.9%	26
Puerto Guzman	Putumayo	2,083	2.7%	15
Total		35,505	46%	307

Map 13: Coca cultivation density change in Colombia, 2005 - 2006



Source: Government of Colombia - National monitoring system supported by UNODC
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In absolute numbers, the most important increases of coca crops between 2005 and 2006 were in the departments of Putumayo (+3,300 hectares) in the southern part of the country and Nariño (+1,731 hectares) in the southwest corner of the country. The increase in Putumayo corresponded to 37% of the area under coca cultivation in 2005, from 8,960 hectares to 12,254 hectares. Putumayo used to be the centre of coca cultivation, with 66,000 hectares in 2000. Coca cultivation had strongly declined until 2004 when Putumayo was the sixth largest cultivating area. However, due to increases in 2005 and 2006 this department now has the second largest cultivation level.

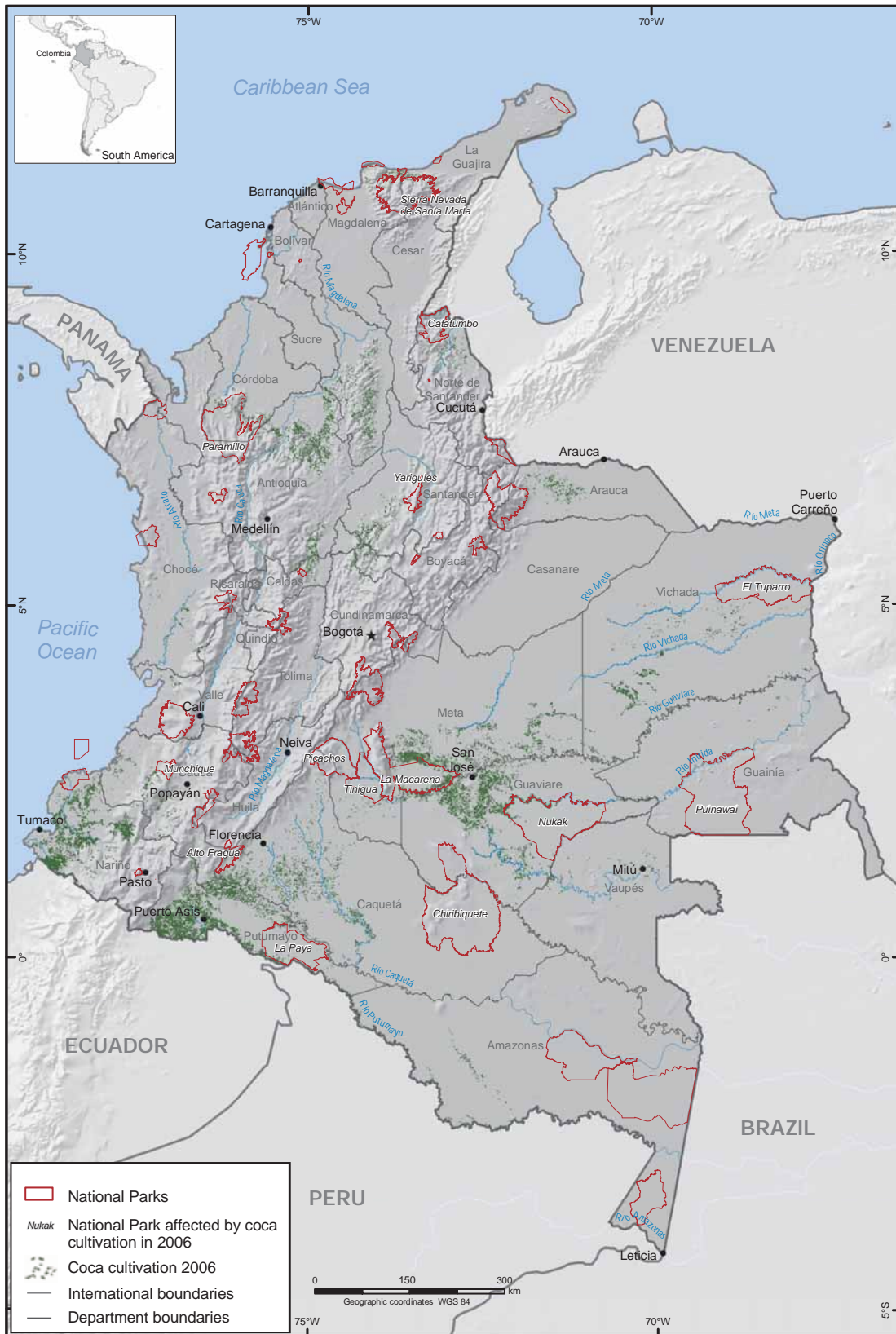
The largest reductions of coca crops took place in the department of Meta (-6,200 hectares). The department of Norte de Santander, at the border with Venezuela, had a small coca cultivation area in 2006, with less than 500 hectares. In 2001 Norte de Santander was among the departments with the highest coca cultivation levels with 9,145 hectares.

Compared to 2005, Nariño and Putumayo – with an combined increase of over 5,000 hectares – became the first two top departments in terms of coca cultivation, together accounting for 36% of the total area under coca cultivation in the country. In fact, 50% of the 2006 cultivation took place in just three departments Nariño, Putumayo and Meta, the same three departments that accounted for 46% of 2005 total cultivation.

Table 22: Coca cultivation by department, 2001 – 2006 (hectares)

Department	Nov-2001	Dec-2002	Dec-2003	Dec-2004	Dec-2005	Dec-2006	% Change 2005-2006	% of 2006 total
Nariño	7,494	15,131	17,628	14,154	13,875	15,606	12%	20%
Putumayo	47,120	13,725	7,559	4,386	8,963	12,254	37%	16%
Meta	11,425	9,222	12,814	18,740	17,305	11,063	-36%	14%
Guaviare	25,553	27,381	16,163	9,769	8,658	9,477	9%	12%
Antioquia	3,171	3,030	4,273	5,168	6,414	6,157	-4%	8%
Vichada	9,166	4,910	3,818	4,692	7,826	5,523	-29%	7%
Caquetá	14,516	8,412	7,230	6,500	4,988	4,967	0%	6%
Bolívar	4,824	2,735	4,470	3,402	3,670	2,382	-35%	3%
Cauca	3,139	2,120	1,443	1,266	2,705	2,104	-22%	3%
Arauca	2,749	2,214	539	1,552	1,883	1,306	-31%	2%
Córdoba	652	385	838	1,536	3,136	1,216	-61%	2%
Santander	415	463	632	1,124	981	866	-12%	1%
Chocó	354		453	323	1,025	816	-20%	1%
Guainía	1,318	749	726	721	752	753	0%	1%
Amazonas	532	784	625	783	897	692	-23%	0.9%
N. de Santander	9,145	8,041	4,471	3,055	844	488	-42%	0.6%
Caldas			54	358	189	461	144%	0.6%
Vaupés	1,918	1,485	1,157	1,084	671	460	-31%	0.6%
Boyacá	245	118	594	359	342	441	29%	0.6%
Valle del Cauca	184	111	37	45	28	281	904%	0.4%
Magdalena	480	644	484	706	213	271	27%	0.3%
Guajira	385	354	275	556	329	166	-50%	0.2%
Cundinamarca	22	57	57	71	56	120	114%	0.2%
TOTAL	144,807	102,071	86,340	80,350	85,750	77,870	-9.2%	
Rounded Total	145,000	102,000	86,000	80,000	86,000	78,000	-9%	
Departments affected	22	21	23	23	23	23	0%	

Map 14: National Parks and coca cultivation in Colombia, 2006



Sources: for coca cultivation Government of Colombia - National monitoring system supported by UNODC; for national parks UAESPNN
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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 coca survey, and the data have been delivered to the relevant authorities to enable them to identify actions and projects to be applied for the preservation of its social and environmental characteristics.

The limits of National Parks and Indigenous territories have been provided by the official institutions in charge of their management. In 2005, the limits of National Parks were edited by the monitoring project in cooperation with technicians from the National Parks Administrative Unit. 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.

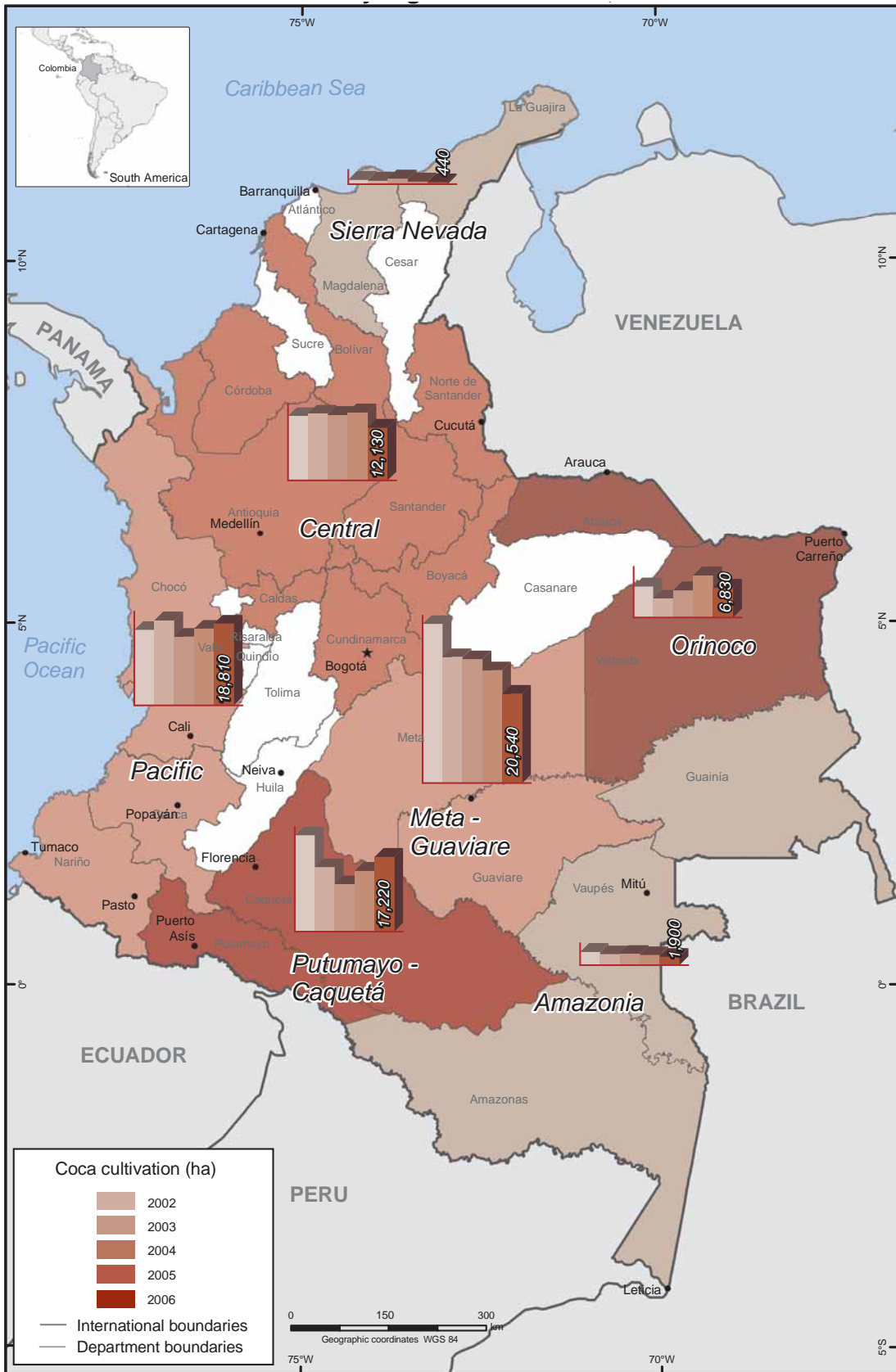
Coca cultivation in 2006 was found in 14 of the 51 National Parks in Colombia. With 3,556 hectares in 2006, coca cultivation represented 0.02% of the total area covered by National Parks, and coca cultivation in National Parks represented 5% of the total level of coca cultivation in 2006.

Coca cultivation in National Parks showed a reduction of 41% in the period 2005 and 2006. This decrease was mainly due to a decrease in the National Parks of Sierra La Macarena (-1,665 hectares, or -50%), Paramillo (-450 hectares or -66%) and La Paya (-201 hectares or -28%). In most other National Parks, coca cultivation decreased, and it almost completely disappeared from the National Park of Alto Fragua. However, for the first time, the National Parks of Selva de Florencia and El Cocuy were affected by coca cultivation in 2006.

Table 23: Coca cultivation in National Parks, 2003 – 2006

National Parks	2003	2004	2005	2006	% Change 2005-2006
Sierra La Macarena	1,152	2,707	3,354	1,689	-50%
Nukak	1,469	1,043	930	779	-16%
La Paya	310	230	728	527	-28%
Paramillo	110	461	686	236	-66%
Tinigua	340	387	155	122	-21%
Sierra Nevada	212	241	95	119	+25%
Puinawai	33	139	60	41	-32%
Catatumbo-Bari	129	107	55	22	-60%
Munchique	1	8	13	6	-54%
Los Picachos	13	15	7	6	-14%
Yarigués	-	-	2	4	+100%
Selva de Florencia	-	-	-	2	-
El Cocuy	-	-	-	2	-
Alto Fragua	8	14	25	1	-96%
Sanquianga	7	-	-	-	-
Farallones	2	-	-	-	-
Tayrona	4	1	-	-	-
Total	3,790	5,353	6,110	3,556	
Rounded total	3,800	5,400	6,100	3,600	-41%

Map 15: Coca cultivation by region in Colombia, 2001-2006



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

In 2006, 48% of coca cultivation in Colombia took place in the coca-growing regions of Meta-Guaviare and Putumayo-Caquetá. The largest increases took place in Putumayo-Caquetá (+3,270 hectares) in the southern part of the country bordering Ecuador, and in Pacifico (+1,174 hectares), in the corridor between the western range of mountains and the Pacific coastal region. Important decreases took place in: Orinoco (-2,880 hectares, -30%), in the northeastern part of the country bordering Venezuela; Meta-Guaviare (-5,423 hectares, -21%) in the southeastern part of Colombia and in the Central region (-3,501 hectares, -22%).

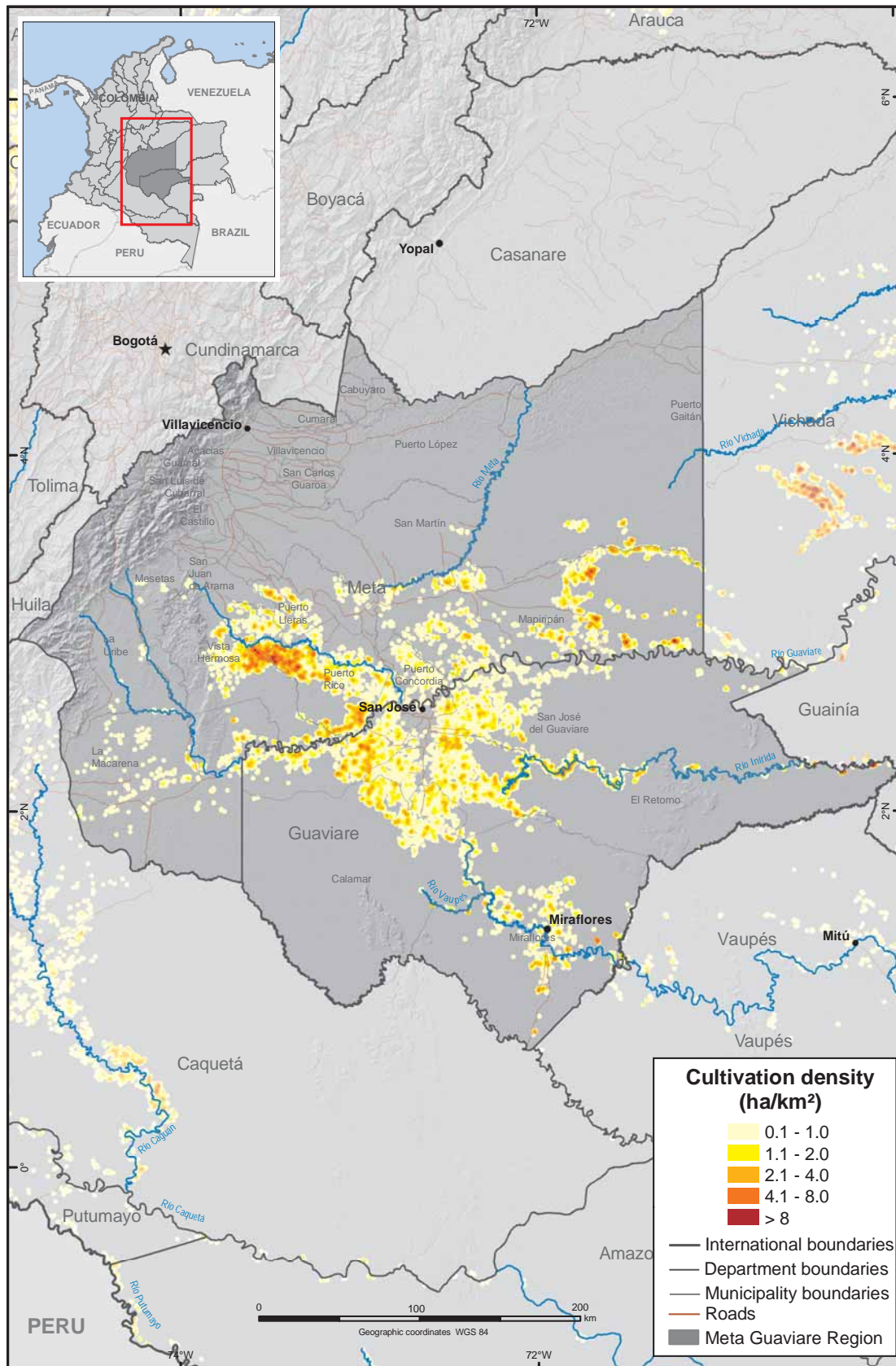
Table 24: Coca cultivation by region 2001 - 2006 (hectares)

Region	2001	2002	2003	2004	2005	2006	% Change 2005 - 2006	% of 2006 total
Meta-Guaviare	36,978	36,603	28,977	28,507	25,963	20,540	-21%	26%
Pacific	11,171	17,362	19,561	15,789	17,633	18,807	+7%	24%
Putumayo-Caqu.	61,636	22,137	14,789	10,888	13,951	17,221	+23%	22%
Central	18,474	14,829	15,389	15,081	15,632	12,131	-22%	16%
Orinoco	11,915	7,124	4,357	6,250	9,709	6,829	-30%	9%
Amazonia	3,768	3,018	2,508	2,588	2,320	1,905	-18%	2%
Sierra Nevada	865	998	759	1,262	542	437	-19%	1%
Rounded Total	145,000	102,000	86,000	80,000	86,000	78,000	-9%	100%



Coca leaves

Map 16: Coca cultivation density in the Meta-Guaviare region, Colombia 2006



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

Meta-Guaviare is traditionally the largest coca-producing region; however, the gap to the second largest cultivation area, the Pacific region, has closed due to a 21% decrease of coca cultivation in Meta-Guaviare in 2006.

Table 25: Coca cultivation in Meta-Guaviare, 2000 – 2006 (hectares)

Department	2000	2001	2002	2003	2004	2005	2006	% Change
Meta	11,123	11,425	9,222	12,814	18,740	17,305	11,063	-36%
Guaviare	17,619	25,553	27,381	16,163	9,769	8,658	9,477	+9%
Total	28,742	36,978	36,603	28,977	28,509	25,970	20,540	-21%
Annual trend	-	+29%	-1%	-21%	-2%	-9%	-21%	

In 2004 and 2005, the department of Meta was the department with the highest level of coca cultivation, but it dropped to the third place in 2006, because of a decrease of 36%, from 17,305 hectares in 2005 to 11,036 hectares. The department of Meta included 14% of the national coca cultivation area.

