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THE VALUE OF
ILLEGAL DRUG EXPORTS
TRANSITING THE
CARIBBEAN -
1981-2000

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The Caribbean Regional Office of the United Nations Office on Drugs and Crime has been producing a drug trends analysis concerning the Caribbean region since 1997. The trends analysis aims to create a better understanding of regional drug related issues based on primarily open sources of information, as well as seizure data (and interviews) from the individual jurisdictions. This document is devoted primarily to analyzing the drug trafficking situation in the Caribbean, whereas other documents will deal with other aspects of the multi-faceted drug issue.

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CONTRIBUTION OF THE TRADE IN ILLEGAL DRUGS TO THE CARIBBEAN ECONOMY

What is the contribution of the trade in illegal drugs to the Caribbean economy? Given the inflation of data and figures presented in the mass media, it may seem that it is not difficult to estimate this contribution. A partial review of the mass media and scientific articles produces several dozen estimates for different concepts and countries. The variations between these estimates are so large that they cannot be explained solely in terms of the concepts employed or of methodological variations.

In order to overcome the methodological weaknesses found in most estimates, this study will attempt to carry out a methodologically more refined experiment to calculate the value of the illicit drug exports from the Caribbean region. This quantification will be limited to the main export substances - cocaine and marijuana - ignoring the value of other illicit drugs that are re-exported from the Caribbean, such as heroin or the various forms of amphetamine-type substances (ATS) for which the calculation is much more difficult and the significance in economic terms much lower for the time being.

This academic experiment will use a demand-based methodology. In other words, starting with the value of demand in the countries that are importing drugs from the Caribbean, the model will try to *infer* the amount of drugs leaving the Caribbean. While the weakness of this focus and the limited reliability of the data on which the calculation is based cannot be ignored - and this shortcoming will be borne in mind throughout the paper - a demand-based methodology is preferred to other models based on capital or merchandise flows. Moreover, the annual corrections to these figures have tended to be quite significant. This trend in revising figures, apart from adding further doubts about the reliability of the data, prevents the use of historical data. Finally, the overstatement of these figures, perhaps with the intention of externalising the drug problem from the consumer to producing countries, has been conspicuous.

Present estimates of illegal drug exports from the Caribbean will take into account only the amount of a drug that passes through a jurisdiction in the region and will ignore the quantities of drugs that

merely transit the Caribbean Sea on the way from the producing to the consuming countries. The assumption in this choice is that drugs that go through the Caribbean Sea without stopping in a Caribbean jurisdiction have no substantive influence on the local economies. In addition, the analysis will be divided between substances, cocaine and marijuana, and exporting markets - the North American market, including both the United States and Canada, and the European market.

In mathematical terms, the model will follow the following formula:

$$VCE = \sum_{i=1}^n \sum_{j=1}^n P_{ij} \times \mu_{ij} (D_{ij} + S_{ij} + L_{ij})$$

where:

- VCE is the total value of the Caribbean's illicit drug exports;
- i is the number of kinds of illegal drugs exported from the Caribbean to other parts of the world - limited to cocaine and marijuana for the present study;
- j is the number of regions receiving the illicit drug exports from the Caribbean - North America and Europe in this analysis;
- P_{ij} is the exporting price of the drug i to the region j ;
- μ_{ij} is the penetration of Caribbean exports in the market for the drug i in the region j ($0 \leq \mu \leq 1$);
- D_{ij} is the final demand for the drug i in the region j , calculated using the following formula:
 $D_{ij} = N_{ij} \times \lambda_{ij}$, where:
 - N_{ij} is the annual number of consumers of the drug i in the region j ; and
 - λ is the average amount of the drug i consumed by the average user in the region j ;
- S_{ij} is the amount of the drug i seized by local authorities in the region j ; and
- L_{ij} is the losses¹ of the drug i in the region j .

¹ Losses are counted as cocaine entering the countries but not being consumed because, for example, of having to be dumped in the water on the approach of enforcement agencies or because it was

CARIBBEAN EXPORTS OF COCAINE TO NORTH AMERICA

The United States' Office of National Drug Control Policy (2002a: 18) estimates over 350 metric tons (MT) of pure cocaine were consumed in the United States during the period 1988-2000. The foundation of these estimates is the multiplication of the number of users – divided in two clusters, hard-core and occasional users – by the average amount of cocaine consumed by the average users in each group. Both the number of users and the amount consumed are estimated from several surveys of specific at-risk social groups, especially through urine tests in male inmates, and the national household survey in the United States carried out by the local Health Department. The amount of cocaine used is extrapolated from the data obtained in the prisoners' survey.