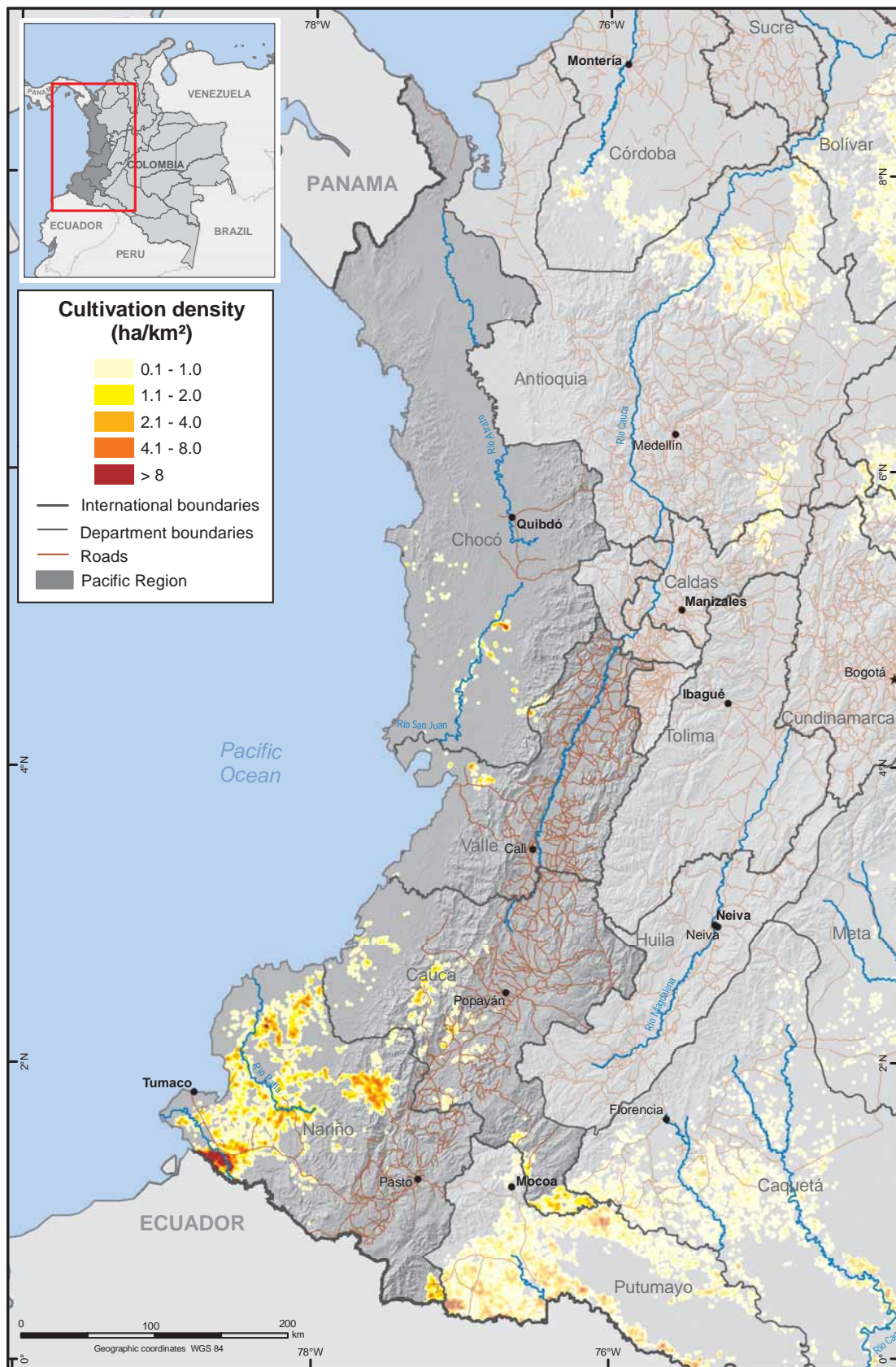
In 2006, a record of 25,900 hectares of coca cultivation was sprayed and 5,176 hectares were eradicated manually in Meta department, which represented 82% of the total eradication and 64% of the total aerial spraying, which this region experienced. However, it has received very little support with alternative development programmes. Among the fourteen national parks surveyed, the National Park of Sierra de la Macarena, located within Meta department, had the largest level of coca cultivation within a protected area in 2006, with 1,689 hectares. This was a reduction of 1,665 hectares (-50%) from 2005 to 2006, mostly due to an intensive campaign of manual eradication (2,893 hectares) and aerial spraying (2,100 hectares) during the first seven months of 2006.

Guaviare was the department where coca cultivation first appeared in Colombia at the end of the seventies. Since then, coca cultivation remained important in the department. Though a significant decrease was noted in the past few years, this trend was reversed in 2006 when 9,477 hectares were detected. Guaviare accounted for 12% of the national total. Between 2005 and 2006, coca cultivation in the department of Guaviare increased from 8,658 hectares to 9,477 hectares (+9%). At the same time, aerial spraying increased from 11,900 hectares in 2005 to 14,700 hectares in 2006 (+24%) and manual eradication amounted 1,103 hectares.



Coca field in Guaviare

Map 17: Coca cultivation density in the Pacific region Colombia 2006



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

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. This contributed to the spread of cultivation of coca bush and opium poppy, as well as the maritime smuggling of illegal drugs and precursor chemicals through the department.

Table 26: Coca cultivation in the Pacific Region, 2000-2006 (hectares)

Department	2000	2001	2002	2003	2004	2005	2006	Change 2005-2006
Nariño	9,343	7,494	15,131	17,628	14,154	13,875	15,606	+20%
Cauca	4,576	3,139	2,120	1,443	1,266	2,705	2,104	-25%
Chocó	250	354		453	323	1,025	816	-20%
Valle del	76	184	111	37	45	28	281	+904%
Total	14,245	11,171	17,362	19,561	15,788	17,633	18,807	+7%
Annual trend	-	-22%	+55%	+13%	-19%	+12%	+7%	

Coca cultivation in Nariño became significant in 2002, when coca cultivation decreased in the neighbouring departments of Putumayo and Caqueta. Between 2001 and 2002, coca cultivation decreased by 40,000 hectares in Caqueta and Putumayo, while increasing by 7,600 hectares in Nariño. Aerial spraying has been intense in Nariño department since 2000, exceeding 30,000 hectares in 2004 and 2005, and reaching a record 59,900 hectares in 2006. In addition, 7005 hectares of manual eradication were reported in 2006. However, in the period 2005-2006, coca cultivation increased 1,731 hectares.

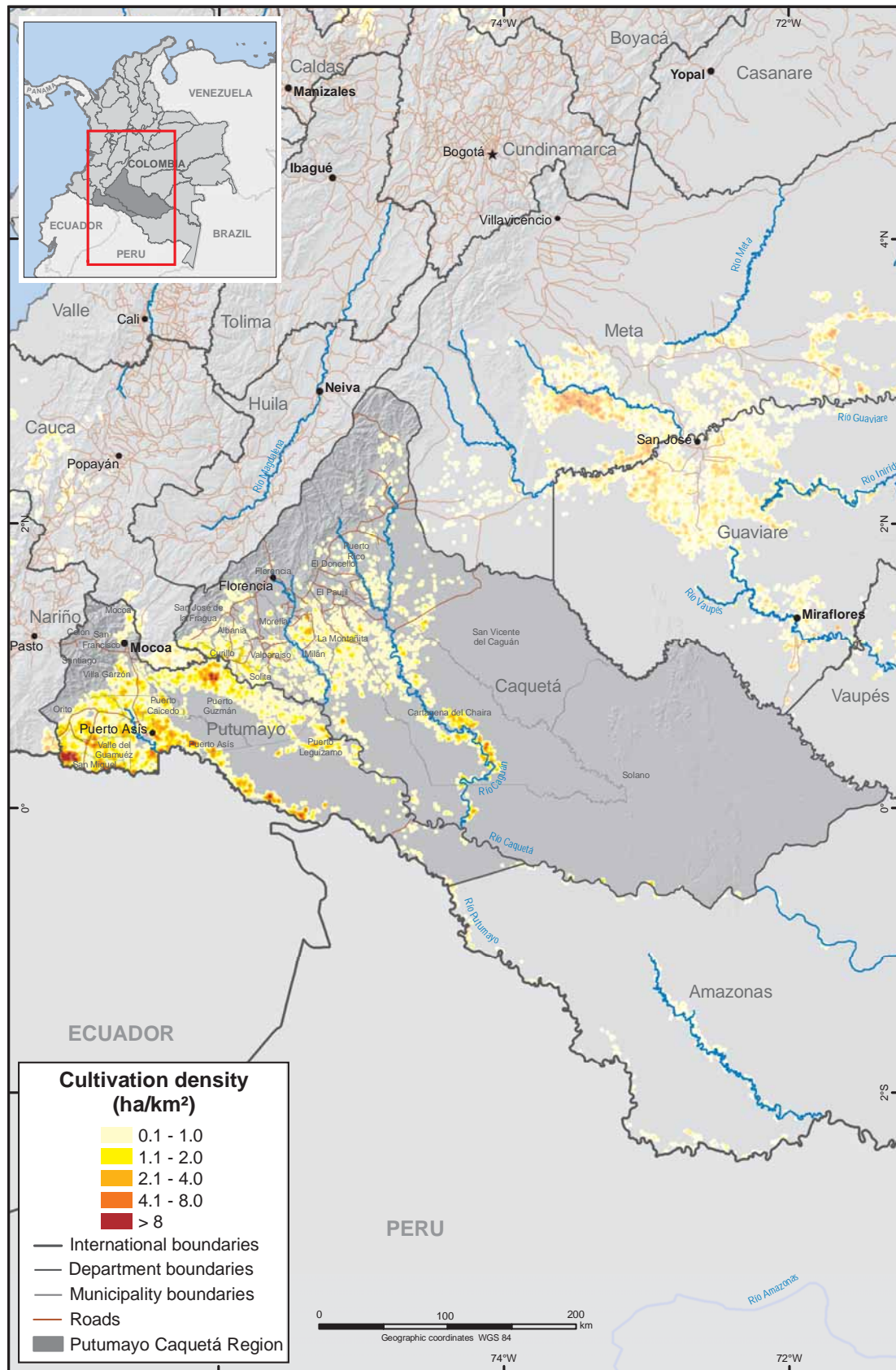
In 2006, coca cultivation was found in 21 municipalities out of 64. With a total of 15,606 hectares of coca cultivation, Nariño was the department with the highest amount of land under illicit cultivation, corresponding to 12% of the total coca cultivation in the country. Nariño accounted for 37% of all the fields of less than ¼ hectare found in the country, indicating the small scale of the coca cultivation.

Even though the department of Nariño shows the largest amount of coca cultivation, the investment in alternative development programmes continues at a low level at national level (3.7% in completed programmes and 7.6% in ongoing programmes). In Cauca department, the investment maintained a level of 3.9% of the national total.

Like neighbouring Nariño department, Cauca has a long coastline, high mountain ranges and a mainly rural economy. Coca cultivation remained relatively low in Cauca department, however, following a period of continuous decreases between 1999 and 2004, coca cultivation increased between 2004 and 2005 by 1,420 hectares (+114%) but decreased again in 2006 (- 600 hectares) when 4,174 hectares of coca were manually eradicated.

Although its capital, Cali, was an important centre for narco-trafficking in the nineties, the department of Valle del Cauca always recorded less than 200 hectares under coca cultivation. In the period 2005-2006, it showed a dramatic increase of 253 hectares (900%), from 28 hectares to 281 hectares, despite the manual eradication of 246 hectares.

Map 18: Coca cultivation density in the Putumayo-Caquetá region, Colombia 2006



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

In 2000, coca cultivation peaked in Putumayo department at 66,000 hectares, representing 40% of the national total. Following four years of consecutive decreases, coca cultivation in Putumayo was estimated at only 4,400 hectares or 5% of the national total in 2004. However, this trend was later reversed. Between 2004 and 2006, coca cultivation soared by 105% in 2005 and by 37% in 2006, putting this department on the second place of coca cultivation in the country. At the same time, 5,118 hectares were manually eradicated and aerial spraying increased from 11,800 hectares in 2005 to 26,500 hectares in 2006.

Table 27: Coca cultivation in the Putumayo-Caqueta region, 2000 - 2006 (hectares)

Department	2000	2001	2002	2003	2004	2005	2006	% Change 2005-2006
Putumayo	66,022	47,120	13,725	7,559	4,386	8,963	12,254	+37%
Caquetá	26,603	14,516	8,412	7,230	6,500	4,988	4,967	0%
Total	92,625	61,636	22,137	14,789	10,886	13,951	17,221	+23%
Annual trend	-	-33%	-64%	-33%	-26%	+28%	+23%	

In 2002, the Government started implementing Plan Colombia in this department, combining actions of interdiction, aerial spraying, manual eradication and important alternative development projects with good results in the period 2002 to 2004. However, in 2006, only 0.4% of the budget of ongoing alternative development projects went to Putumayo, whereas this used to be 35% in the past four years. Most of the new coca fields were established on the foothills close to the border with Nariño department and along the riverside of the Putumayo and Caqueta rivers. Spraying is particularly difficult in these mountainous areas, which could be a reason for the shift of coca cultivation to higher regions.

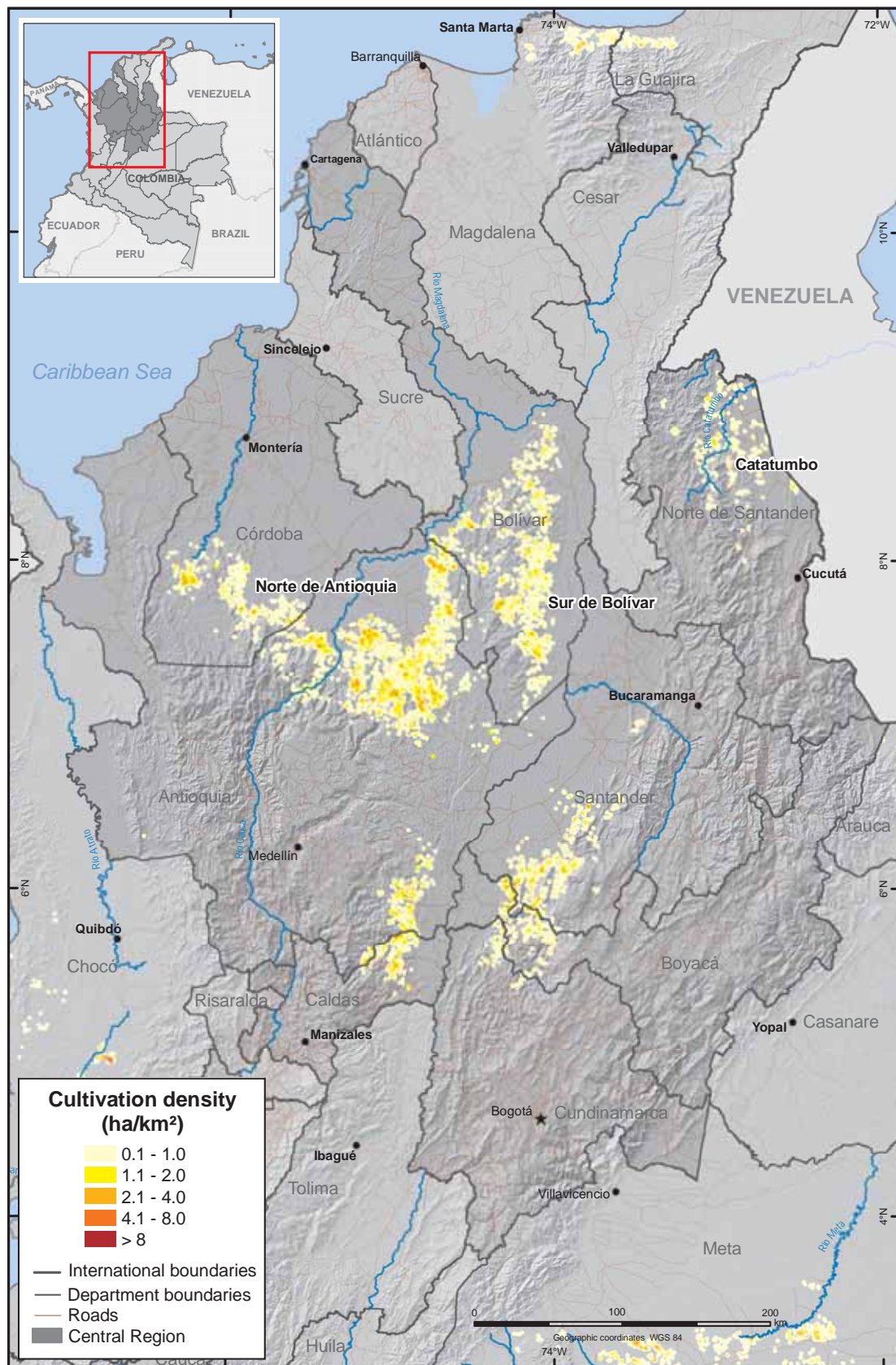
In a belt of about 10 km width along the Ecuadorian border that covers about 550,000 hectares in the departments of Nariño and Putumayo, 7,000 hectares of coca cultivation were found in 2006. This represented an increase of almost 3,000 hectares (or 72%) compared to 2005.

In Caqueta department, coca cultivation peaked at 26,000 hectares in 2000 or 16% of the country total. Following intense aerial spraying that started in 1996 with 537 hectares and peaked in 2002 at 18,600 hectares, coca cultivation decreased. In 2006, coca cultivation was at its lowest level at 4,967 hectares, or 6% of the country total.



Putumayo

Map 19: Coca cultivation density in the Central region, Colombia 2006



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

Since 2002, coca cultivation remained stable at around 15,000 hectares in the Central region of Colombia. Between 2005 and 2006, coca cultivation decreased by 22% to 12,131 hectares.

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. Between 1999 and 2006, the Government has been able to drastically reduce coca cultivation in this department. Between 2002 and 2004, aerial spraying averaged 10,000 hectares per year over this area, but in 2005 and 2006 it dropped to less than 2,000 hectares. In 2006, coca cultivation accounted for only 488 hectares, or 3% of the level of coca cultivation in 1999.

Table 28: Coca cultivation in the Central region, 2000 - 2006 (hectares)

Department	2000	2001	2002	2003	2004	2005	2006	% change 2005-2006
Antioquia	2,547	3,171	3,030	4,273	5,168	6,414	6,157	-4%
Bolivar	5,960	4,824	2,735	4,470	3,402	3,670	2,382	-35%
Cordoba	117	652	385	838	1,536	3,136	1,216	-61%
Santander	2,826	415	463	632	1,124	981	866	-12%
Norte de Sant.	6,280	9,145	8,041	4,471	3,055	844	488	-42%
Boyacá	322	245	118	594	359	342	441	29%
Caldas	-	-	-	54	358	189	461	144%
Cundinamarca	66	22	57	57	71	56	120	114%
Total	18,118	18,474	14,829	15,389	15,073	15,632	12,131	-22%
Annual trend		+2%	-20%	+4%	-2%	+4%	-22%	

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 remained relatively stable, accounting for 4% to 8% of the country total in the period 1999 - 2005. In 2006 coca cultivation decreased by 35% to the amount of 2,382 hectares, the lowest in the last eight years.

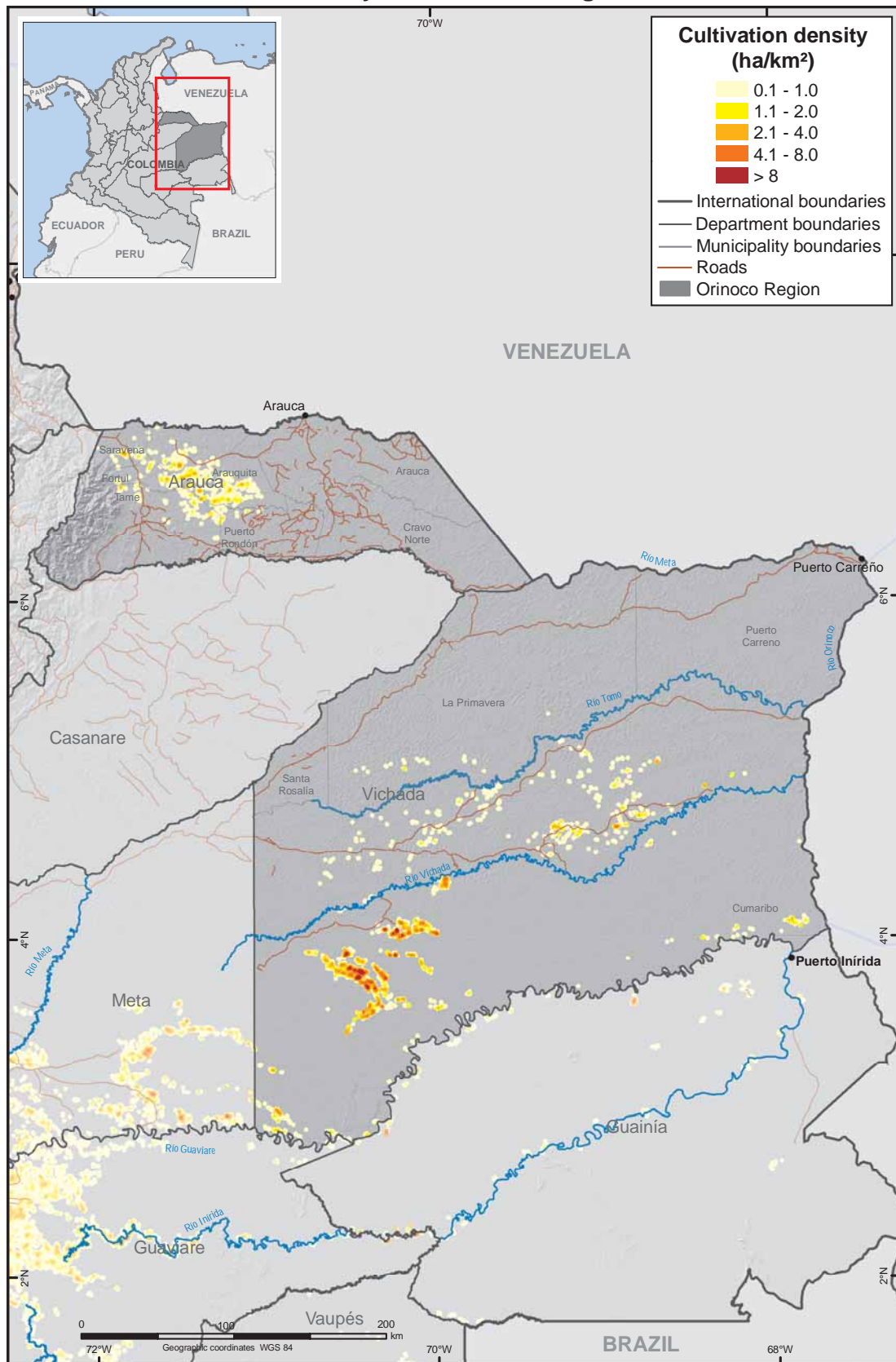
In Antioquia, coca cultivation averaged 3,000 hectares between 1999 and 2002. Coca cultivation has been increasing since 2002, from 3,030 hectares to 6,157 hectares in 2006. This increase over the past four years occurred despite the intensification of aerial spraying, from 3,300 hectares in 2002 to 16,800 hectares in 2005 and 18,000 hectares in 2006, plus the manual eradication of 3,146 hectares.