The reliability of drug use surveys has long been discussed. The critics point out two major weaknesses. First, in spite of all inferences made by the research about the behaviour of the surveyed population, they depend on the good will of the individuals who answer the questions written in the survey. In matters that are both socially and legally condemned, such as the drug consumption, the reliability degree is low (Fendrich *et al.* 1999; Harrison and Hughes 1997; Manski, Pepper and Petrie 2001: 75-135; United States General Accounting Office 1993). For alcohol, for example, whose use is socially censured in some cases but is legally allowed under most circumstances, the inferences raised from surveys show that they only account for two thirds of the alcohol expenditures observed in tax

Cocaine use in the United States, 1988-2000

	Hard-core users (thousands)	Occasional users (thousands)	Median expenditure by hard-core users (2000 dollars)	Median expenditure by occasional users (2000 dollars)	Total expenditures by hard-core users (million of 2000 dollars)	Total expenditures by occasional users (million of 2000 dollars)	Total expenditure (million of 2000 dollars)	In-kind expenditure (million of 2000 dollars)	Price per gram of pure cocaine (2000 dollars)	Total amount of cocaine used (metric tons)
	A	B	C	D	E	F	G	H	I	J
					AxC	BxD	E+F	Gx0.11		(G+H)/I
1988	3,984	6,000	360	28	74,757	8,653	83,410	9,175	238	390
1989	3,824	5,300	342	32	68,197	8,827	77,024	8,473	226	379
1990	3,558	4,600	323	36	59,866	8,532	68,398	7,524	227	334
1991	3,379	4,478	290	38	51,105	8,856	59,961	6,596	227	293
1992	3,268	3,503	265	42	45,108	7,622	52,730	5,800	224	261
1993	3,080	3,332	239	42	38,437	7,247	45,683	5,025	199	255
1994	3,032	2,930	228	39	36,112	5,981	42,093	4,630	187	250
1995	2,866	3,082	226	41	33,774	6,595	40,369	4,441	196	229
1996	2,828	3,425	220	37	32,441	6,543	38,984	4,288	175	247
1997	2,847	3,487	188	41	27,909	7,430	35,339	3,887	195	201
1998	2,809	3,216	197	38	28,860	6,429	35,289	3,882	183	214
1999	2,754	3,216	206	39	29,587	6,458	36,046	3,965	184	218
2000	2,704	3,035	212	44	29,896	7,015	36,912	4,060	212	194

Source: Own elaboration from Rhodes *et al.* (1997) and Office of National Drug Control Policy (2001b, 2002a).

badly adulterated.

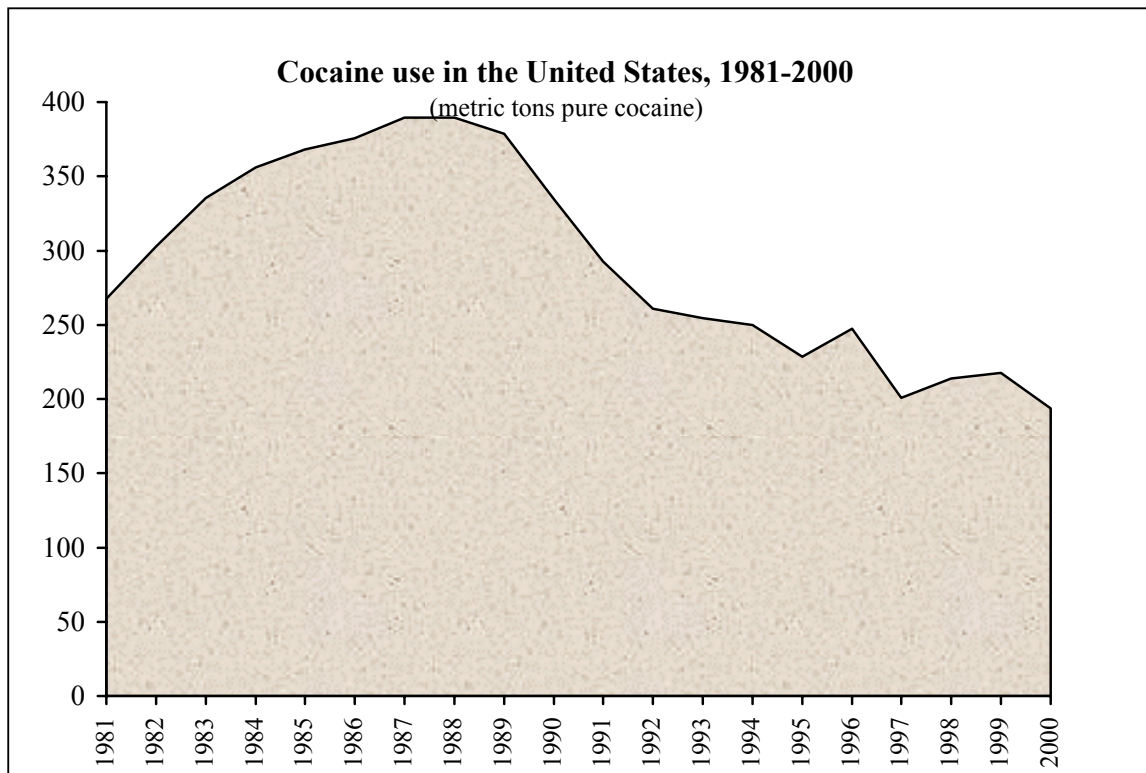
Over 50% of those who reported occasional heroin use in surveys were indeed hard-core users when measured in urine tests.

registrations. Manning *et al.* (1991) estimated that the drug prevalence given by the United States' National Health Survey is only a half of the total population using illegal drugs. Morral *et al.* (2000), after studying a sample of drug users in treatment facilities, found that over 50% of those who reported occasional heroin use in surveys were indeed hard-core users when measured in urine tests. The second weakness of the drug surveys is that the United States National Household Survey on Drug Use excludes from its sample some social groups that are prone to drug

use, such as the military, the inmates and those living in drug treatment facilities (Taylor *et al.* 2001).

Using the same methodology but enhancing the data with new evidences, the total amount of pure cocaine consumed in the United States fluctuates between 390 MT in 1988 and under 200 MT in 2000.

But the study commissioned by the Office of the National Drug Control Policy (2002a) only estimates cocaine consumption in the United States for the period 1988-2000. To obtain figures for earlier years, this research will rely on the figures given by Rydell and Everingham (1994), who applied a capture-recapture methodology dividing the total use between hard-core and occasional consumers. Since differences in quantities arise between both studies, the complete consumption curve for the period 1981-2000 will be constructed by assuming that in 1988 the figure given by the first-mentioned research is right and the consumption patterns in the previous



years followed the path outlined by the second study. Under this assumption, for the 1981-1987 period the total consumption of cocaine in the United States is calculated using the following formula:

$$D_i = D_i^{R\&E} \times \frac{D_{88}^{ONDCP}}{D_{88}^{R\&E}}$$

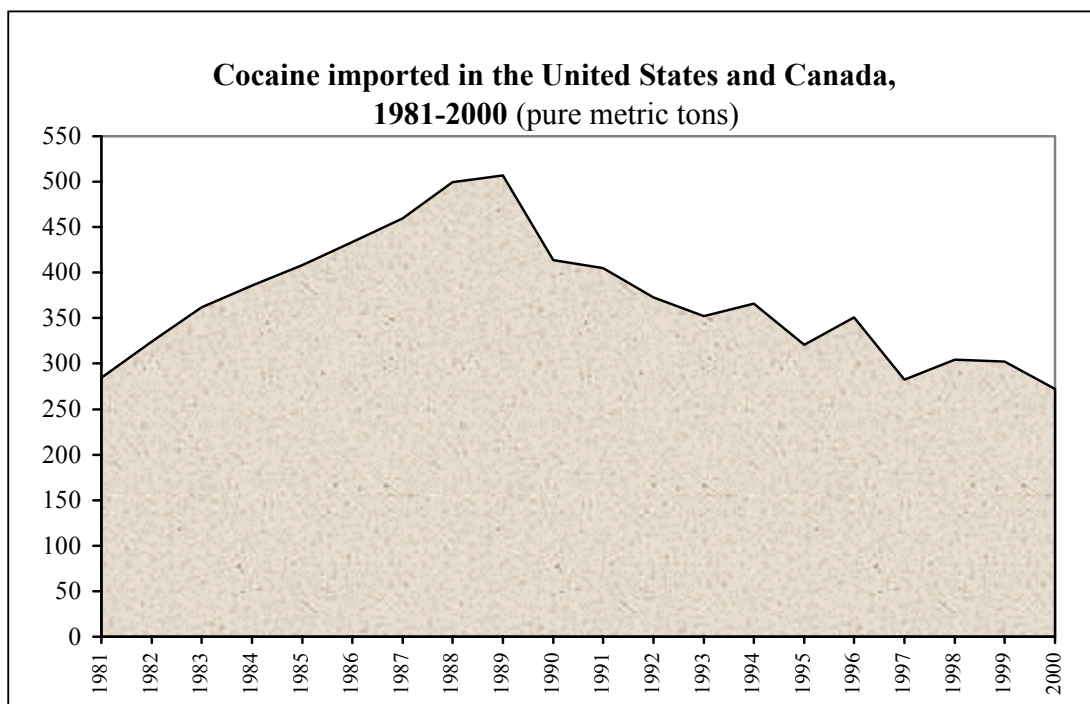
where:

- D_i is the amount of cocaine consumed in the United States in the year i ;
- $D_i^{R\&E}$ is the Rydell and Everingham (1994) estimate of cocaine consumed in the United States in the year i , including the year 1988.
- D_{88}^{ONDCP} is the estimate of cocaine used in the United States issued by the Office of National Drug Control Policy (2002a); and
- $D_{88}^{R\&E}$ is the Rydell and Everingham (1994) estimate of cocaine consumed in the United States in the year i , including the year

1988.