In the department of Caldas, the most important coffee growing area in Colombia, coca cultivation was detected for the first time in 2003 (54 ha). Coca cultivation reached a peak in 2006 with 461 hectares, despite manual eradication of 552 hectares in 2006.

The department of Cordoba showed a decrease of 1,920 hectares in 2006 (-61%) after an important increase in the period 2004-2005. Manual eradication reported in 2006 amounts to 2,142 hectares and the aerial spraying presented a significant increase from 1,800 hectares in 2005 to 5,600 hectares in 2006.

The departments of Norte de Santander, Antioquia and Santander received the largest support in alternative development in Colombia in 2006 with the 65% of the national total investment, though the coca cultivation amounts only to 9.6% of the national cultivation.

Map 20: Coca cultivation density in the Orinoco region, Colombia 2006



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

Orinoco region

In Vichada department, near the Venezuelan border, coca cultivation peaked at 9,200 hectares in 2001. It remained between 4,000 and 5,000 hectares from 2002 to 2004, but increased again by 67% between 2004 and 2005, before decreasing to 5,523 hectares in 2006.

Table 29: Coca cultivation in the Orinoco region, 2006 (hectares)

Department	2000	2001	2002	2003	2004	2005	2006	% Change 2005-2006
Vichada	4,935	9,166	4,910	3,818	4,692	7,826	5,523	-29%
Arauca	978	2,749	2,214	539	1,552	1,883	1,306	-31%
Total	5,913	11,915	7,124	4,357	6,244	9,709	6,829	-30%
Annual trend	-	+102%	-40%	-39%	+43%	+56%	-30%	

In Vichada, coca cultivation is concentrated along the Uva River. However, in the past three years, coca cultivation expanded to the Eastern part of the department, towards the Venezuelan border. The dispersion of coca cultivation in remote parts of the department increases the flight time and cost of aerial spraying. As a result, aerial spraying has been relatively low in this department in the past (below 3,000 hectares). However, in 2006, 5,500 hectares of aerial spraying were reported. Very little manual eradication took place in this department.

Coca cultivation in Arauca was detected for the first time in 2000 with about 1,000 hectares. It increased to more than 2,000 hectares in 2001 and 2002. In 2003, aerial spraying amounted to 12,000 hectares and coca cultivation dropped to 500 hectares in December of that year. However, it increased in 2004 and 2005, but decreased again in 2006 to 1,306 hectares. In 2006, 362 hectares were manually eradicated and 1,400 hectares sprayed.

Amazonia region

Like the Putumayo-Caqueta region, the departments of Vaupes, Amazonas and Guainia belong to the Amazon basin. Although sharing important similarity with Putumayo and Caqueta, these three departments, referred to as Amazon region, have never been important centres of coca cultivation. This is due to the remoteness of the area, the lack of airports and road infrastructure linking this region to the rest of the country. Consequently, aerial spraying of coca cultivation was almost not existent, except in Vaupes.

Overall, coca cultivation has slowly decreased since it was first observed in 2000.

Table 30: Coca cultivation in the Amazonia Region, 2000 - 2006 (hectares)

Department	2000	2001	2002	2003	2004	2005	2006	% Change 2004-2005
Guainía	853	1,318	749	726	721	752	753	0%
Amazonas	-	532	784	625	783	897	692	-23%
Vaupés	1,493	1,918	1,485	1,157	1,084	671	460	-31%
Total	2,346	3,768	3,018	2,508	2,588	2,320	1,905	-18%
Annual trend	-	+61%	-20%	-17%	+3%	-10%	-18%	

Sierra Nevada region

The Sierra Nevada region, with the departments of Magdalena and Guajira, has never been an important centre of coca cultivation in Colombia. Coca cultivation remained between 500 and 1,300 hectares over the last eight years. Between 2004 and 2006, coca cultivation decreased by an impressive 65%, to reach its lowest level with only 437 hectares. Coca cultivation remained located mainly in the fringe of lowlands between the high mountains of the Sierra Nevada and the seashore.

Table 31: Coca cultivation in the Sierra Nevada region, 2000 - 2006

Department	2000	2001	2002	2003	2004	2005	2006	% Change
Magdalena	200	480	644	484	706	213	271	27%
Guajira	321	385	354	275	556	329	166	-50%
Total	521	865	998	759	1,262	542	437	-19%
Annual trend	-	+66%	+15%	-24%	+66%	-57%	-19%	

For a few years already, the Sierra Nevada region benefited from important aid for alternative development, mainly due to the Sierra Nevada National Park. Government's data indicated an important increase in alternative development budget for 2005. At the same time, manual eradication activities reached 1,166 hectares in 2006.

The region is also an important tourism centre and hosts the Sierra Nevada National Park. The National Park is one of the most important ecological reserves in Latin America, known for its rich bio-diversity and presence of several ancient indigenous cultures. In 2006, coca cultivation amounted to 119 hectares in the Sierra Nevada National Park, an increase of 25% compared to 2005.

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.

In 2006, 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 the verification of small and isolated patches of coca cultivation was considered too time consuming and too costly. Therefore, the estimate for coca cultivation in these areas is presented as indicative and was not included in the final estimate. The 2006 survey analyzed 19 Landsat images for vegetation having characteristics similar to coca fields. A total of 356 hectares were assessed as possible coca cultivation in new areas.

Table 32: Possible coca cultivation in new area, 2006

Department	Area (ha)
Amazonas	203
Arauca	12
Caqueta	6
Guainia	35
Vaupés	68
Vichada	32
Total	356

Coca leaf, coca paste and cocaine base production

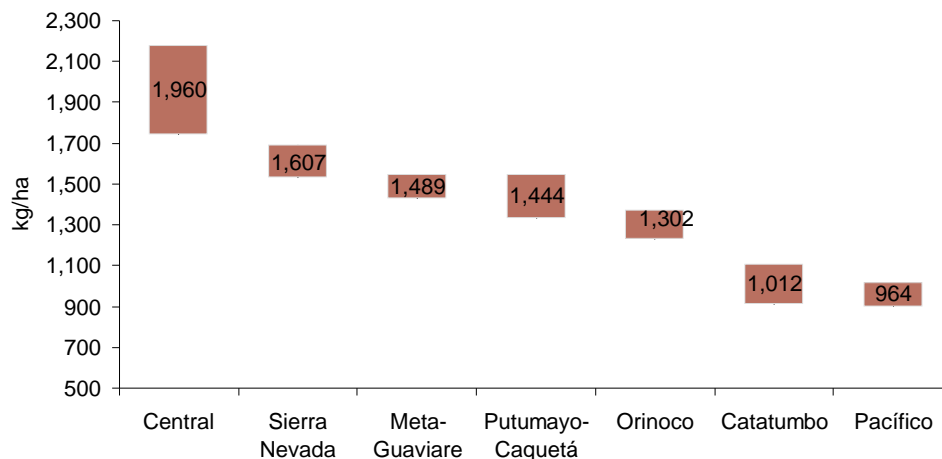
The potential production of fresh coca leaf in Colombia for 2006 was calculated by multiplying the regional average annual yield of fresh coca leaf established by the 2005 yield study by the regional area under coca cultivation⁸. The lower and upper estimates of the potential production of fresh coca leaf were calculated by using the lowest and highest annual regional yields. The potential production of fresh coca leaf was estimated at 489,200 metric tons, within a range of 438,985 and 542,546 metric tons. Assuming 57% moisture content, this was equivalent to a total production of 278,844, metric tons of sun-dried coca leaf.

Table 33: Regional average coca leaf yield per harvest by region

Region	Avg yield per harvest	Lowest limit of confidence interval	Highest limit of confidence interval	Coefficient of variation (CV in %)
	(kg/hectares)	(kg/hectares)	(kg/hectares)	
Central region	1,960	1,740	2,180	5.7%
Sierra Nevada	1,607	1,530	1,690	2.6%
Meta-Guaviare	1,489	1,430	1,550	2.1%
Putumayo-Caquetá	1,444	1,330	1,550	3.8%
Orinoco	1,302	1,230	1,370	2.7%
Catatumbo	1,012	910	1,110	5.0%
Pacific	964	900	1,020	2.9%
All regions	1,360	1,340	1,380	1.4%

Catatumbo and Sur de Bolívar make up Central region

Figure 24: Regional average of coca leaf yield per harvest (kg/hectares)



Due to the high annual yield observed in Meta-Guaviare, the region accounted for 42% of the total production, although it represented only 26% of the total coca cultivation.

In Colombia, traditional use of the coca leaf can be considered marginal, and virtually the entire coca leaf production is destined for cocaine production. There are various ways to produce cocaine. The overall process is that leaves are processed into coca paste, then into cocaine base, then into cocaine hydrochloride. The farmers can either sell the coca leaves, or process these leaves into coca paste or base. The last step, the processing of the cocaine base into cocaine hydrochloride is not carried out by farmers but in clandestine laboratories.

⁸ At the beginning of 2007, a pilot study was conducted in order to update the yield estimates. Preliminary results of this research are within the limits of variation observed during the yield study in 2005. The evaluation of this new study is still ongoing at the time of the printing of this report.

Coca paste is the first product obtained in the process of alkaloid extraction from coca leaves using sulfuric acid and combustibles. It is then a cocaine sulfate with a high content of organic remnants, pigments, tannin, and other substances. Cocaine base is obtained by dissolving the cocaine sulphate in an acid and adding an oxidant agent (potassium permanganate being the oxidant most often used), then adding a base. The resulting substance is precipitated and filtered.

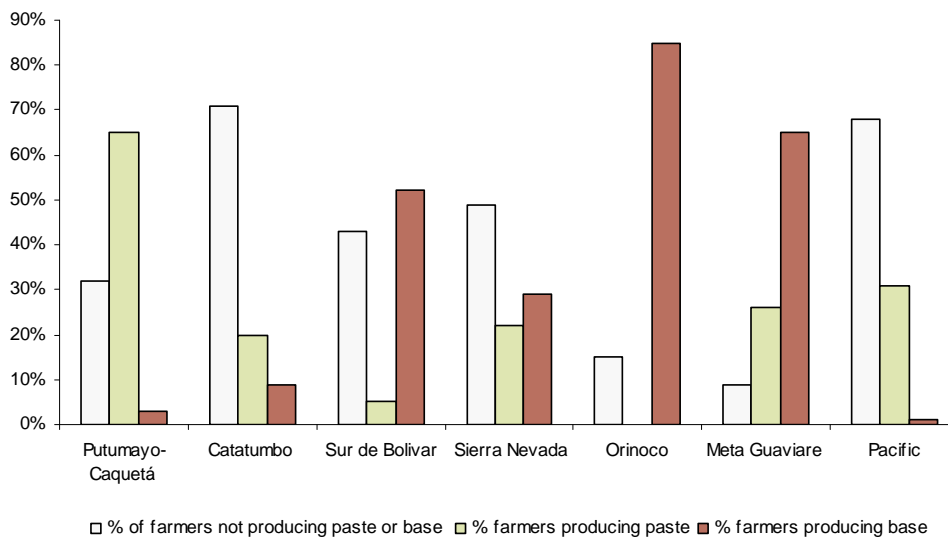
The coca leaf yield survey revealed that 34% of the farmers, representing only 25% of the total coca leaf production, sell directly the coca leaves, without processing them. Another 35% of the farmers, who represent 26% of the total coca leaf production, processed them into coca paste, and the remaining 31% of the farmers, who represent 49% of the total coca leaf production, process their leaves into cocaine base.

Table 34: Division of labour among coca producers

Region	% of farmers not processing coca leaves	% of farmers processing coca leaves into coca paste	% of farmers processing coca leaves into cocaine base
Putumayo-Caquetá	32%	65%	3%
Catatumbo	71%	20%	9%
Central	43%	5%	52%
Sierra Nevada	49%	22%	29%
Orinoco	15%	0%	85%
Meta Guaviare	9%	26%	65%
Pacific	68%	31%	1%
All regions	34%	35%	31%

Catatumbo and Sur de Bolivar make up Central region

Figure 25: Proportion of farmers processing and not processing coca leaves



During the survey, the farmers who processed their coca leaves were asked about the amount of coca leaves and ingredients used, and the amount of final product obtained. The distinction between paste and base is not easy to draw because the terms are often confused by the farmers themselves. In order to distinguish between these two products, it was decided to refer to cocaine base when the farmers reported the use of permanganate potassium or ammonium for processing their leaves, and coca paste when the farmers did not report the use of these products.

Therefore, it was possible to calculate the average conversion rate of one metric ton of coca leaves into coca paste (1.63 kg) and cocaine base (1.52 kg). In other words, coca paste yielded 93% of cocaine base.

Table 35: Average kg of coca paste or base obtained from one metric ton of coca leaf

Region	Number of PAU's ⁹ process coca leaf	Avg kg of coca paste per metric tons of coca leaf	Avg kg of cocaine base per metric tons of coca leaf
Putumayo-Caqueta	152	1.75	1.74
Catatumbo	37	1.39	1.38
Central	107	1.41	1.41
Sierra Nevada	69	1.45	1.45
Orinoco ¹⁰	118	-	1.73
Meta Guaviare	285	1.53	1.52
Pacific	79	1.55	1.46
All regions	847	1.63	1.52

Catatumbo and Sur de Bolivar make up Central region

About 30% of the coca leaf production was processed into coca paste. Thus, out of the total production of 489,200 mt of coca leaf, about 142,500 mt tons were processed into coca paste. Using the conversion rate of 1.63 kg of coca paste out of every tons of coca leaf, the total coca paste production from farmers was estimated at 234 mt. This was equivalent to 218 mt of cocaine base, based on a coca paste to base ratio of 93%.

Table 36: Calculation of coca paste production

Region	Total leaf production mt	Proportion of farmers producing coca paste %	Leaf production processed into coca paste mt
Meta-Guaviare	203,300	26%	52,900
Central	76,800	5%	3,800
Putumayo-Caqueta	96,400	65%	62,700
Orinoco	48,500	-	-
Pacific	48,900	31%	15,200
Amazonian	10,700	65%	7,000
Catatumbo	2,200	20%	400
Sierra Nevada	2,400	22%	500
Country level	489,200		142,500

Catatumbo and Sur de Bolivar make up Central region

The rest of the farmers either processed directly into cocaine base, or sell their production as leaf, corresponding to a total of 346,760 mt. Assuming that the production of coca leaf sold directly by the farmers was processed outside the farm into cocaine base at the same rate as within the farm of 1.52 kg per tons of leaf, the total amount of cocaine base was estimated at 536 mt.

⁹ Agriculture Production Unit: an economical unit dedicated to the production or others licit crops under a unique management of a person or a family

¹⁰ The Orinoco farmers process only cocaine base.

Table 37: Calculation of cocaine base production

Region	Fresh coca leaf production mt	Proportion of farmers producing cocaine base %	Proportion of farmers selling coca leaf for base processing %	Fresh coca leaf production for base processing mt
Meta-Guaviare	203,300	65%	9%	150,442
Central	76,800	52%	43%	72,960
Putumayo-Caqueta	96,400	3%	32%	33,740
Orinoco	48,500	85%	15%	48,500
Pacific	48,900	1%	68%	33,741
Amazonia	10,700	3%	32%	3,745
Catatumbo	2,200	9%	71%	1,760
Sierra Nevada	2,400	29%	49%	1,872
Country level	489,200			346,760

Catatumbo and Sur de Bolivar make up Central region

Overall, either produced from coca paste or directly from coca leaves, the total production of cocaine base in Colombia in 2006 was estimated at 754 metric tons.

Potential cocaine production

The coca yield survey implemented by UNODC and DNE in 2005 focused on obtaining data on the yield of coca leaf and on the processing by farmers of coca leaf into coca paste or cocaine base. The data on annual coca leaf yield and the conversion rates of coca leaves into coca paste and cocaine base were combined with the 2006 census estimating coca cultivation to estimate the total productions of coca leaf, coca paste and cocaine base.

To estimate cocaine production, UNODC relied on external sources. Indeed, investigating clandestine laboratories was not possible because these laboratories are directly in the hands of narco-traffickers. So far, UNODC did not collect any data to estimate the efficiency of these clandestine laboratories nor on the quantity of cocaine hydrochloride that can be produced from coca paste/base. In addition to the technical difficulties to obtain these data, this kind of survey is also complicated by the existence of several techniques to produce cocaine hydrochloride, and various purity level of the end-product.

The UNODC calculation for cocaine production in 2006 relied on its own estimate of cocaine base and on data obtained by the US Operation Breakthrough regarding the conversion rate from cocaine base to cocaine hydrochloride and the purity level of cocaine hydrochloride for conversion into equivalent of pure cocaine production.

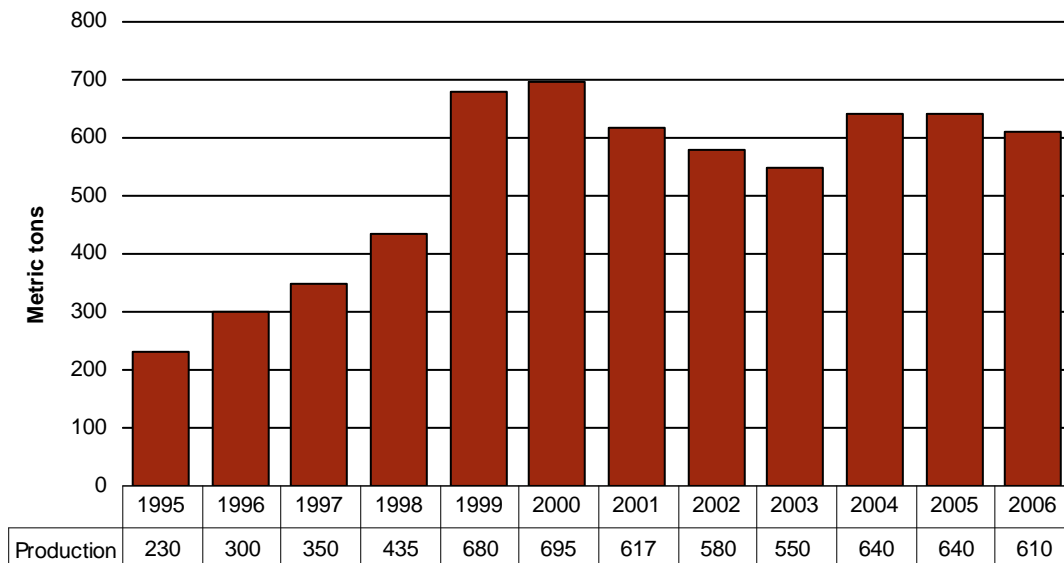
US Operation Breakthrough mentioned a 1:1 conversion rate from cocaine base to cocaine hydrochloride. However, this was obtained from laboratories especially set up for this kind of survey, and thus this conversion rate is likely to correspond to ideal circumstances not always obtained in reality, especially by farmers. The same source also communicated to UNODC that cocaine base contained about 75% of pure cocaine alkaloid and the cocaine hydrochloride contained about 85% of pure cocaine alkaloid. From this data, UNODC derived a 1:0.9 ratio from cocaine base to cocaine hydrochloride. This ratio of 1:0.9 was deemed to apply better to the cocaine base production, which corresponded to cocaine base obtained from farmers not working under ideal conditions. DEA and Operation Breakthrough apply a ratio of 1:1.

Based on this data, the 754 metric tons of cocaine base were equivalent to 678 metric tons of cocaine hydrochloride or 577 metric tons of pure cocaine. This represented an average pure cocaine yield per hectare of 7.4 kg/hectares.

Since 2002, UNODC estimated the cocaine production in Colombia based on the average of the two cultivation figures recorded as of December of the previous year and December of the current year. This average was then multiplied by the estimated yield per hectare. This method enables to

take into account that coca fields are harvested more than once in a given year and eradication activities are spread over several months. Therefore, based on an average coca cultivation level of 82,000 hectares, the pure cocaine production in Colombia for 2006 amounted to 610 metric tons.

Figure 26: Potential cocaine production in Colombia, 1995 - 2006 (metric tons)



Note: Cocaine production estimates for 2004 and later are not directly comparable with previous years.

In 2006, at the global level, the potential cocaine production in Colombia represented 62% of the global potential cocaine production of 984 metric tons.

Coca prices

Coca leaf, cocaine base and cocaine prices

Between 2005 and 2006, coca leaf prices decreased by 9% in US\$ terms and stayed stable in the local currency, Colombian Pesos (COP). Cocaine base, coca paste and cocaine prices also showed a decrease of 2 to 5%.

Changes in prices and purity of drugs are important indicators for the availability of drugs on the market. In 2005, UNODC-SIMCI started the periodic and systematic collection of price data in the first production stage (coca leaf, coca paste and cocaine base). This information is completed with data from the Presidential Programme against Illicit Crops (PCI). The prices of cocaine, cocaine base, morphine and heroin were provided by DIRAN and were collected by intelligence services in different cities in the country.

More and more, peasants take part in the transformation process and produce cocaine paste and cocaine base. Coca paste is the most traded product by farmers, whereas cocaine base would be produced mainly in clandestine laboratories as an intermediary product to cocaine hydrochloride. A 2005 study on the agricultural characteristics of coca cultivation in Colombia¹¹ showed that 34% of the peasants sell coca leaves without processing. Another 35% sell coca paste and the remaining 31% sell cocaine base.

Most peasants sell coca paste that they themselves produce in small “kitchens” located on the farm. The processing does not require much know-how and technology and therefore, in 85% of the cases the peasant does the processing himself, and only in 15% a “cook” or “chemist” is hired to do the processing. The technical know-how was brought to the farmers during the 90’s by drug-traffickers to facilitate and to increase the commercialization of cocaine.

¹¹ A study performed in 2005 by UNODC/SIMCI and DNE.

The prices of coca in different processing stages (coca leaves and coca paste) are influenced by aerial spraying and manual eradication, interdiction and the intervention of illegal armed groups, who often impose their prices and conditions on the farmers. In general, it was observed that repressive interventions of the national army had a decreasing impact on the prices due to the unavailability of sellers and resellers, although it did not necessarily affect production. On the other hand, extensive aerial spraying or problems due to adverse climate, pests and diseases could push up the prices.

Table 38: Average prices of coca leaf and its derivatives, 2004-2006

Derivatives	2004		2005		2006		% Change 2005-2006	
	US\$/kg	'000 COP/kg	US\$/kg	'000 COP/kg	US\$/kg	'000 COP/kg	US\$/kg	'000 COP/kg
Cocaine HCl	1,710	4,600	1,860	4,315	1,762	4,155	-5.3	-3.7
Cocaine base			1,090	2,532	1,038	2,447	-4.8	-3.3
Coca paste	810	2,119	910	2,109	879	2,070	-3.4	-1.8
Coca leaf	1.2	3.3	1.1	2.4	1.0	2.4	-9.1	0

Source: UNODC/SIMCI

Coca leaf prices

In Colombia, coca leaf is traded as fresh, whereas in Peru and Bolivia, coca leaf is traded as sun-dried.

In 2006, the average price for fresh coca leaf was US\$ 1.0/kg. Converted in equivalent sun-dried coca leaf (assuming a moisture loss of 57% between fresh and sun-dried coca leaf), this corresponds to US\$ 2.6/kg, which is similar to prices of sun-dried coca leaf in Peru (US\$ 2.5/kg) but a bit lower than in Bolivia (US\$ 3.2/kg). Average national coca leaf prices have shown little fluctuations in the last two years. At the regional level in Colombia, the highest coca leaf price was registered in Putumayo-Caquetá region and the lowest in Sierra Nevada region.

Coca paste prices

Prices of coca paste decreased from an average of US\$ 910 in 2005 to US\$ 879/kg in 2006 (-3%). However, the prices in local currency remained virtually unchanged in the last three years (around COP 2.1 million). The lowest level in the period 2000 to 2006 was registered in 2000 (COP 1.7 million) and the highest in 2003 (COP 2.2 million). Nevertheless, the fluctuations within a year are much more significant as can be seen in Figure 12, where the final price of 2006 is 28% higher than the price at the beginning of the year and is at its highest point in two years.

At the regional level, the highest coca paste prices were observed in Sierra Nevada, which is an important distribution point and where the prices are 30% higher than the national average price. At the beginning of 2006, it showed its lowest price of the year, which can be attributed to the demobilization of the AUC armed group. However, prices recovered and were at COP 2.8 million at the end of 2006.

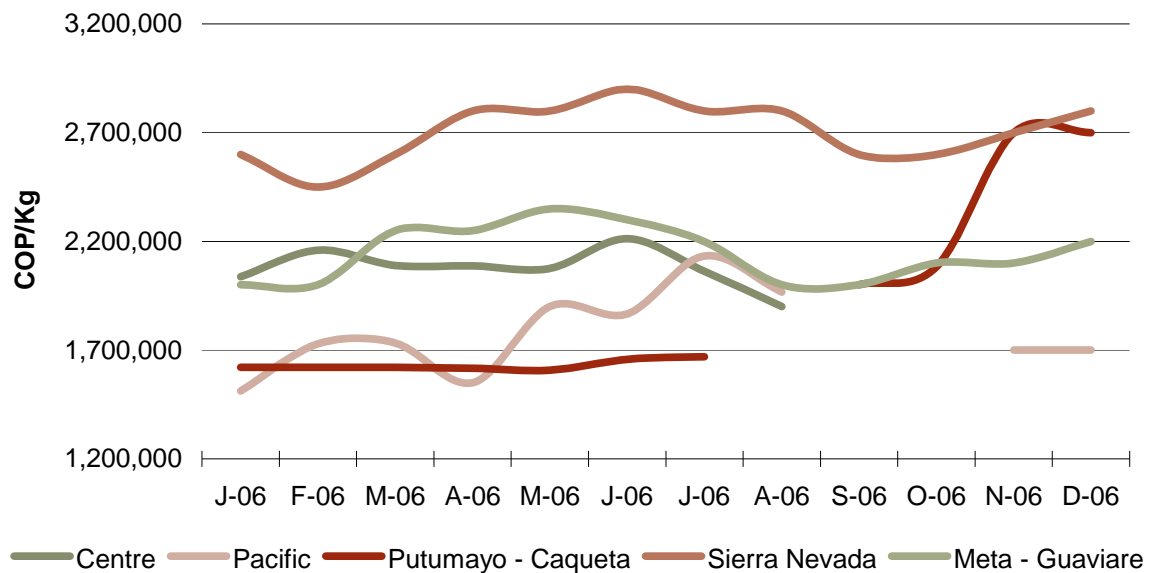
The lowest prices were paid in the Pacific region (COP 1.8 million or US\$ 755), followed by Putumayo-Caquetá (COP 1.9 million or US\$ 891). There was an increasing trend in the second half of 2006, which can be attributed to high levels of aerial spraying.

Table 39: Monthly coca paste price, 2006 ('000 COP/kg)

Months	Weighted national average	Central	Pacific	Putumayo -Caqueta	Sierra Nevada	Meta-Guaviare
January	1,846	2,037	1,512	1,621	2,600	2,000
February	1,939	2,159	1,729	1,621	2,450	2,000
March	1,932	2,089	1,733	1,621	2,600	2,250
April	1,918	2,087	1,550	1,617	2,800	2,250
May	2,002	2,075	1,900	1,608	2,800	2,350
June	2,061	2,212	1,866	1,658	2,900	2,300
July	2,040	2,062	2,133	1,670	2,800	2,200
August	2,150	1,900	1,967		2,800	2,000
September	2,100			2,000	2,600	2,000
October	2,150			2,083	2,600	2,100
November	2,340		1,700	2,700	2,700	2,100
December	2,360		1,700	2,700	2,800	2,200
Average COP	2,070	2,078	1,779	1,900	2,704	2,146
Average US\$	879	779	755	891	1,147	911

Source: UNODC/SIMCI

Figure 27: Monthly coca paste price in Colombia, 2006 ('000 COP/kg)



*Orinoco does not have information on coca paste because the coca is immediately processed into cocaine base, which can be explained by the region's easy access to the necessary chemicals.

Cocaine base prices

The collection of price data and their analysis is complicated by the absence of standard in naming coca products, and by the lack of indications on their quality. This is the case for cocaine base and coca paste, which can easily be confused. However, the data on cocaine base, albeit less frequently reported than the data on coca paste, confirmed that cocaine base is a more refined product than coca paste, and that both products can be traded. On average, for 2006, prices of cocaine base were 19% higher than the prices of coca paste and the highest prices for cocaine base were obtained in Orinoco and Meta-Guaviare.

Cocaine prices

In 2006, cocaine prices continued to decrease. This decrease started in 2004 after 7 years of increases in cocaine prices. The annual average in 2006 was US\$ 1,762/kg, which was a 6% decrease compared to the average of 2005. The highest prices were paid in Meta Guaviare, followed by the Central region and Sierra Nevada; the lowest prices were paid in the Pacific region and Orinoco.

Because of the clandestine nature of the trade, cocaine prices are less easily collected than prices of coca paste or coca leaf. This explains that fewer data are available for cocaine prices compared to other products. In Colombia, prices of cocaine hydrochloride are collected by DIRAN (the Anti-Narcotics Police), and refer to wholesale prices in the main cities. The purity level was not investigated in this study.

The table below presents the annual averages of cocaine prices since 1991. The prices are presented both in Colombian Pesos (COP) and US\$ as constant price of 1991 to correct for inflation.

Table 40: Cocaine HCl price in Colombia 1991 - 2006

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
2005	4,315	1,860
2006	4,155	1,762

Source: DIRAN

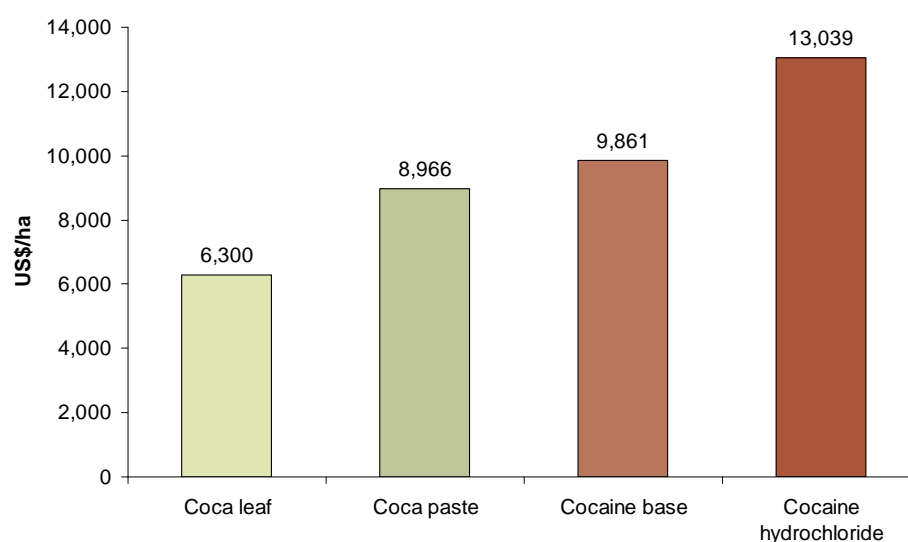
When an analysis is made of the trend of annual prices of cocaine in Colombian pesos and the trend of the annual total areas of aerial spraying, a positive correlation is found ($\rho = 0.92$ for constant prices between 1994 and 2006). This means that an increase in area sprayed corresponds to an increase in cocaine prices in Colombian Pesos. However, this relationship cannot be so strongly established for prices of cocaine in US\$ ($\rho = 0.19$ for constant prices between 1994 and 2006).

Income per hectare

The potential income values from the sale of coca leaf, coca paste and cocaine base was calculated from data from the monthly survey on prices of the Andean coca market combined with the data from the coca leaf yield survey. The differences between these incomes give an indication of the value-added if farmers produce coca paste and cocaine base. The table below shows a definite increase in the value added at each step of the processing. The value-added of cocaine base (60%), the final product that can be produced by the farmers, also explained why 49% of the coca leaf production was transformed into cocaine base by the farmers.

Table 41: Potential annual gross income per hectare of coca cultivation for different derivatives of coca leaf

Derivatives	Annual yield	Average annual price	Annual income in	Value-added from coca leaf
	kg/ha	US\$/kg	US\$/hectare	%
Coca leaf	6,300	1.0	6,300	---
Coca paste	10.2	879	8,966	44%
Cocaine base	9.5	1,038	9,861	57%
Cocaine hydrochloride	7.4	1,762	13,039	107%

Figure 28: Potential annual income per hectare of coca leaf, coca paste, cocaine base and cocaine HCl

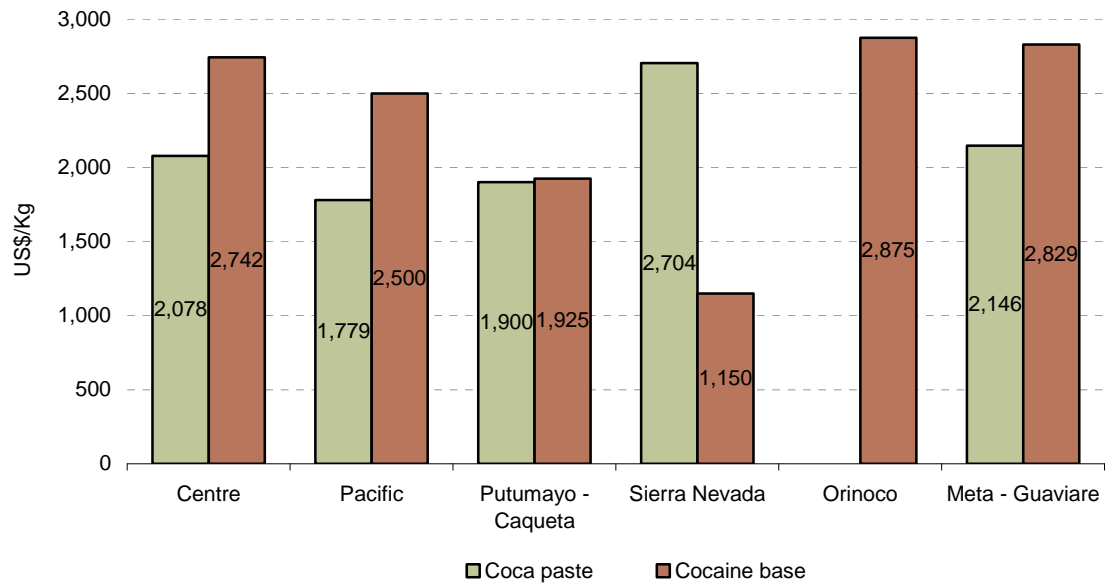
Based on the total production of each product sold by the farmers and the respective prices in 2006, the total farm-gate income value resulting from coca cultivation was estimated at about US\$ 683 million. This value does not take into account the farmers' production costs, such as costs of herbicides, pesticides, fertilizers and labour wages. Due to the very high annual coca leaf yield (9,900 kg/hectares) and the high proportion of farmers processing cocaine base in Meta-Guaviare, 47% of the total amount of US\$ 683 million is made in this region alone.

The total farm-gate value of production of coca leaf and its derivatives corresponded to 0.5% the 2006's GDP. In 2006, the total farm-gate value of coca cultivation represented 5% of the agricultural GDP.

Table 42: Value of the production of coca leaf and its derivatives at farm-gate level

Product	Kg	US\$/kg	US\$ value
Coca leaf	128,858,000	1.0	128,858,000
Coca paste	234,000	879	205,686,000
Cocaine base	336,000	1,038	348,768,000
Rounded total farm-gate			683,312,000

Figure 29: Comparison of the prices of coca paste and cocaine base in 2006 (US\$/kg)



**Orinoco does not have information on coca paste because the coca is immediately processed into cocaine base, which can be explained by the region's easy access to the necessary chemicals.*



Sprayed coca fields

Supply reduction

Reported forced manual eradication

For the third consecutive year, forced manual eradication increased in 2006 and amounted to 41,530 hectares. This was an increase of 33% compared to 2005 (31,285 hectares). The eradication activities have been extended to 20 departments (17 in 2005) and 85 municipalities (21 in 2005). About half of the total eradicated area is located in 4 departments: Nariño, Meta, Putumayo and Cauca.

Forced manual eradication is the responsibility of the Presidential Agency for Social Action, and is executed by Mobile Eradication Groups-GME- that consist of farmers and ex- illegal armed group members with the help of the Anti Narcotics Police (DIRAN) and the army. In addition, the national police implemented an institutional plan “Everybody against coca”, by which police departments are instructed to assist in the manual eradication programmes. In 2006, UNODC has monitored and verified the manually eradicated fields on a sample base.

Table 43: Reported forced manual eradication of coca areas by department, 2006 (ha)

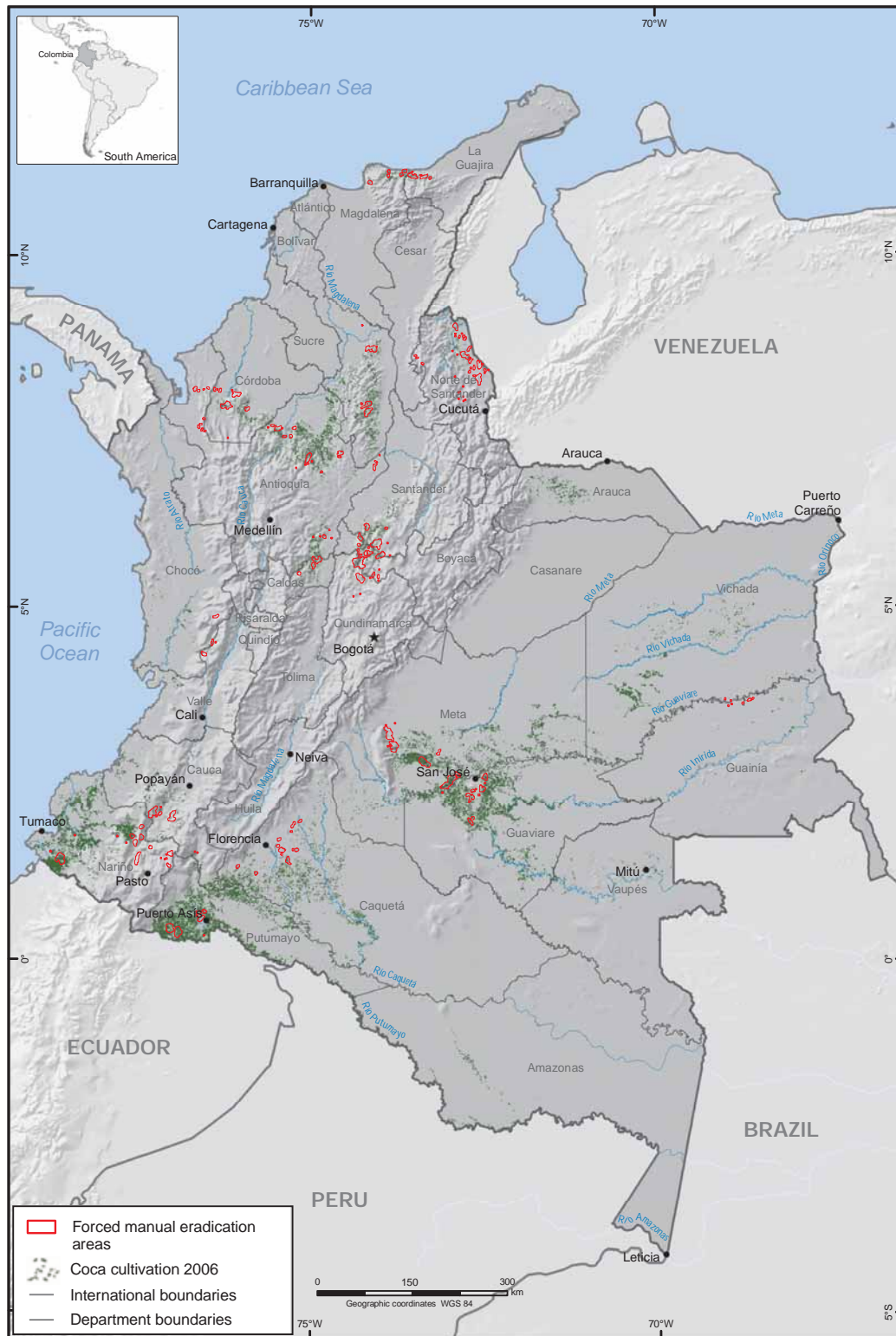
Department	Manual eradication by GME (ha)	Manual eradication by the Police (ha)	Total (ha)	Share %
Amazonas		15	15	0.04
Antioquia	2,506	640	3,146	7.6
Arauca		362	362	0.9
Bolivar	1,819	132	1,952	4.7
Boyaca	1,389	508	1,897	4.6
Caldas	521	31	552	1.3
Caqueta	1,028	263	1,291	3.1
Cauca	4,090	85	4,174	10.1
Casanare		3	3	0.01
Cesar		15	15	0.04
Choco	181	422	603	1.5
Cordoba	2,052	90	2,142	5.2
Cundinamarca	668	74	742	1.8
Guainia	193	111	303	0.7
Guajira	671	8	679	1.6
Guaviare	843	260	1,103	2.7
Huila		10	10	0.02
Magdalena	463	10	473	1.1
Meta	5,170	6	5,176	12.5
Nariño	6,132	873	7,005	16.9
Norte de Santander	1,509	139	1,648	4
Putumayo	4,969	149	5,118	12.4
Santander	1,388	1,242	2,630	6.4
Sucre		4	4	0.01
Tolima		16	16	0.04
Valle	364	63	427	0.6
Vichada		44	44	0.1
Total	35,956	5,575	41,530	100

Sources: PCI- Social Action, National Police

Manual eradication has a major impact on coca production since the bushes are completely uprooted. Replanting means significant costs for the farmer since it takes about 8 months between planting and the first harvest, moreover with low productivity in the initial stage. However, in

some eradicated areas, replanting and new coca plantations have been observed and UNODC recommends in its eradication report¹² to accompany eradication with alternative development projects.