Using this technique, the results are that from 1981 to 1988 the amount of cocaine used in the United States experienced a slight, constant increase starting from 270 MT. At the peak, American users consumed almost 400 MT of pure cocaine in 1988. From the latter year onwards, the use of cocaine decreased by one half in a decade. In 2000, the total demand for cocaine in the United States reached a historic low of less than 200 MT.

Within the Western Hemisphere, exports of cocaine from the Caribbean have not only reached American coasts in massive amounts but have moved, to a lesser extent, towards Canada. The Royal Canadian Mounted Police (2002), without making explicit the methodology used, provide an estimate of about 13 MT of cocaine arriving in the country in 2000. After discounting the cocaine confiscated in that year by Canadian authorities, the amount of impure cocaine available in Canada was 13MT. Using latest figures available for cocaine purity in Canada (United Nations Office for Drug Control and Crime Prevention



2002:198), the pure cocaine consumed in 2000 was less than 10 MT.

To check the reliability of this figure and given the evolution of cocaine consumption in Canada, this study will assume that the dynamic and static patterns of cocaine use in Canada and the United States are similar. This assumption is supported by several studies in Canada (Stamler, Fahlman and Keele 1984; Smart 1991). There are only two national surveys about drug use in Canada for the proposed period 1989 and 1994. In the latter year, the annual prevalence of cocaine and crack cocaine use was 0.7% of the adult population - 160,000 people in absolute terms (MacNeil and Webster 1997). This figure represents a dramatic reduction from the prevalence of 1.4% observed in 1989 - 360,000 people. For these years, it will be assumed that the amount in grams of pure cocaine consumed by the average user in Canada and the United States is the same. Thus, the formula used for estimating the total amount of cocaine consumed in Canada is:

$CCC_i = ACUSA_i \times NCC_i$, where

- CCC is the total amount of pure cocaine consumed in Canada in the year i ,
- $ACUSA_i$ is the annual amount of cocaine used by the average user in the United States during the year i and
- NCC_i is the total number of cocaine consumers in Canada determined by local surveys in the year i .

Using this procedure, the total amount of pure cocaine consumed in Canada fell by nearly a half - from 22 MT in 1989 to 14 MT in 1994. This reduction is slightly higher than the decline in cocaine use observed in the United States. For the years in-between, this study will assume a constant reduction in the annual prevalence and then apply the prevalence obtained for every year in the 1990-1993 period to the demographic profile of Canada. For the years before 1989 and after 1994, the key assumption will be that the cocaine use dynamics in the United States were the same under this formula:

The total amount of pure cocaine consumed in the two export markets for cocaine from the Caribbean region has varied tremendously during the 1981-2000 period.

$$CCC_i = \frac{CCUSA_i \times CCC_r}{CCUSA_r}$$

where:

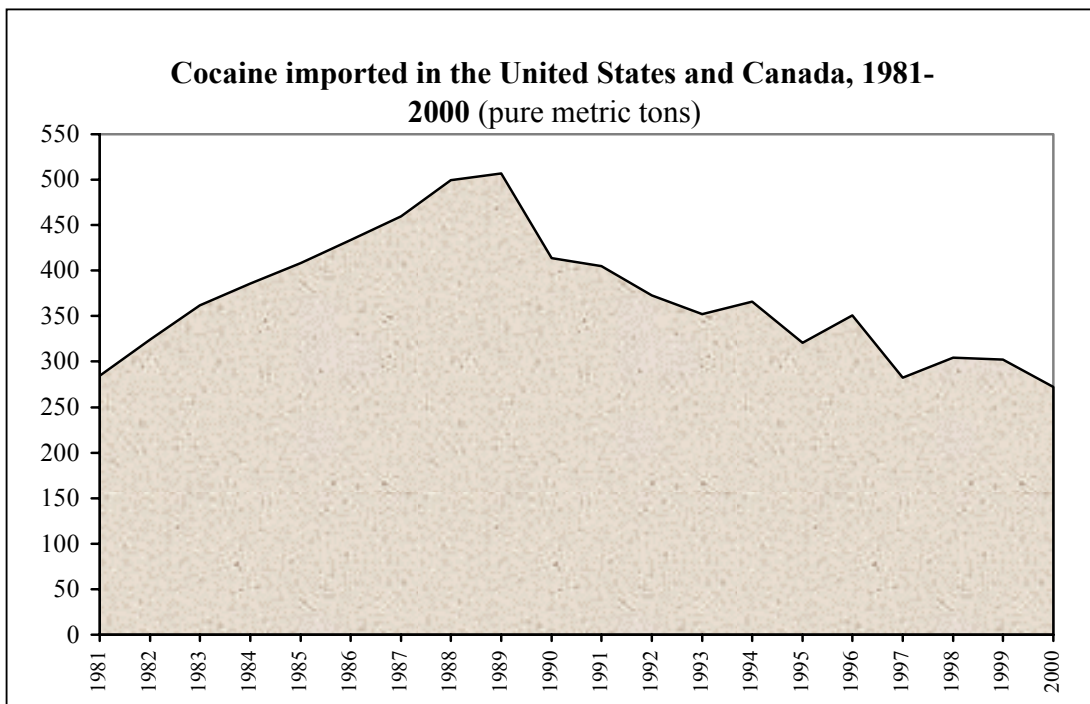
- CCC_i is the total amount of pure cocaine consumed in Canada in the year i ;
- $CCUSA_i$ is the total amount of pure cocaine consumed in the United States in the year i ;
- CCC_r is the total amount of cocaine consumed in Canada in the reference year r - 1989 for the 1980-1988 period and 1994 for the following years until 2000; and
- $CCUSA_r$ is the annual amount of cocaine used by the average user in the United States for the same reference years r .