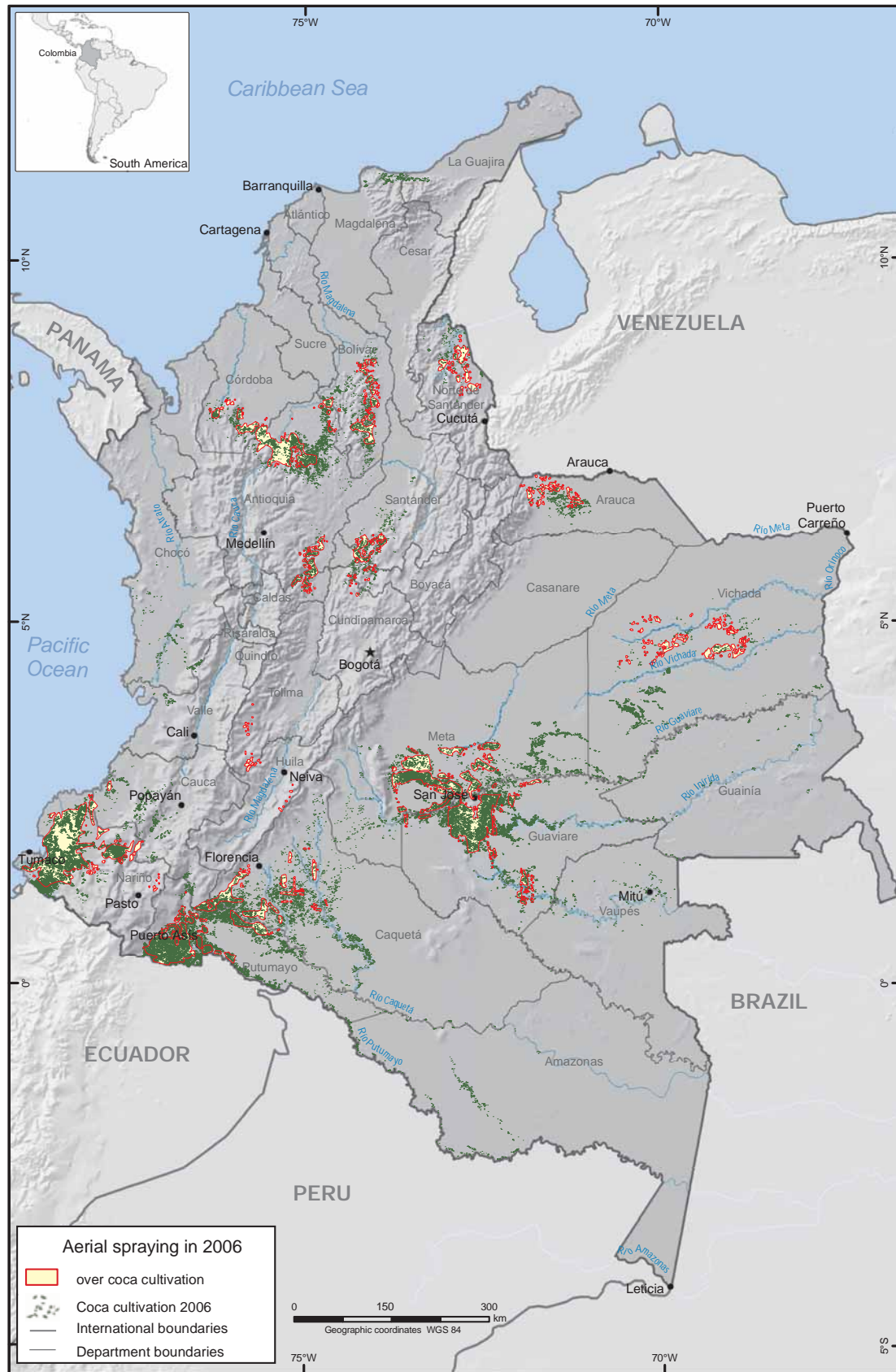
Map 21: Forced manual eradication and coca cultivation in Colombia, 2006



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

¹² Report on monitoring and assessment of the manual eradication conducted in 2006 (GME)

Map 22: Aerial spraying and coca cultivation in Colombia, 2006



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

Reported aerial spraying

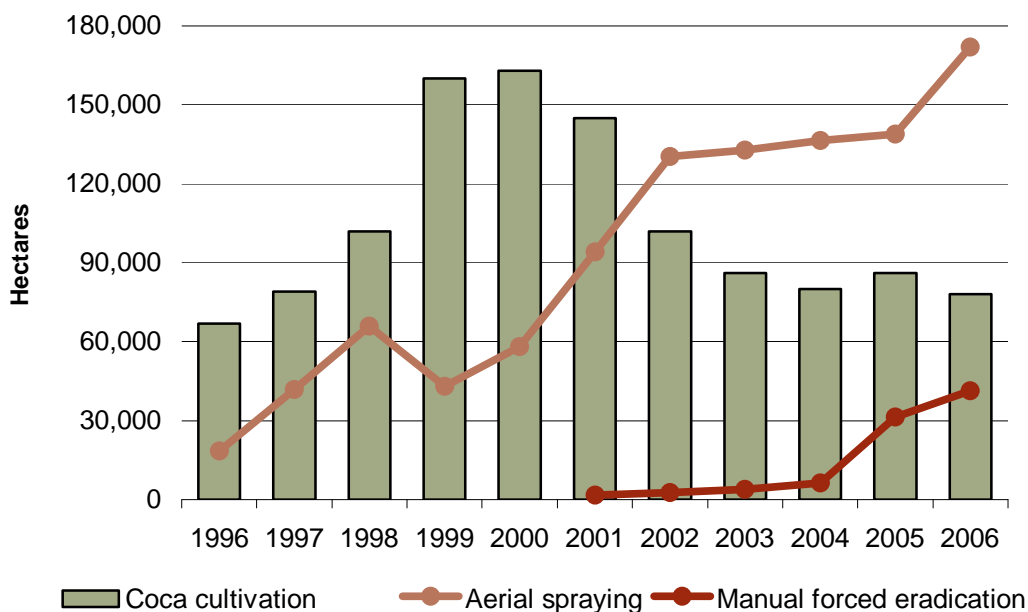
The Colombian anti-drugs strategy includes a number of measures ranging from aerial spraying, to forced or voluntary manual eradication, including alternative development and crops substitution programmes. UNODC did not participate in or supervise the spraying activities. All data were received directly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

The spraying programme carried out by DIRAN 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 increase the spraying effectiveness rate, which was reported to be 91% in 2004. The chemical mixture affects the leaves and not the roots or the soil, and therefore the bush can be pruned at about one feet above the ground to obtain a renewal of the bush in about six months. In 2006, the spraying effectiveness rate was estimated by the Government as being 88 %.

The Government of Colombia's 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 the “Eradication of Illicit Crops Programme by Aerial Spraying with Glyphosate”, confirming the observance of the environmental obligations required in the Management Plan. In 2006, the government of Colombia authorized the aerial spraying of 2,090 hectares of coca cultivation into the National Natural Park Sierra La Macarena.

Reports from DIRAN showed that, for the sixth consecutive time, spraying activities reached record level in 2006. The DIRAN sprayed a total of 172,025 hectares, representing an increase of 24% compared to last year aerial spraying levels. 50% of spraying activities were implemented in the departments of Putumayo, Meta, Antioquia and Guaviare. In the department of Nariño, which has the lowest potential production of cocaine, 59,865 hectares (or 35%) of coca cultivation were sprayed. In the department of Meta, which has the highest cocaine productivity rates in Colombia, 25,195 hectares (or 15%) of coca cultivation were sprayed. The Government also reported the aerial spraying of 231 hectares and the manual eradication of opium poppy cultivation.

Figure 30: Comparison of net coca cultivation, cumulative spraying and eradicated areas (hectares)



The cumulative sprayed area is the sum of areas during a given time period (calculated by multiplying the length of flight lines by their width), and it differs from the effective sprayed area,

which disregards the overlap between adjacent sprayed bands and areas sprayed several times in the same calendar year.

Table 44: Reported aerial spraying of coca cultivation by department, 1998 - 2006 (ha)

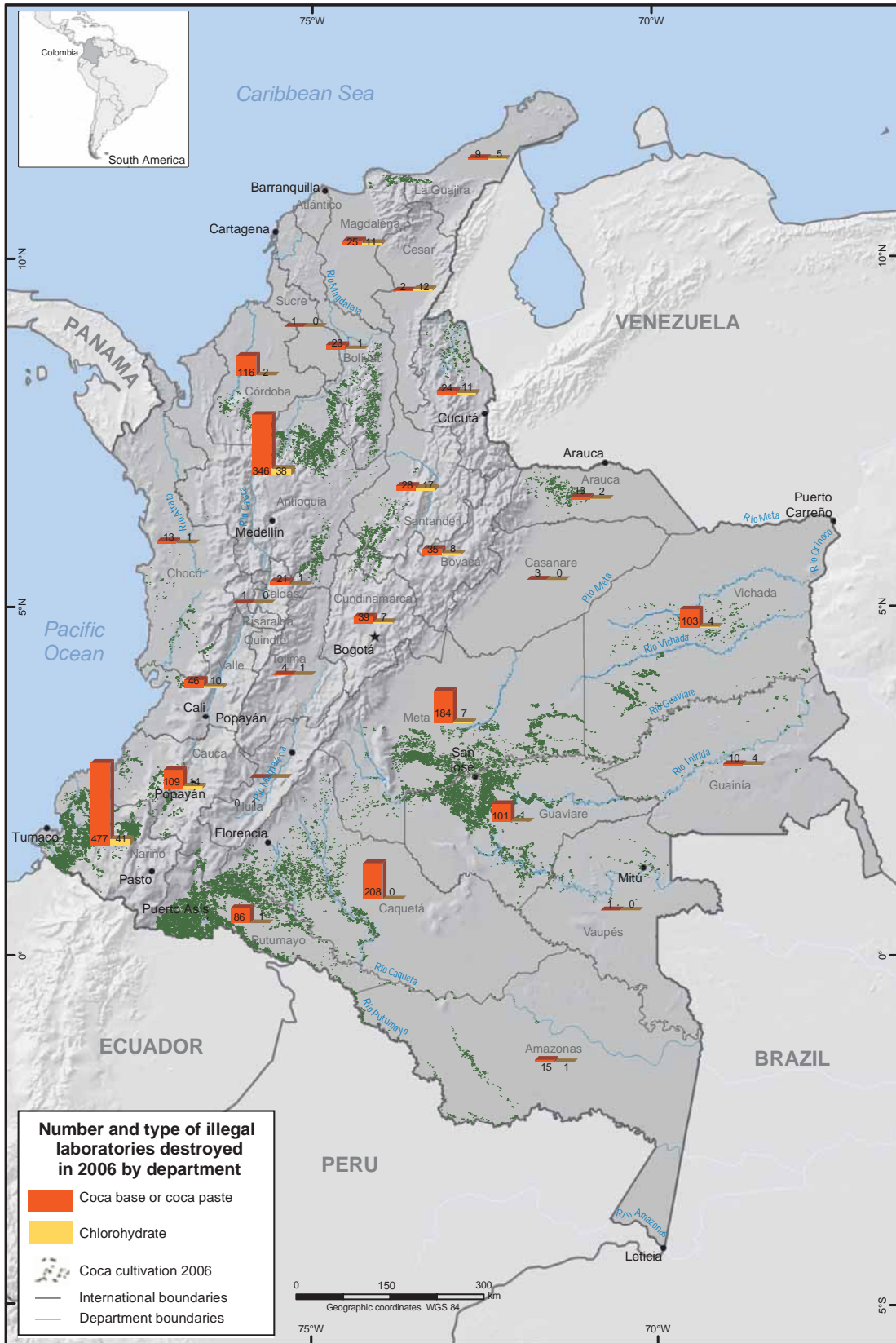
Sources	Environmental Audit of the National Narcotics Bureau		Antinarcotics Police Department						
	1998	1999	2000	2001	2002	2003	2004	2005	2006
Guaviare	37,081	17,376	8,241	7,477	7,207	37,493	30,892	11,865	14,714
Meta	5,920	2,296	1,345	3,251	1,496	6,973	3,888	14,453	25,915
Caquetá	18,433	15,656	9,172	17,252	18,567	1,059	16,276	5,452	4,575
Putumayo	3,949	4,980	13,508	32,506	71,891	8,342	17,524	11,763	26,491
Vichada	297	91	-	2,820	-	-	1,446	-	5,485
Antioquia	-	-	6,259	-	3,321	9,835	11,048	16,833	18,022
Córdoba	-	-	-	-	734	550	-	1,767	5,588
Vaupés	349	-	-	-	-	-	756	340	-
Cauca	-	2,713	2,950	741	-	1,308	1,811	3,292	1,536
Norte de Sant.	-	-	9,584	10,308	9,186	13,822	5,686	899	1,687
Nariño	-	-	6,442	8,216	17,962	36,910	31,307	57,630	59,865
Santander	-	-	470	-	-	5	1,855	2,042	2,146
Boyacá	-	-	102	-	-	-	-	925	831
Bolívar	-	-	-	11,581	-	4,783	6,456	6,409	2,662
Arauca	-	-	-	-	-	11,734	5,336	2,584	1,400
Magdalena	-	-	-	-	-	-	1,632	383	-
Guajira	-	-	-	-	-	-	449	572	-
Caldas	-	-	-	-	-	-	190	1,090	1,068
Valle	-	-	-	-	-	-	-	5	-
Chocó	-	-	-	-	-	-	-	425	-
Cundinamarca	-	-	-	-	-	-	-	43	41
Total	66,029	43,111	58,073	95,898	133,116	136,828	139,141	138,772	172,02
Net cultivation	102,00	160,00	163,00	145,00	102,000	86,000	80,000	86,000	78,000

Source: DIRAN

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 recovers quickly. 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).

In order to neutralize or reduce the impact of the aerial spraying, several actions are taken by the farmers such as: to plant coca bushes interspersed with other plants, to apply protective substances on leaves, to wash the leaves, to reduce the size of the fields, to rotate coca crops with other licit crops in the same field, etc. The aerial spraying may cause the loss of one or more harvests, the reduction of productivity or the total loss of crops but it has become clear that the impact varies considerably from one region to another and that it is not the only cause for reduction or loss of coca crops.

Map 23: Destruction of clandestine laboratories and coca cultivation



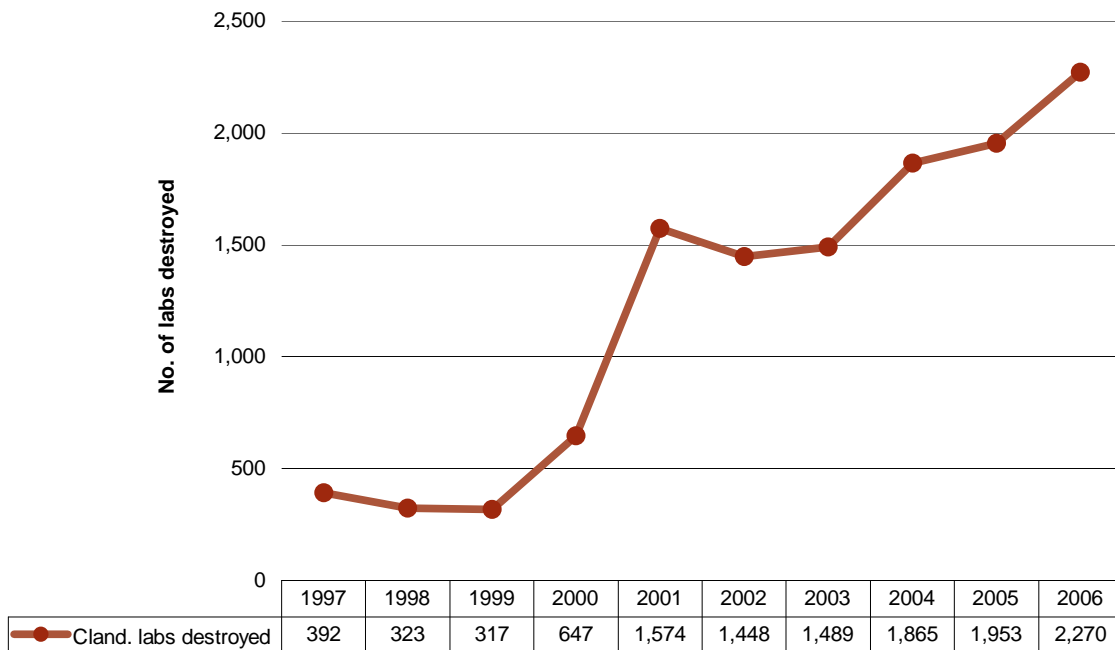
Source: Government of Colombia - National monitoring system supported by UNODC, for destruction of illegal laboratories: DNE
 The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations

Reported seizures

UNODC is not involved in the collection of data on seizures and destruction of laboratories. The data provided by the Colombian government are presented here to show the existence of possible trafficking corridors and allow for a better understanding of the dynamics that surrounds the drug business.

According to DNE, in 2006, a total of 2,270 clandestine laboratories were destroyed. Out of these, 2,045 laboratories processed coca paste or cocaine base, 202 cocaine hydrochloride, 15 potassium permanganate, and 7 heroin and 1 marihuana. Compared to 2005, this represented an increase of 16% in the number of illegal laboratories destroyed, demonstrating the high intensity of the actions taken by the Colombian Government against illicit drug production.

Figure 31: Number of clandestine laboratories destroyed, 1997-2006



Most of the laboratories for coca leaf processing (basic paste, cocaine base and cocaine) and also for potassium permanganate were detected and destroyed in the departments of Nariño and Antioquia, where 28% of coca crop cultivation was found. 50% of the laboratories were found in the Central Region¹³, followed by the Pacific Region¹⁴, which is strategically well located.

¹³ Central Region: Antioquia, Bolívar, Córdoba, Santander, Boyacá, Caldas, Cundinamarca, Tolima.

¹⁴ Pacific Region: Nariño, Cauca, Chocó y Valle.