Based on these assumptions, for the first period - from 1981 to 1988 - cocaine use in Canada increased by over 100% from 16 MT to 33 MT. In contrast, between 1995 and 2000 cocaine use declined from 12 MT to 10 MT. The latest figure is consistent with the estimate of cocaine imports given by the Royal Canadian Mounted Police (2002) for 2000. Adding both estimates, the total amount of pure cocaine consumed in the two export markets for cocaine from the Caribbean region has varied tremendously during the 1981-2000 period. During the first decade, the amount of cocaine used in Canada and the United States increased by nearly 50% from 280 MT in 1981 to over 400 MT in 1987, an all-time high for cocaine use in North America. From that year onwards, the amount of cocaine consumed began a constant and sharp decline that ended with the 200 MT of pure cocaine consumed in 2000.

To estimate the total amount of pure cocaine entering North America from the Caribbean countries, two steps will be followed. First, the figures for cocaine seizures and other non-intentional losses in the United States and Canada will be added to the cocaine consumed there. The data about captures will be obtained from the official sources (Bureau of Justice Statistics 2000; Office of National Drug Policy Control 2001b, 2002b, 2002d; Royal Canadian Mounted Police 2002). When the figures are provided in gross cocaine, they would be converted to pure cocaine through the average purity of the cocaine seized. For the United States, the figures for cocaine seizures in the period 1989-2000 are provided by the Federal-wide Drug Seizure System. This database comprises data on drug seizures made within the jurisdiction of the United States by the Drug Enforcement Administration, the Federal Bureau of Investigation, the U.S. Customs Service, and the U.S. Border Patrol as well as maritime seizures made by the US. Coast Guard. Drug seizures made by other Federal agencies are included in this database when custody of the drug evidence was transferred to one of these five

agencies. For earlier years, the figure for cocaine seizures will be the aggregate of the captures made by the Customs Service and the Drug Enforcement Administration.

Here it should be noted that information about drug seizures in the United States, much more than in Canada, is incomplete and flawed: "Because the Federal-wide Database Seizure System is a combination of data from several databases, with drug identity and weight sometimes based on visual examination and estimation, the statistics are not as precise as those based solely on laboratory analysis," (Office of National Drug Policy Control 1999: 86). Seizures made by local and state authorities are not included in this database unless they are given in custody, or apprehensions were made in cooperation with the agencies named above and that is not always the case. There is no database for seizures by state or local law enforcement agencies in the United States. Nor is the weight given for seizures dependable. In the last available tally, Godshaw et al. (1987:126) estimated that in 1986 drug seizures made by state and local authorities totaled one half the weight of the



federal seizures, Caulkins and Reuter (1998:613), by extrapolating from drug seizure data in Washington D.C. during 1991, concluded that seizures by local and state authorities amount to 15% of those made by federal law enforcement.

To complete the total amount of cocaine available in the Caribbean export markets, the unintentional losses will be added. As no single measure for, or evidence about, this is available in the literature, in this study the ratio applied will be 0.1% of the total amount of cocaine available, a sensible ratio — although not supported by any evidence. In comparison, the more usual ratio applied to unintentional losses of cocaine in producing countries is 0.5% (Rocha 2000). Including seizures and un-intentional losses, the total amount of pure cocaine imported by the United States and Canada rose from almost 300 MT in 1981 to 500 MT in 1988, followed by a sharp reduction to less than 350 MT in 2003.

At this point in the development of the methodology it is important to note that there is a time-span problem in the model: the time of consumption is not the same as that of importation since there is a delay between the time when the cocaine is available in the export markets and the time when the cocaine is used or seized. The Institute for Defense Analysis (2000) found that coca eradication efforts in Peru and Colombia (Layne et al., 2001) supported this conclusion by providing evidence that law enforcement efforts in production areas generate transformations in the United States markets after four to six months. When this disruptive law enforcement activity took place in arrival and in-transit areas, such as the Caribbean region, the lag time was reduced to between zero and two months. In this context, assuming that there is no time span between the export time in the Caribbean and the consumption time in Canada and the United States makes sense because drug traffickers try to limit this time due to the risks associated with storage.