Table 45: Clandestine laboratories destroyed by department and by drug type, 2006

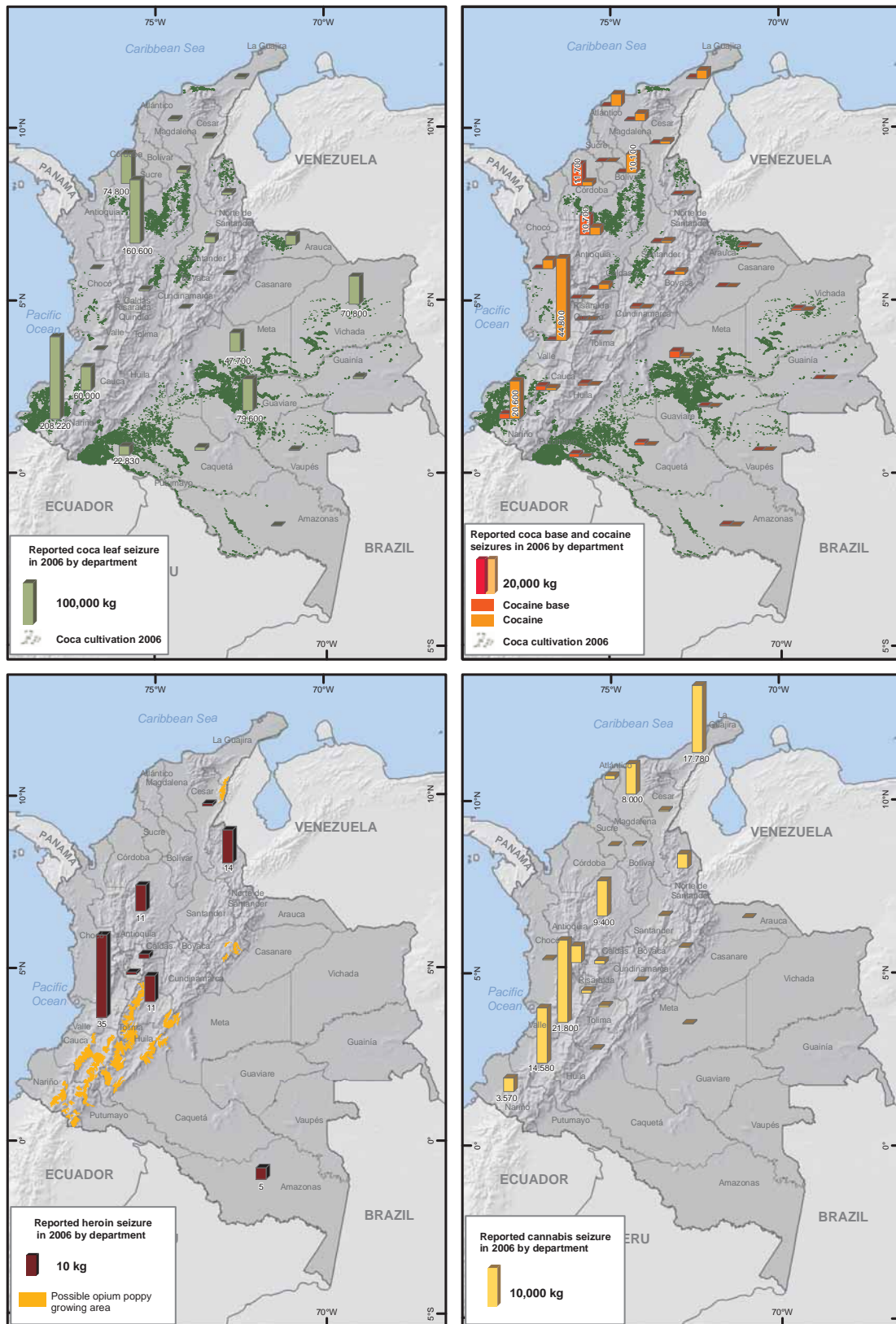
Department	Coca paste or cocaine base laboratories destroyed	Cocaine laboratories destroyed	Heroin laboratories destroyed	Marihuana	Potassium permanganate laboratories destroyed	Total
Nariño	477	41	7	-	8	533
Antioquia	346	38	-	-	4	388
Santander	28	17	-	-	1	46
Cauca	109	14	-	-	-	123
Cesar	2	12	-	-	-	14
Magdalena	25	11	-	-	-	36
Norte de Sant.	24	11	-	-	-	35
Valle	46	10	-	-	-	56
Boyaca	35	8	-	-	-	43
Cundinamarca	39	7	-	1	-	47
Meta	184	7	-	-	2	193
La-guajira	9	5	-	-	-	14
Guainia	10	4	-	-	-	14
Vichada	103	4	-	-	-	107
Arauca	13	2	-	-	-	15
Bogota	1	2	-	-	-	3
Cordoba	116	2	-	-	-	118
Amazonas	15	1	-	-	-	16
Bolivar	23	1	-	-	-	24
Caldas	21	1	-	-	-	22
Choco	13	1	-	-	-	14
Guaviare	101	1	-	-	-	102
Putumayo	86	1	-	-	-	87
Tolima	4	1	-	-	-	5
Caqueta	208	-	-	-	-	208
Casanare	3	-	-	-	-	3
Huila	1	-	-	-	-	1
Risaralda	1	-	-	-	-	1
Sucre	1	-	-	-	-	1
Vaupés	1	-	-	-	-	1
Total	2,045	202	7	1	15	2,270

Source: DNE

Data provided by National Narcotics Bureau –DNE- show a decrease of 27% from 2005 to 2006 in cocaine seizures from 173 mt to 127 mt. However, there were important increases in coca leaf and base or paste seizures (20% and 105%) and decreases in the rest of the drugs.

In the last three years, the departments of Valle del Cauca and Nariño have been the leaders in drug seizures with 51% of total due to their strategic locations for production and easy exportation to international markets. The Pacific Corridor continues to be the most commonly used route for drug transport (81% of seizures take place at sea).

Map 24: Drug seizures by department and by drug type, 2006



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 46: Reported seizures of illicit drugs, 2001 - 2006

Drug	unit	2001	2002	2003	2004	2005	2006
Coca leaf	kg	583,165	638,000	688,691	567,638	682,010	818,544
Coca paste	kg	53	974	2,368	1,218	2,651	5,451
Cocaine base	kg	16,572	22,615	27,103	37,046	106,491	42,708
Basuco	kg	1,225	1,706	2,988	2,321	19,607	1,476
Cocaine hydrochloride	kg	57,140	95,278	113,142	149,297	173,265	127,326
Opium latex	kg	4	110	27	57	1,632	118
Morphine	kg	47	21	78	39	93	27
Heroin	kg	788	775	629	763	745	442
Raw cannabis	kg	86,610	76,998	108,942	151,163	150,795	93,745
Synthetic drugs	unit	22,750	175,382	5,042	19,494	-	-

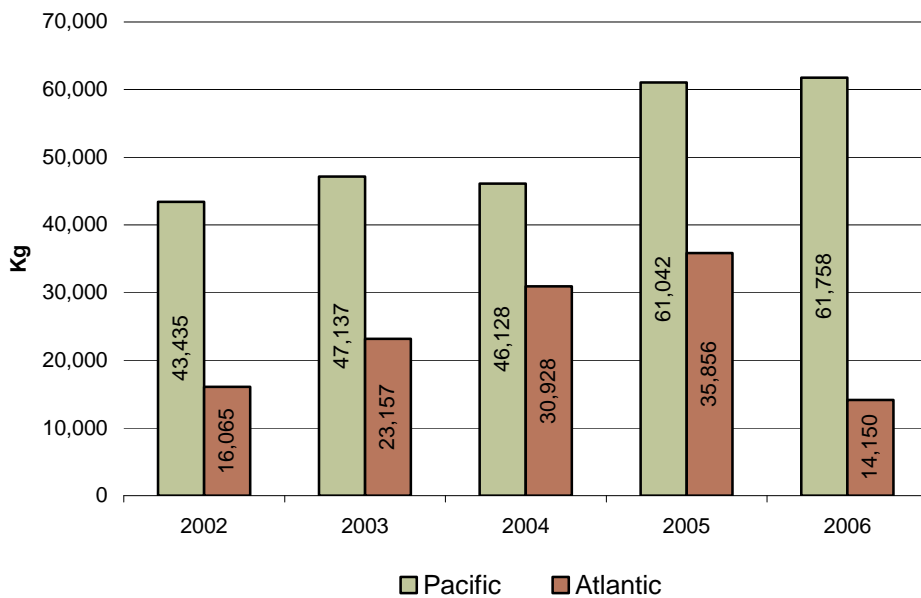
Source: DNE

Table 47: Reported seizures of cocaine on the Pacific and Atlantic routes, 2002 - 2006

	2002	2003	2004	2005	2006	% seizures
Pacific	43,435	47,137	46,128	61,042	61,758	81%
Atlantic	16,065	23,157	30,928	35,856	14,150	19%
Total seized by sea	59,500	70,294	77,056	96,898	75,908	100%
Total seizures	95,278	113,142	149,297	173,265	127,326	
% of seizures	62%	62%	52%	56%	60%	

Source: Colombian Navy, Intelligence Division

Out of the total 127 mt of cocaine seized in 2006, 76 mt (or 60%) were seized at sea or in maritime ports, which leads to the conclusion that most of coca shipments are transported over sea.

Figure 32: Reported seizures of cocaine on the Pacific and Atlantic routes, 2002 - 2006

PART 4. ECUADOR

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Aldo Lale-Demoz, UNODC Representative for Peru and Ecuador

Coen Bussink, Remote Sensing and GIS Expert (UNODC – Research and Analysis Section)
Anja Korenblik, Programme Manager (UNODC – Research and Analysis Section)
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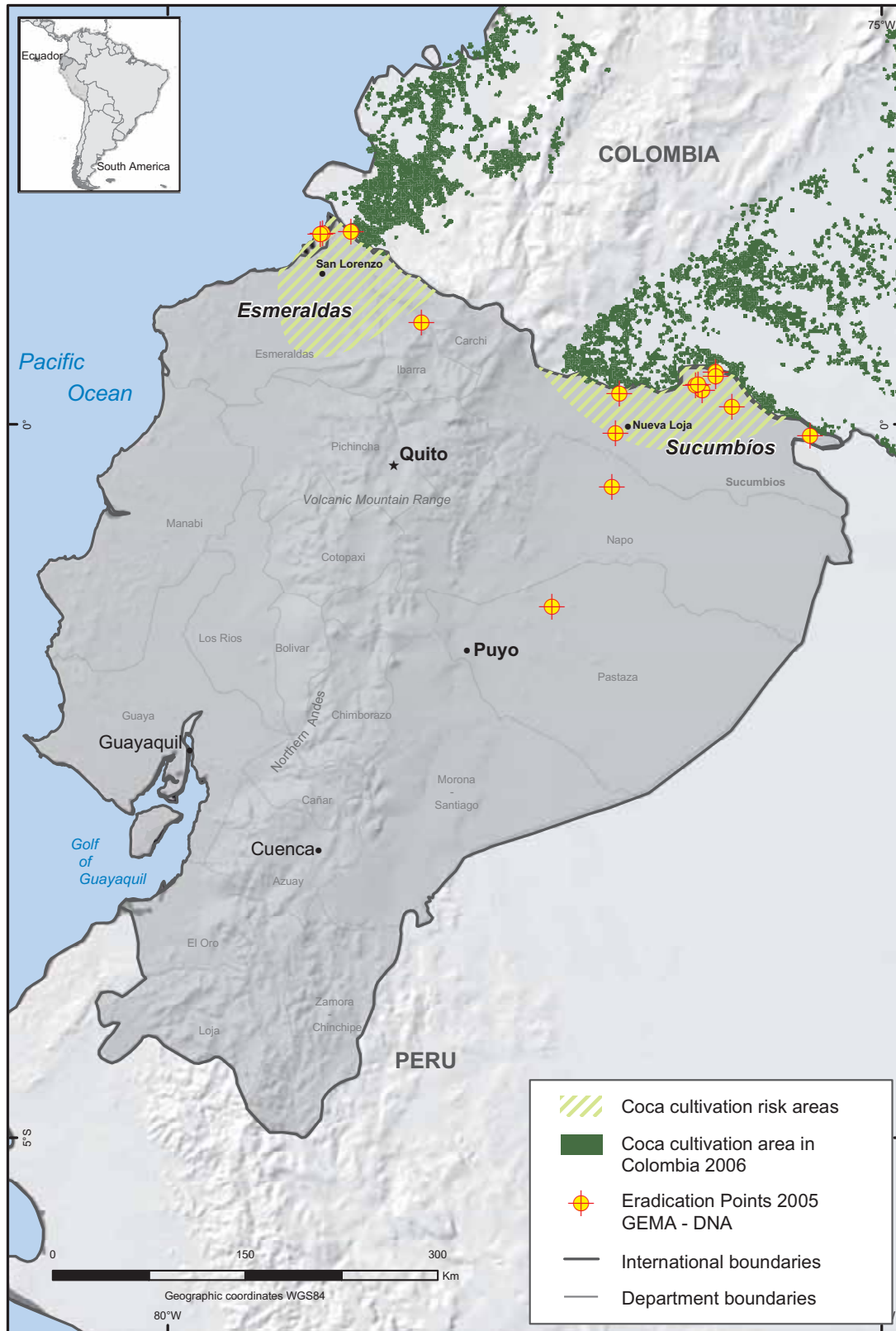
1 INTRODUCTION

UNODC has been supporting national illicit crop monitoring systems in South America since several years, in Bolivia since 2003, in Colombia since 1999 and in Peru since 2000. Information on cocaine seizures, clandestine laboratories but also on eradication of coca bush indicated that Ecuador might not only be affected by cocaine trafficking but also by coca cultivation, with two of the main coca cultivating regions of Colombia, Putumayo-Caquetá and Pacific, located just across its northern border. It was feared that the strong eradication measures taken by the Government of Colombia could lead to a balloon effect, i.e. a spilling over of coca cultivation across the border into Ecuador.

In 2005, the Government of Ecuador and UNODC consequently agreed to start a cooperation aimed at establishing a national illicit crop monitoring system to assess the extent of coca cultivation in the country. Technical support was provided by UNODC's illicit crop monitoring team in Peru, which had already several years of experience with coca bush monitoring.

It was agreed that the methodology used would be similar to the one used in the other countries affected by coca cultivation, which relies mainly on the interpretation of satellite imagery and verification overflights. For the 2006 coca cultivation survey, several SPOT 5 satellite images acquired between December 2005 and September 2006 were used. The methodology will be further developed and adjusted to the situation of coca cultivation in Ecuador, based on the experiences gathered during the 2006 survey. This could include testing of very high resolution satellite imagery or aerial photography.

Map 25: Coca cultivation risk areas in Ecuador, 2006



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

2 FINDINGS

Coca cultivation

The total area under coca bush in Ecuador in 2006 was estimated at less than 100 hectares. Coca cultivation is mainly located near the northern border of the country in the provinces of Esmeraldas and Sucumbíos. This confirms earlier indications that the proximity to coca cultivating areas in neighbouring Colombia could stimulate coca cultivation across the border in Ecuador, mainly along the Putumayo river.

Based on interpretation of satellite images, overflights, field visits and the analysis of eradication records provided by the Government, the survey identified coca cultivation risk areas in both Esmeraldas and Sucumbíos, where the majority of coca cultivation took place. The area under coca cultivation could not be quantified with more precision due to the technical limitations of the methodology employed and the small extension of coca cultivation evident in the survey area. The coca fields encountered were frequently smaller than one hectare and often under tree cover or in association with other crops.

Reports of eradication activities indicate the existence of coca fields in other provinces in northern Ecuador as well, such as Carchi, Napo, Orellana, Pastaza, and Pinchincha and even in the central province of Chimborazos. However, only provinces close to the Colombian border were included in the survey. According to the information available, coca cultivation in other provinces was not thought to be oriented towards cocaine production at any significant scale but towards traditional uses of coca leaf.



Coca cultivation in Ecuador

Esmeralda

The coca fields discovered in Esmeralda province were in a flat coastal area close to the sea. The plant density in the coca fields seemed to be rather low, and the plants were not arranged along lines or in furrows, which indicates a low level of cultivation intensity. Coca bush was often cultivated under tree cover, including in orchards, which makes detection difficult.

The province of Esmeralda is neighbouring the department of Nariño, Pacific region, in Colombia, where coca cultivation is widespread. It may well be possible that Ecuadorian migrant workers brought coca seeds back from Colombia.

Sucumbíos

Coca fields observed in the province of Sucumbíos showed similar characteristics to fields found in the other Andean countries. The coca plants are arranged in furrows along lines, with spaces between the lines, which indicates a certain level of know-how about coca cultivation. Sucumbíos neighbours the Colombian department of Putumayo, which lies just across the Putumayo River. Despite the proximity to one of the larger coca cultivation areas on the Colombian side, which, in addition, has experienced a significant extension of the area under coca bush since 2004, coca cultivation on the Ecuadorian side was marginal in 2006.

Eradication

In the past five years, eradication reported by the Government showed generally an increasing trend. Eradication was mainly concentrated in the northern provinces of the country, especially in the Esmeraldas province. However, occasionally, coca fields are eradicated in other provinces as well. In Ecuador, eradication of coca bush is done manually.

Table 48: Reported eradication of coca bush (hectares), 2002 to 2006

Province	2002	2003	2004	2005	2006*
Esmeraldas	0.71	6	4	2.8	8
Napo	-	-	0.02	-	n.a.
Pastaza	-	-	-	5.5	n.a.
Pinchincha	-	-	-	0.06	n.a.
Sucumbíos	-	-	-	3.92	n.a.
Orellana	-	-	-	5	n.a.
Carchi	-	-	-	1	n.a.
Total	0.71	6	4.02	18.28	8

Table 49: Reported eradication of coca bush (no. of plants), 2002 to 2006

	2002	2003	2004	2005	2006
No. of plants	580	28,500	19,428	68,613	60,500

Source: Anti-narcotics Units Ecuador

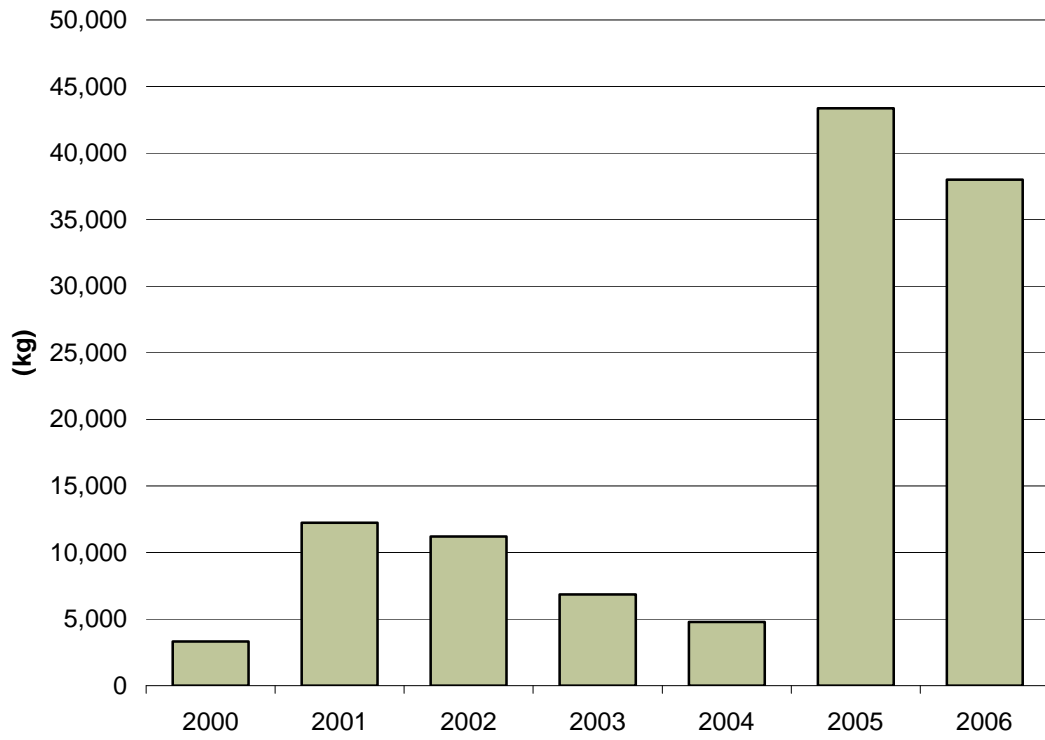
* Reported until September 2006.



Eradication of coca bush

Reported seizures

Ecuador, located between the two largest cocaine producers Colombia and Peru along the Pacific coast, is thought to be an important transit country for cocaine. Seizures of 43 metric tons in 2005 and 38 metric tons in 2006, which in both years surpassed the combined seizures of Bolivia and Peru, confirm this assumption.

Figure 33: Reported seizures of cocaine base and HCl in Ecuador (kg), 2000 to 2006

Source: ARQ; INCSR 2007

PART 5. PERU

FACT SHEET – Peru Coca Survey for 2006

	2005	Variation on 2005	2006
Coca cultivation	48,200 ha	+7%	51,400 ha
<i>Of which in</i>			
<i>Alto Huallaga</i>	16,000 ha	+7%	17,100 ha
<i>Apurímac-Ene</i>	15,500 ha	+2%	15,800 ha
<i>La Convención-Lares</i>	12,500 ha	+2%	12,700 ha
<i>Elsewhere</i>	4,200 ha	+38%	5,800 ha
Weighted average sun-dried coca leaf yield	2,200 kg/ha		2,200 kg/ha
Potential production of sun-dried coca leaf	106,000 mt	+8%	114,100 mt
Potential production of cocaine HCl ¹⁵	260 mt	+8%	280 mt
In per cent of global production	27%		28%
Average farm-gate price of sun-dried coca leaf	US\$ 2.87/kg	-12%	US\$ 2.52/kg
Potential farm-gate value of sun-dried coca leaf	US\$ 307 million	-7%	US\$ 285 million
Average price of coca paste	US\$ 638/kg	-14%	US\$ 550/kg
Average price of cocaine HCl	US\$ 897/kg	-8%	US\$ 823/kg
Reported eradication of coca cultivation	12,237 ha	+4%	12,688 ha
Reported seizure of coca paste	4,583 kg	+10%	5,044 kg
Reported seizure of cocaine HCl	17,815 kg	-17%	14,749 kg
Reported seizure of opium latex	505 kg	-78%	109 kg

¹⁵ Figure for 2005 was revised based on updated information available on the amount of coca leaf necessary to produce one kilogramme of cocaine HCl.

Abbreviations

CADA	Alternative Development Assistance Body
CONTRADROGAS	Committee for the Fight Against Drug Consumption
CORAH	Control and Reduction of Coca Leaf in Alto Huallaga
DEVIDA	National Commission for Development and Life without Drugs
DIRANDRO	Anti-Drugs Directorate, Peruvian National Police
ENACO	National Coca Enterprise
GIS	Geographical Information Systems
GPS	Global Positioning System
ICMP	UNODC Illicit Crop Monitoring Programme
NAS	Narcotics Affairs Section, United States Embassy
OFECOD	Drug Control Office, Peruvian Ministry of Interior
UNODC	United Nations Office on Drugs and Crime

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www.unodc.org/unodc/en/crop_monitoring.html

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Map 26: Coca cultivation density in Peru, 2006



Source: National monitoring system supported by UNODC - Government of Peru
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1 INTRODUCTION

In response to the decisions of the 1998 United Nations General Assembly Special Session on Drugs, UNODC developed and implemented a global Illicit Crop Monitoring Programme (ICMP). Through this programme, UNODC supports Member States in establishing a crop monitoring system to monitor illicit cultivation of coca, opium poppy and cannabis. The Programme is currently operating in Afghanistan, Bolivia, Colombia, Laos, Morocco, Myanmar, and Peru.

In 1998, UNODC started working with DEVIDA to develop a national coca monitoring system in Peru. Using aerial photography, the project produced a detailed mapping (at 1/20,000 scale) of all the coca cultivation areas in 2000. Every year since then, satellite images were used to update the estimates. This report presents the findings of the 2006 Survey.

In Peru, the General Law on Drugs enacted in 1978 prohibits the cultivation of coca and seedlings in new areas within the national territory. This reference to “cultivation” includes the grafting and renovation of existing coca bushes. In 1978, another law established the National Coca Enterprise (ENACO), which has a monopoly on the commercialization and industrialization of the coca leaves. Therefore, the selling of coca leaves to any party other than ENACO is considered illicit by national law.

The Government also established in 1996 a Committee for the Fight Against Drug Consumption (CONTRADROGAS), renamed National Commission for Development and Life without Drugs (DEVIDA) in 2002. DEVIDA’s objectives are to design, coordinate and implement policies and activities aimed at national drug control.

Until the mid-1990’s, Peru was the world’s main coca cultivating country. Today, it is the second major producer of coca behind Colombia.

The reduction in coca cultivation in Peru in the mid-1990’s was linked to the sharp decline in both the coca leaf prices and the demand for Peruvian coca leaf. In 1995, trade in coca leaf on the local market ceased and, from 1996 to 1998, the prices of coca leaf remained lower than its production costs. Farmers abandoned their coca fields and coca cultivation dropped from 115,300 ha to 38,700 ha, or 66%, between 1995 and 1999.

After 1999, coca prices increased slowly while the prices of licit crops (coffee and cacao) decreased. Farmers started to re-activate their abandoned coca fields and coca cultivation rose again in Peru. To some extent, the increase has been contained by the presence of alternative development projects, as well as the introduction of eradication measures, which include both forced eradication conducted by CORAH (Ministry of Interior) and voluntary eradication schemes conducted by DEVIDA.

Map 27: Coca cultivation in Peru by region, 2002 to 2006



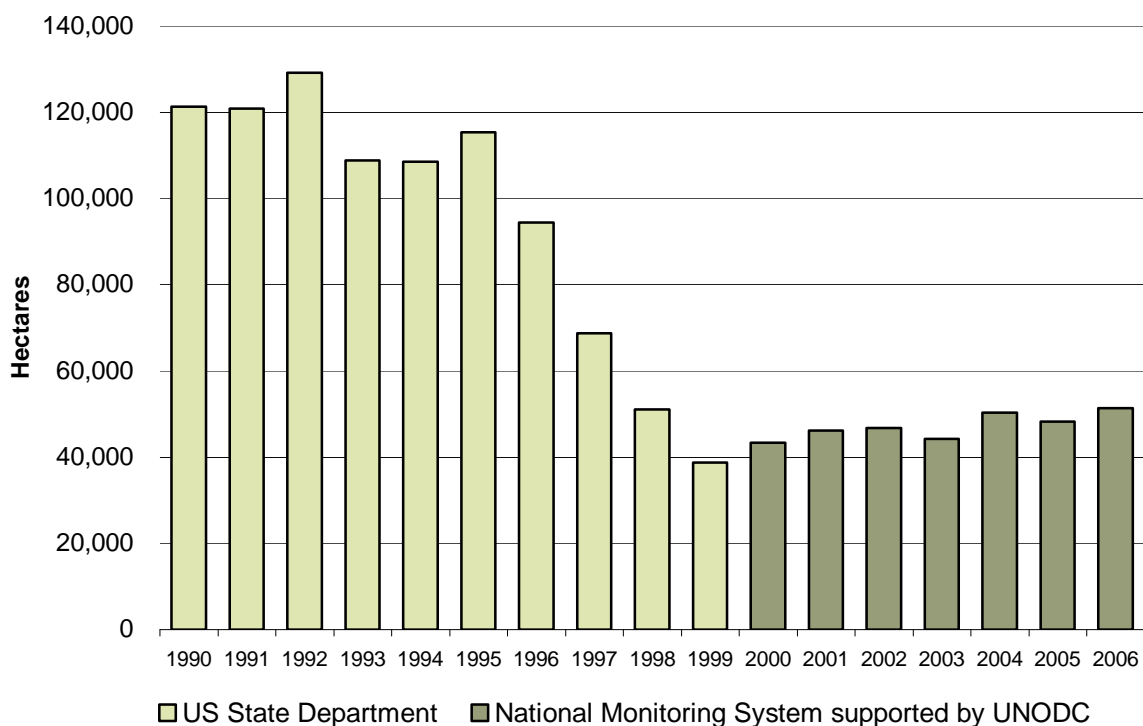
Source: National of monitoring system supported by UNODC - Government of Peru
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2 FINDINGS

Coca cultivation

In 2006, coca cultivation in Peru amounted to 51,400 hectares, a 7 per cent increase compared to 2005. Peru remains the second largest coca cultivating country behind Colombia, with a share of 33 per cent of global coca cultivation. Since its low of 38,700 hectares in 1999, the area under coca bush in Peru has increased by one third but remains well below the record level of over 120,000 hectares reached in the early 1990s. This year, an increase in the area under coca bush could be observed in almost all the cultivation regions.

Figure 34: Coca cultivation in Peru (hectares), 1990 to 2006



Regional analysis

The three large coca cultivation regions of Alto Huallaga, Apurímac-Ene and La Convención-Lares together account for 89 per cent of the total coca cultivation in Peru in 2006. The remaining 11 per cent are distributed among five much smaller cultivation regions. A newly identified coca area in the Colombia-Brazil-Peruvian border triangle in the Amazonian basin was included into the Marañón-Putumayo region as Amazonas (Caballococha). Twelve out of the 24 departments in Peru were affected by coca cultivation in 2006.

Figure 35: Coca cultivation by cultivation region, 2006

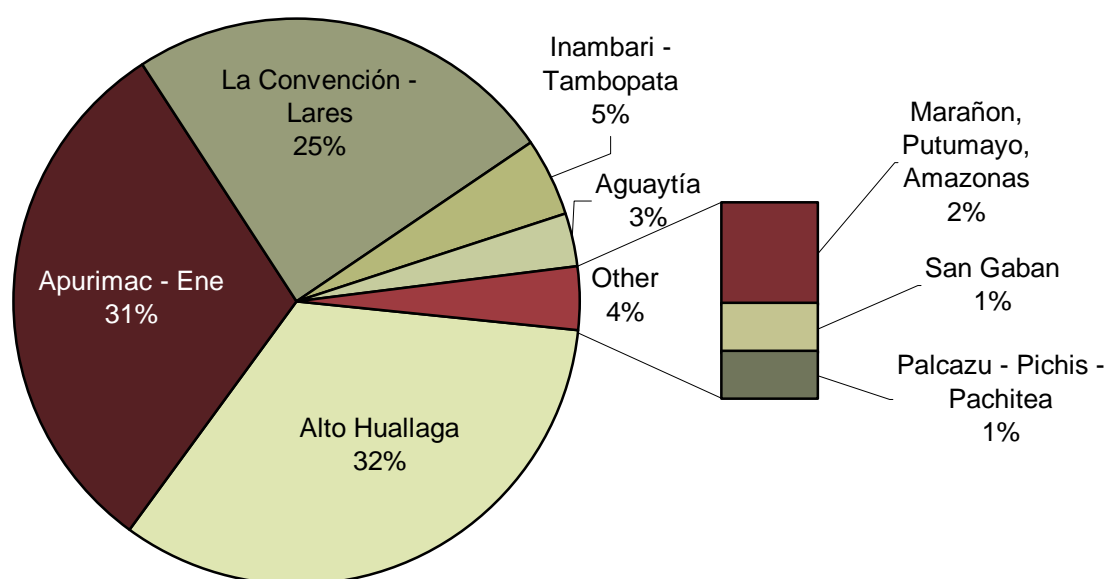


Table 50: Coca cultivation by cultivation region (hectares), 2001 to 2006

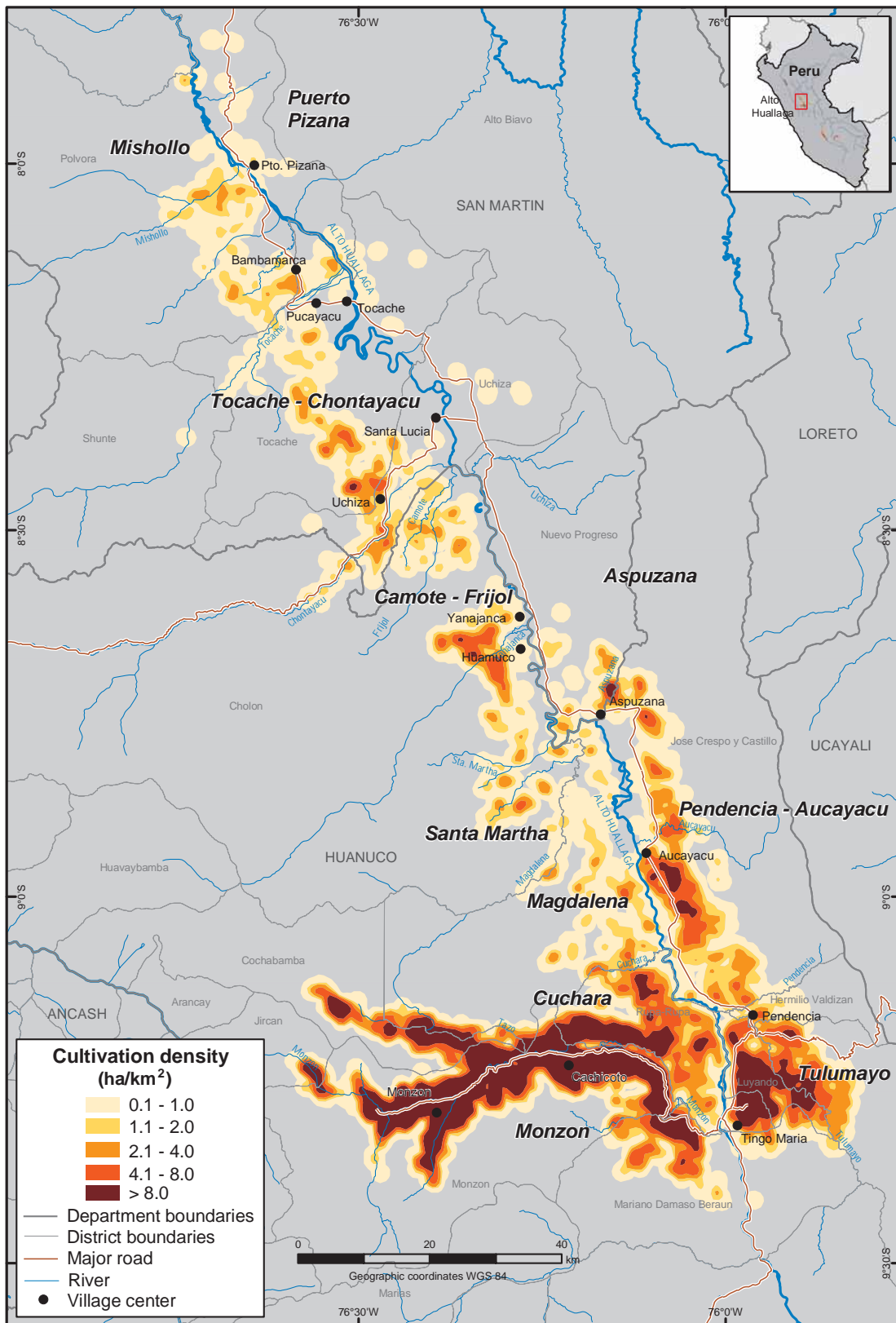
Region	2001	2002	2003	2004	2005	2006	Variation 2005 - 2006
Alto Huallaga	14,481	15,286	13,646	16,900	16,039	17,080	1,126
Apurímac-Ene	12,600	14,170	14,300	14,700	15,530	15,813	283
La Convención-Lares	13,980	12,170	12,340	12,700	12,503	12,747	244
Inambari-Tambopata	2,520	2,430	2,260	2,000	2,250	2,366	116
Aguaytía	1,051	1,070	510	500	917	1,570	653
Marañon, Putumayo, Amazonas	1,250	1,250	450	500	500	968	468
San Gabán	n.a.	n.a.	470	2,700	292	446	154
Palcazú-Pichis-Pachitea	350	350	250	300	211	426	215
Rounded Total	46,200	46,700	44,200	50,300	48,200	51,400	3,200

Alto Huallaga

The Alto Huallaga region is located on the eastern side of the Andes mountain range, in the high tropical or subtropical forests of the departments of San Martín and Huamanga. In this region, coca bush is cultivated between 400 and 1,400 meters above sea level.

For the third year in a row, Alto or Upper Huallaga was the largest coca cultivation region in Peru and accounted alone for one third of the total area under cultivation. The coca bush area in the Alto Huallaga region grew by 7 per cent in 2006. However, diverging sub-regional trends characterized the situation.

Map 28: Coca cultivation density in Alto Huallaga, 2006



Source: National monitoring system supported by UNODC - Government of Peru
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The north of Alto Huallaga was targeted by eradication campaigns, which resulted in a decrease in coca cultivation area. The decrease was, however, more than compensated by cultivation increase in a number of areas in the southern part of the region, which led to an overall increase of 7 per cent. On the other hand, coca cultivation seems to have reached a certain saturation in the Monzon area, also located in the southern part of Alto Huallaga. During verification flights, it was observed that almost all the land suitable for coca cultivation, including very steep slopes, was already covered by coca bush.

In Alto Huallaga, coca cultivation goes back at least 30 years. Since several years, coca fields have plant densities of about 20,000 to 30,000 coca plants per hectare. Recently, older fields have been rejuvenated by replacing old bushes with young coca seedlings. Higher coca plants densities up to 60,000 plants per hectares have also been reported. Both measures could potentially increase coca leaf yield in an area that is know for its relatively low yields but high quality of coca leaf, i.e. smaller coca leaf amount is needed to produce the same amount of coca paste compared to other areas.



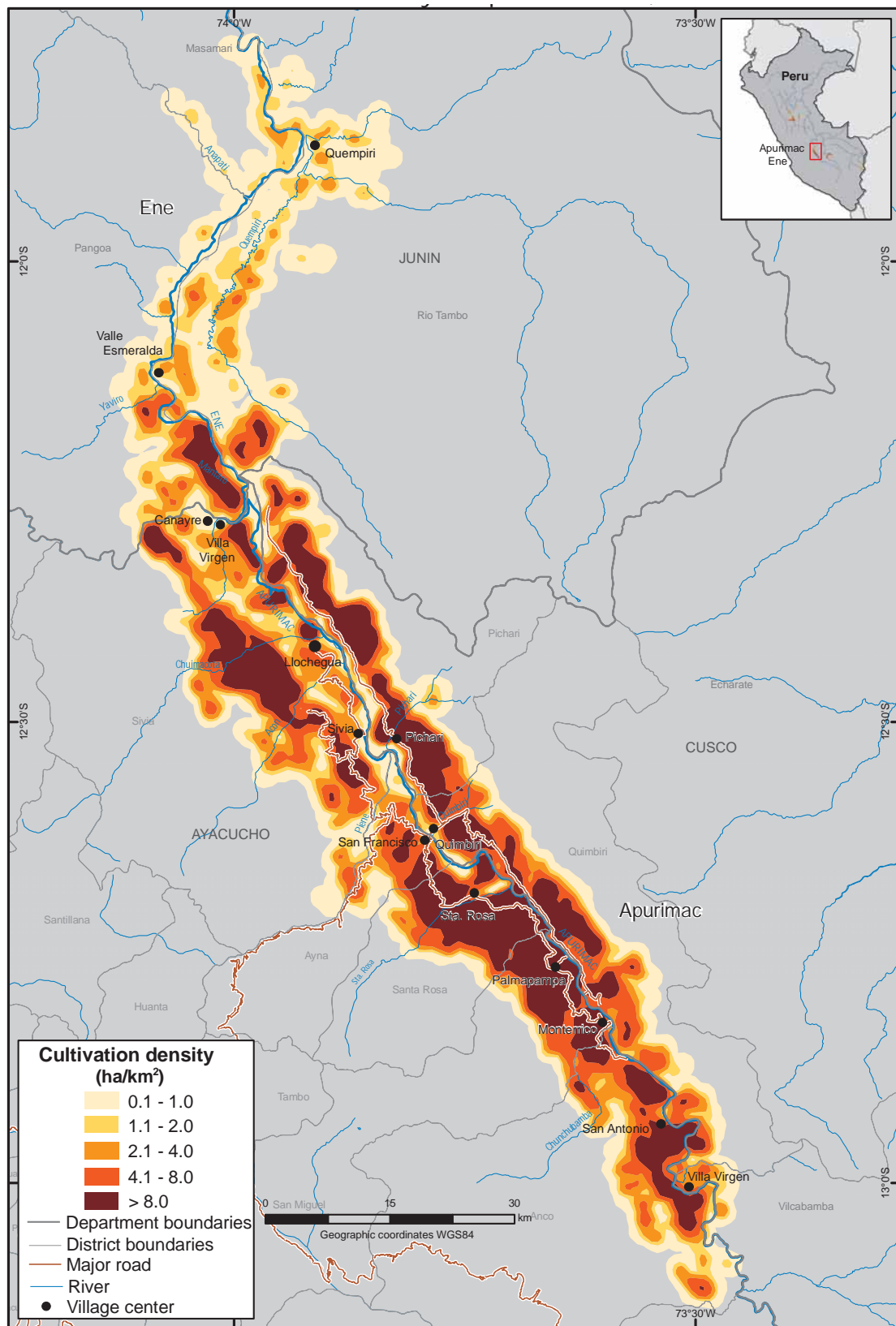
Valley in Alto Huallaga

Apurímac-Ene

The Apurímac-Ene cultivation region is situated in the central part of the country extending over 12,000 sq km in the valleys of the rivers Apurímac and Ene, among the departments of Ayacucho, Cusco and Junin. The relief is uneven, and coca cultivation takes place at altitudes ranging between 550 and 2,000 meters above sea level.

Apurímac-Ene is the second largest coca cultivating region in Peru, with over 15,800 hectares in 2006, and accounted for just under one third of the total area under coca bush cultivation in the country. Over the last five years, the coca cultivation areas have grown slowly but steadily. The increase by 283 hectares compared to 2005 did not happen in specific parts of the region but was more or less evenly distributed. In 2006, Apurímac-Ene was not targeted by eradication of coca bush. However, maceration pits and cocaine HCl laboratories were destroyed by the authorities.

Map 29: Coca cultivation density in Apurímac-Ene, 2006



Source: National monitoring system supported by UNODC - Government of Peru
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Coca seedbeds in Apurímac

In Apurímac-Ene, much higher coca plant densities were observed than in Alto Huallaga. Fields with only 40 centimetres distance between coca plant rows and 20 centimetres between plants were observed, which translates into plant densities of up to 120,000 plants per hectares. It is not unusual to find coca plantations with two or more coca plants per *hoyo* (planting hole). This results in (initial) plant densities of over 300,000 plants per hectare. However, it can be assumed that not all of the initially planted seedlings survive, and that plant densities of mature plantations are still lower.