The second step in estimating the quantity of pure cocaine exported through Caribbean countries to the United States and Canada is to multiply the amount of cocaine imported by these two countries by the market share of the Caribbean countries in that market. The Caribbean Co-

ordination Mechanism (2002), a project engaged in drug research in the Caribbean Regional Office of the United Nations Office on Drugs and Crime, formerly known as the United Nations Drug Control Programme, provides an indicator for the percentage of cocaine exported to North America that passed through the Caribbean over the period studied. Their data is preferred over that of the United States Joint Inter-Agency Task Force's annual Interagency Assessment on Cocaine Movement because the latter only covers some of the years studied in this research, is limited to the cocaine entering the United States, does not take into account the cocaine sent to Canada and, especially, has been subject to year-to-year alterations in the estimates that cannot be explained exclusively in terms of methodological transformations. For example, the 1996 Joint Inter-Agency Task Force report estimated that 190 MT of cocaine were exported from South America to Europe; in the following year's report, that amount was reduced by more than a half to 90MT with no methodological explanation for this change and, more important, at a time when cocaine use in Europe was rising (Resa and Labrousse 2000). Moreover, there is no commitment to these figures, even in the American agencies that comprise the task force that produces the report. For example, in the same hearings in the United States Senate (2001), four different figures are provided for the amount of cocaine entering the United States from the Caribbean: the opening statement gave the amount of cocaine transiting the Caribbean as 30%; then the United States Coast Guard commander in the Atlantic area changed his mind from the 40% given in his written statement to "a half" that he spoke of in the hearings; and the figure of 43% was provided by a senator quoting the Interagency Assessment on Cocaine Movement. Although this is not specified in the report of Caribbean Coordination Mechanism, in this study it will be assumed that the percentage of Caribbean exports is given in terms of pure cocaine because the export quality of cocaine is the same no matter what the origin.

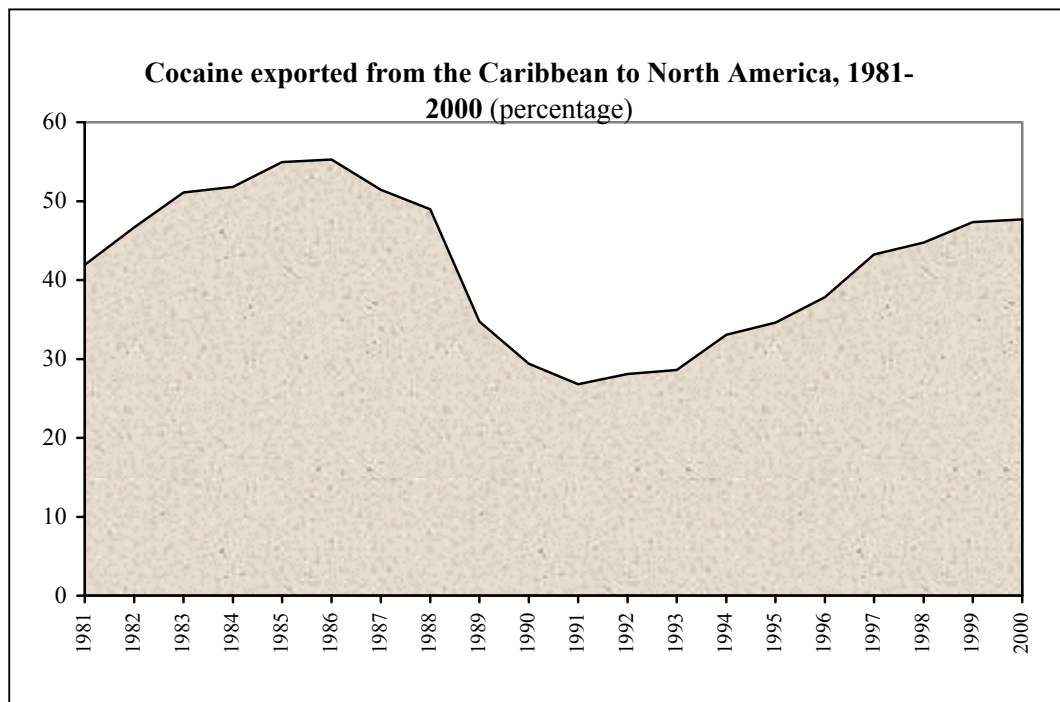
According to the data provided by the Caribbean Coordination Mechanism (2002), in 1981 over 40% of cocaine exports bound for North America

passed through the Caribbean countries. Since then, cocaine traffickers have been busy in the region. The highest level of contact of the Caribbean region with North American cocaine imports occurred in 1985-1986 when over 55% of total imports passed through the region. During the 1986-1991 period, the Caribbean registered a constant decline in participation in cocaine delivery to North America to a minimum of less than 30% between 1990 and 1993. This reduction was attributed to increased law enforcement in the Florida-Bahamas area and the migration of cocaine dealings to Mexico. From that year onwards, the Caribbean has increased its percentage of contact with cocaine exportation to North America to figures of over 47% in 1999 and 2000 as cocaine movement through Mexico became increasingly expensive for cocaine barons (Resa 2001).