Despite a worsening conditions due to the tensions between coca farmers and government forces, UNODC continues to implement Alternative Development projects in the region. The projects are active in the fields of reforestation of former coca plantations and improvement of alternative crops such as coffee, cacao and palm heart.

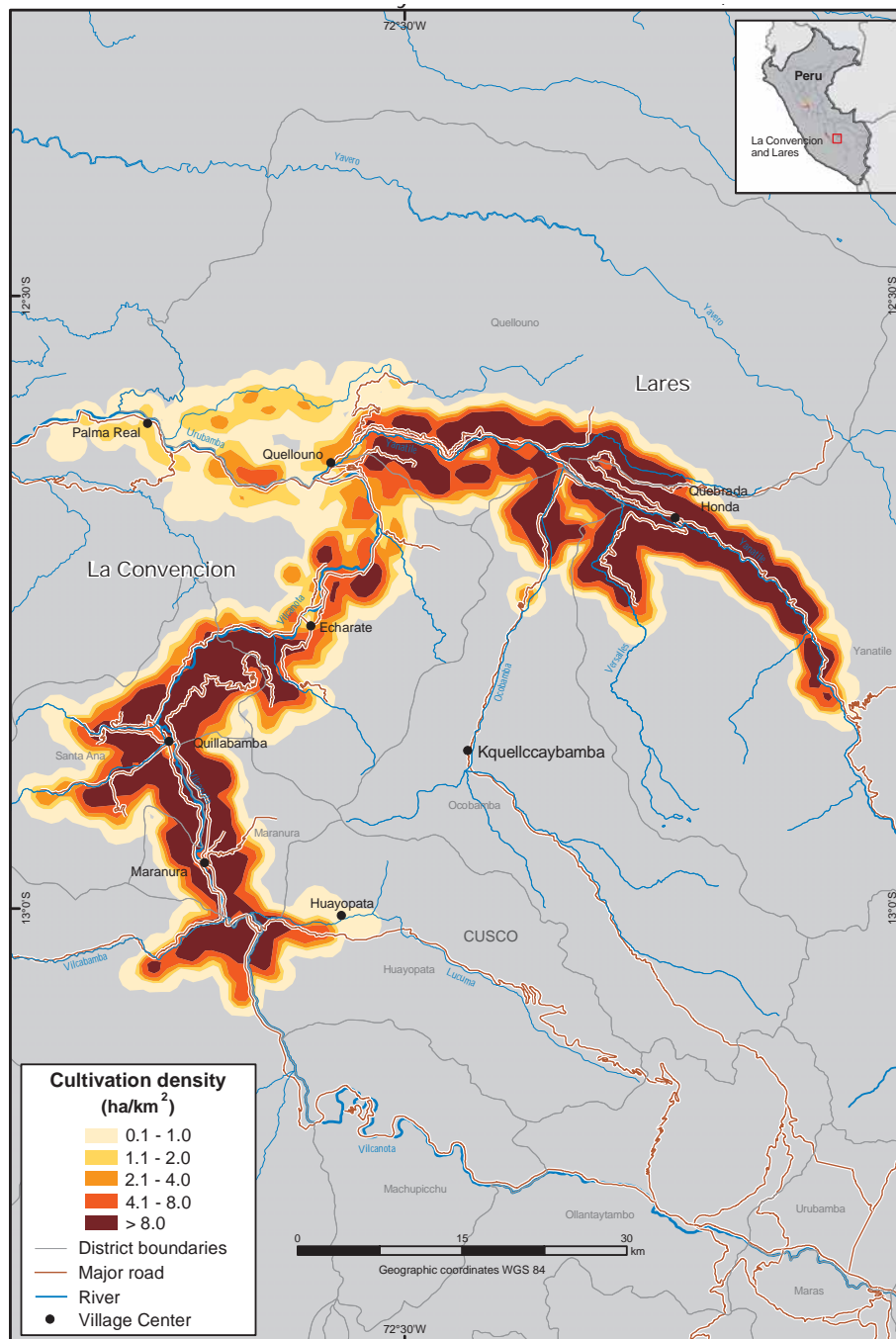


Coca field preparation in Apurímac

La Convención-Lares

The cultivation region of La Convención-Lares is situated in the department of Cusco. Coca is mostly cultivated between 800 and 2,000 meters above sea level on the steep mountain slopes of this region. In 2006, over 12,700 hectares of coca bush were identified in La Convención-Lares, which represents a slight increase by 2 per cent compared to 2005. Since 2001, the area under coca bush has been relatively stable with an average of 12,700 hectares. The variations are thought to be due the practice of pruning the coca bushes periodically after about three to four years rather than to increases or decreases of the actual area under coca cultivation. Freshly pruned coca fields are not captured with the current survey methodology, since these fields cannot be identified as coca on the satellite images used.

Map 30: Coca cultivation density in La Convención-Lares, 2006



Source: National monitoring system supported by UNODC - Government of Peru
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Historically, the region has been considered as the coca cultivation centre for the traditional use of coca leaves. In 1978, the state company ENACO registered 12,685 coca farmers for the cultivation of 10,670 hectares of coca bush. At that time, it was estimated that coca leaf production amounted to 7,400 metric tons per year, of which 3,764 metric tons (or 51%) were destined for ENACO, the rest being smuggled outside the control of ENACO. Since then, the diversion of coca leaf intensified due to better prices offered for coca leaf outside ENACO's market. In particular in the past few years, it was noted that farmers improved their coca leaf yields by increasing the coca plant density and the (increased) use of fertilizers and pesticide. Traditionally, a distance of one meter was kept between rows and 40 cm between plants, corresponding to 25,000 to 30,000 plants per hectare.

However, it is assumed that coca leaf production from the region is mainly oriented towards traditional uses like chewing, and not towards narco-trafficking. There were no reports of eradication nor destruction of maceration pits or clandestine laboratories.

In 2005, a regional decree authorized coca cultivation, thereby recognizing the region as a traditional center of coca cultivation. The decree granted the coca plant the status of Regional Natural, Biological and Cultural Heritage of Cusco, and recognized it as botanical resource integrated within the culture and cosmovision of the Andean world and its medicinal customs and traditions. It recognized the region as traditional coca leaf producing area and legalized coca cultivation in the valleys of La Convención, i.e. the valleys of Yanatile in the province of Calca and Qosñipata de Iño in the province of Paucartambo, all in the department of Cusco. However, the decree was subsequently invalidated by the Constitutional Court.



Coca field in forest clearing in Pichis

Other cultivation regions

Coca cultivation in the smaller cultivation regions together accounted for only about 5,800 hectares, representing 11% on the total coca cultivation area in the country. Although representing only a small portion of the total area under coca bush, the highest rates of increase were observed in the smaller regions, particularly in Palcazú-Pichis-Pachitea (+102%), Marañón-Putumayo-Amazonas (+94%), Aguaytía (+71%) and San Gabán (+53%).

The cultivation region of Marañón-Putumayo was extended to include the newly identified coca cultivation area of Amazonas along the Amazonas river in the locality of Caballococha-Santa Rosa. This low lying area near the Brazilian border is characterized by plains and undulating hills. As reported in earlier reports, eradication activities in Lower and Central Huallaga have reduced coca cultivation in these area significantly.



Coca fields in Quillabamba

Production of coca leaf and derivatives

UNODC continuously tries to refine its estimation of coca leaf yields and cocaine production. Based on results of a UNODC coca leaf yield survey initiated in 2004, regional yield estimates for the main coca cultivation regions Apurímac-Ene, Alto Huallaga and La Convención-Lares were established. For the other regions, information obtained previously by UNODC in the years 2000 and 2001 was used.

Table 51: Annual sun-dried coca leaf yields by region (kg/ha/year)

Region	Annual sun-dried coca leaf yield (kg/ha)
Apurímac-Ene*	3,627
Alto Huallaga*	2,988
Alto Huallaga (Monzon)	1,197
La Convención-Lares*	1,457
San Gabán	1,290
Inambari - Tambopata	1,290
Aguaytía	1,376
Marañón, Putumayo	860
Palcazú-Pichis-Pachitea	1,433

* UNODC coca leaf yield survey 2004.

The total production of sun-dried coca leaf in Peru was estimated at 114,100 metric tons in 2006. This corresponds to a national weighted average of about 2,200 kg/ha sun-dried coca leaf. The coca leaf production in 2006 was 8 per cent higher than in 2005 (106,000 metric tons).

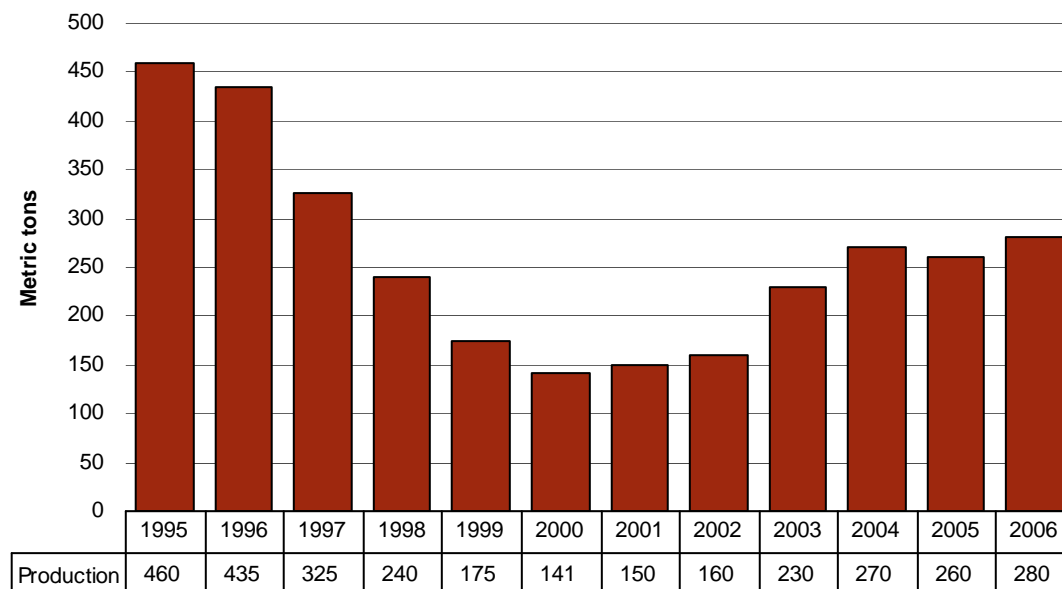


Sun-drying of harvested coca leaves

According to a study of the National Institute of Statistics and Computer Science (INEI), 9,000 metric tons of sun-dried coca leaf are used for traditional, commercial and industrial purposes in Peru annually.¹⁶ For the calculation of the amount of coca leaf available for cocaine production, this amount was deducted from the total of 114,100 metric tons in 2006.

Based on updated information available on conversion rates established by the "Operation Breakthrough", conducted by the United States in 2003 and 2004, 375 kg of sun-dried coca leaf are necessary to produce one kilogramme of cocaine HCl of 100% purity. Applying this rate to the remaining 105,100 metric tons of sun-dried coca leaf available for cocaine production, 280 metric tons of cocaine HCl can be produced. Therefore, the total potential production of cocaine HCl was estimated at 280 metric tons in 2006. The potential cocaine production figures for the years 2003 to 2005 were revised accordingly.

Figure 36: Potential cocaine production (metric tons), 1995 to 2006



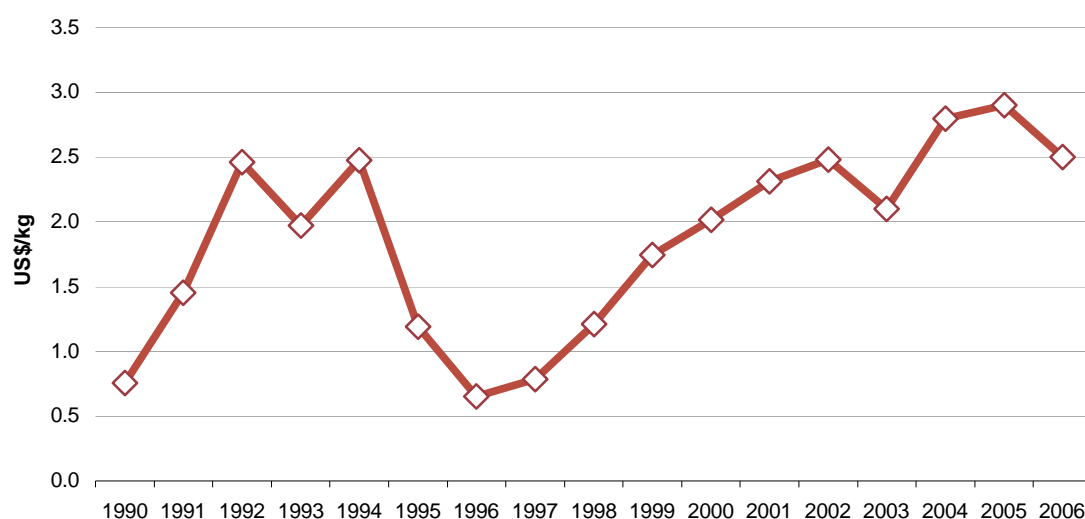
Figures from 2003 to 2005 were revised based on updated information on the amount of coca leaf necessary to produce one kilogramme of cocaine HCl.

In 2006, the potential cocaine production increased by 8 per cent compared to 2005. While this is the highest production figure since 1998, it is still only about half the amount registered during the cocaine production peak in Peru in 1992. Peru accounted for 28 per cent of the global cocaine production in 2006.

Prices for coca leaf and derivatives

In the course of the year 2006, farm-gate prices for sun-dried coca leaf on the illicit market fell in all the cultivation regions in Peru. The national average price for coca leaf in 2006 was only US\$ 2.52 per kg compared to US\$ 2.87 per kg in 2005, a reduction by 12 per cent. Despite this decrease, price on the illicit coca leaf market remained significantly higher than prices paid by ENACO on the government controlled market, with an average price of US\$ 1.54/kg.

¹⁶ "Encuesta nacional sobre consumo tradicional de hoja de coca en los hogares", INEI-DEVIDA, November 2004.

Figure 37: National average farm gate price of sun-dried coca leaf (US\$/kg), 1990 to 2006

The southern parts of Alto Huallaga (Monzón and Tingo Maria) and Apurímac, located in the two largest cultivation regions, experienced the largest price decreases, probably due to an increase in the amount of coca leaf available on the illicit market caused by the increase of the area under coca bush and improved cultivation techniques.

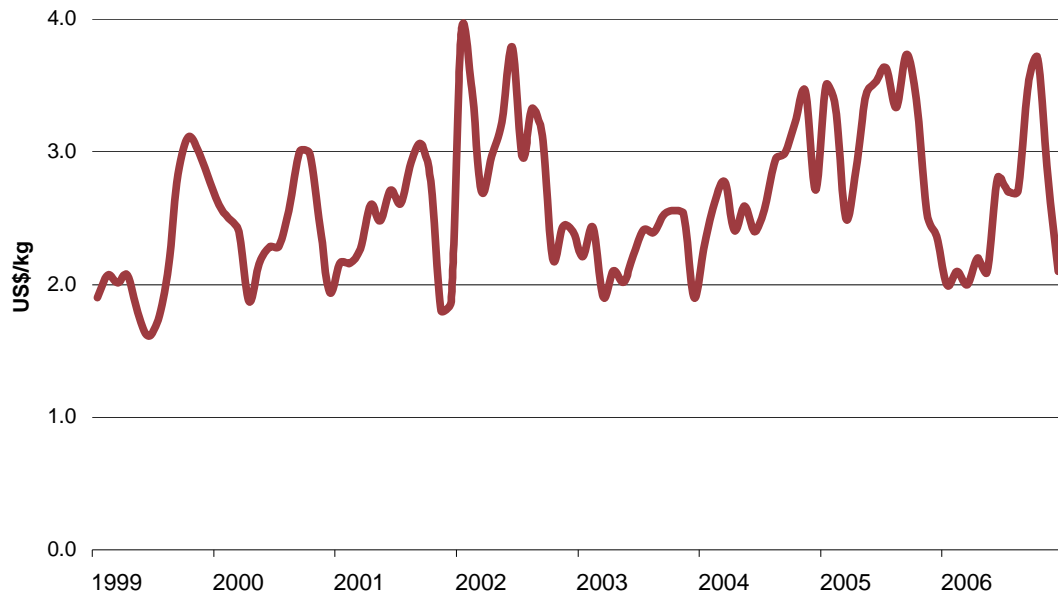
Table 52: Yearly average price of sun-dried coca leaf by region (US\$/kg), 2005 to 2006

Region	2005	2006	% variation 2005 - 2006
Alto Huallaga: Monzón	3.70	3.00	-19%
Alto Huallaga: Sur	3.20	2.60	-19%
Alto Huallaga: Norte	2.60	2.40	-8%
Apurímac	2.20	1.80	-18%
Inambari	2.90	2.80	-3%
Aguaytía	2.60	2.50	-4%
National average	2.87	2.52	-12%

Coca leaf prices differ considerably between regions. This is not surprising considering the fact that transport of the bulky coca leaf between regions is costly and risky due to law enforcement activities.

The monthly fluctuations in coca leaf prices are thought to be the result of seasonal variations in the supply of coca leaf, as well as market disruptions due to law enforcement activities, which cause traffickers to leave some regions temporarily.

Figure 38: Monthly average farm-gate prices of sun-dried coca leaf in Alto Huallaga (US\$/kg), 1999 to 2006

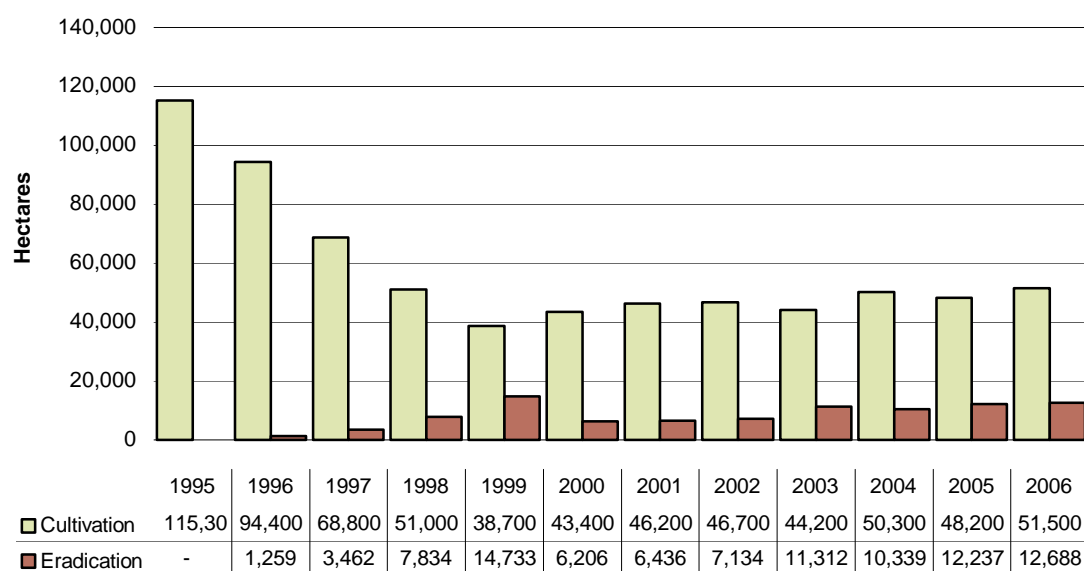


Alto Huallaga

Reported eradication

In Peru, eradication of coca bush is exclusively manual. In 2006, the Government of Peru reported the eradication of 12,688 hectares of coca bush, most of which (10,137 hectares) were eradicated through CORAH's forced eradication programme, and the remainder through voluntary eradication programmes executed by DEVIDA and CADA. The total area eradicated in 2006 was 4 per cent larger than in 2005. In 2006, CORAH's eradication activities were concentrated in the northern area of the Alto Huallaga region. About two thirds of the area eradicated by CORAH were young coca fields, i.e. with plants younger than one year.

Figure 39: Cultivation and reported eradication of coca bush (hectares), 1995 to 2006



Reported seizures

In 2006, the Government of Peru (DIRANDRO) reported a strong increase in the amount of coca paste and cocaine HCl seized by the authorities. Cocaine HCl seizures were almost three times the amount of coca paste seizures.

Table 53: Reported seizures (kg), 2003 to 2006

	2003	2004	2005	2006
Coca leaf	1,328,347	916,024	1,525,739	1,078,514
Coca paste	4,366	6,330	3,199	5,044
Cocaine HCl	3,574	7,303	2,119	14,749

The seizure and destruction of eleven clandestine cocaine HCl laboratories, in addition to 707 laboratories processing coca paste and cocaine base, confirms that the capacity to produce cocaine HCl exists in Peru.



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