After multiplying the two variables, the total amount of cocaine entering North America and the participation of the Caribbean region in the supply of cocaine exports, the total amount of pure cocaine reaching North America from Caribbean countries was estimated at 130 MT in

2000. This represents a small increase from the 100 MT in 1993 and a large decrease from the all-time high of 240 MT reached in 1988.

Once the amount of cocaine exported through the Caribbean to North American markets has been estimated, the final step of this model is to multiply that figure by the average export price to obtain the total monetary value of the cocaine exports. Since the overwhelming majority of the cocaine imported into North America — even when it is consumed in Canada — enters through the United States, the wholesale price of cocaine in the United States for transactions involving more than 100 grams will be considered as the import price with some changes. The cocaine import price is assumed to be 20% lower than the wholesale price and, to avoid sharp year-to-year changes, the three-period moving average will be considered for every year. The data are provided by the Office of National Drug Control Policy (2001a, 2001b), but the raw material for these figures comes from the STRIDE (System to Retrieve Information Drug Evidence) programme carried out by the Drug Enforcement Agency. The import price per gram of pure cocaine decreased

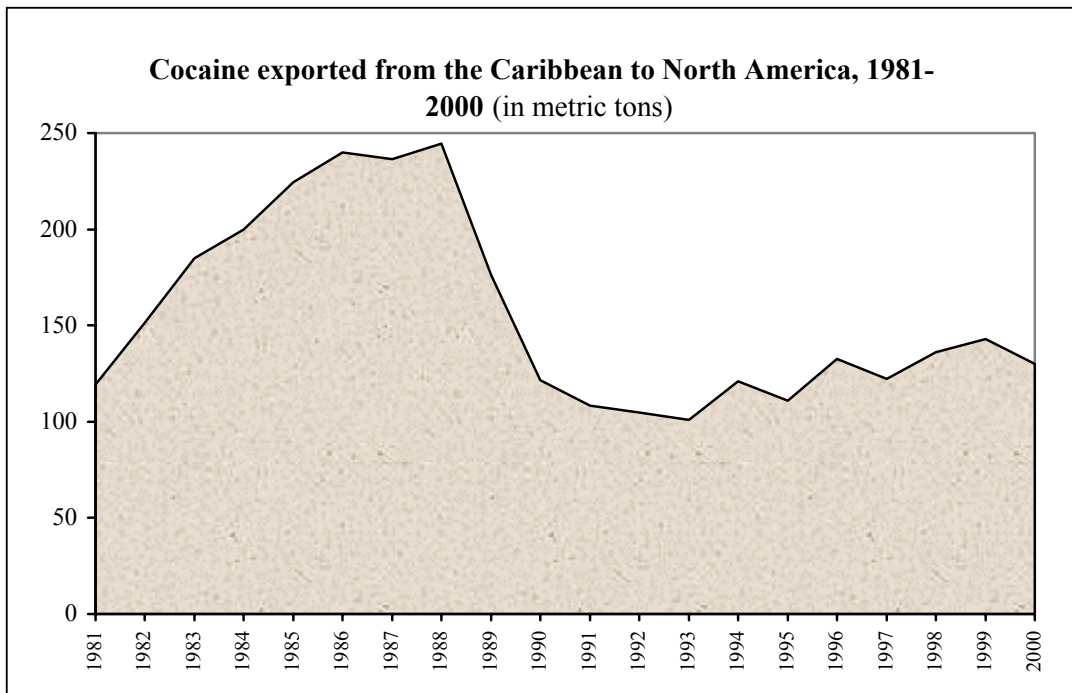


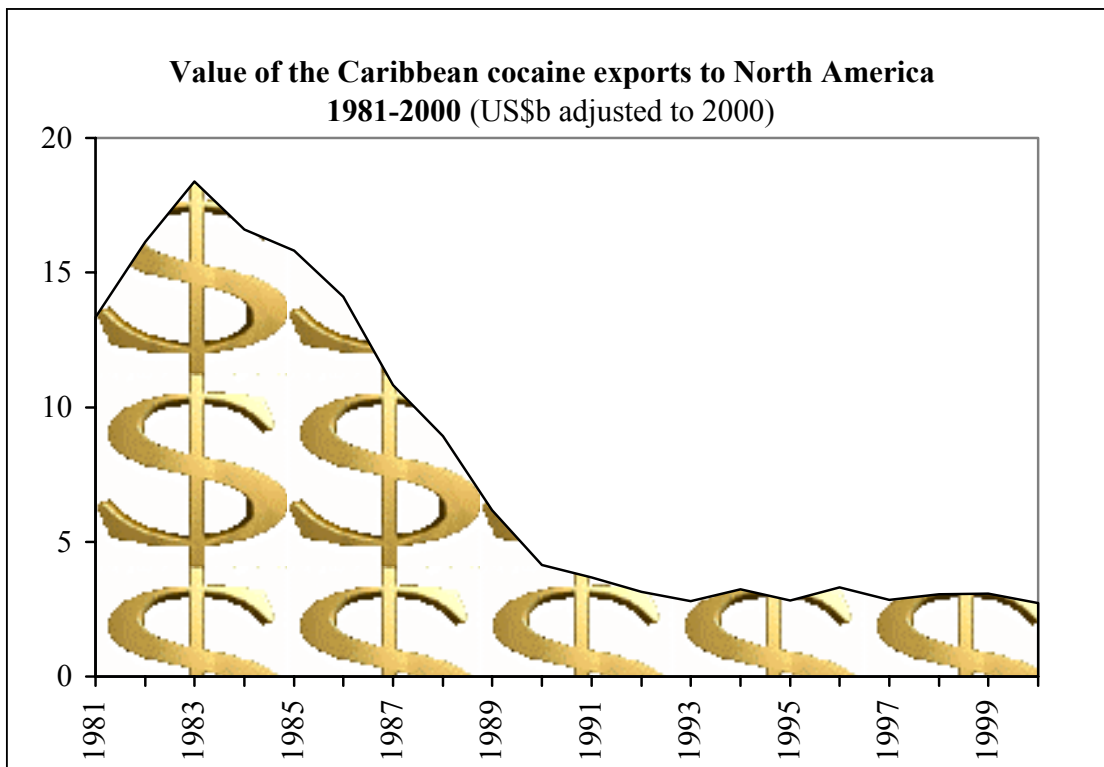
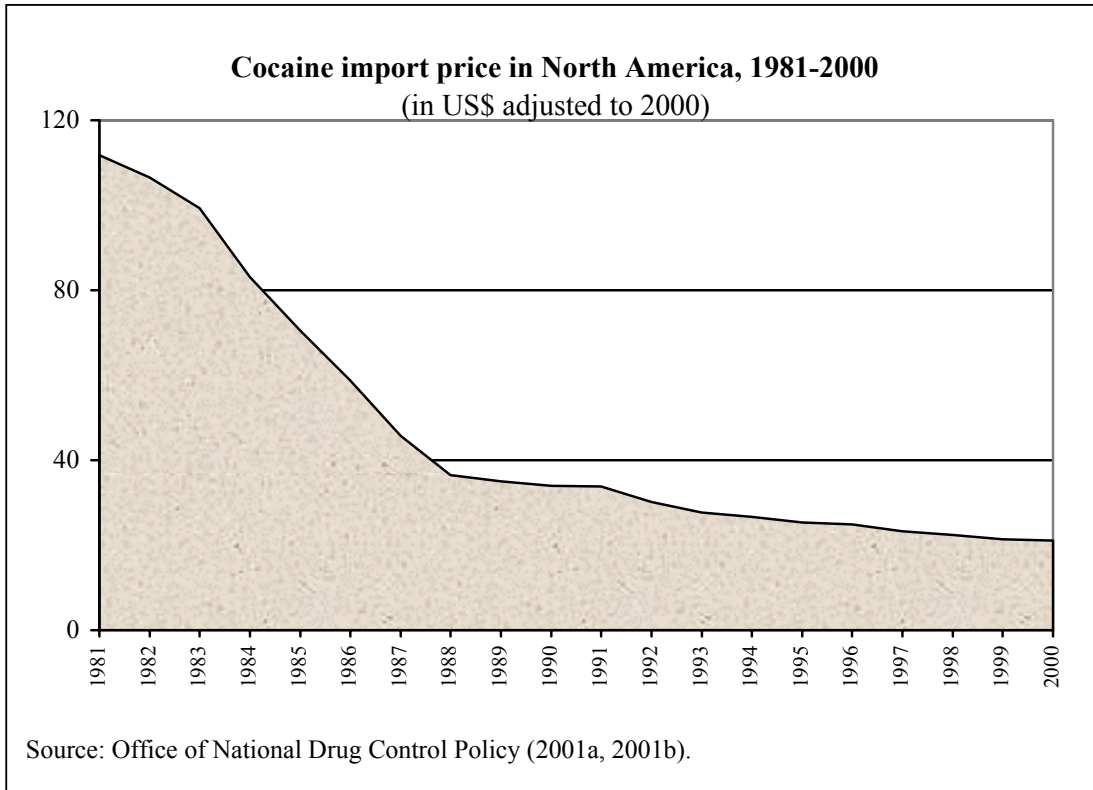
abruptly during the 1980s from over \$150 (all prices adjusted for year 2000) in 1982 to \$40 in 1989. Since that year, the price of pure cocaine has continued on a decline but at a much reduced rate to reach a price of US\$25 in 2000. In sum, the price paid for imported cocaine has fallen by 80% in real terms over the period analyzed. Although the price measures given by the STRIDE programme have some reliability problems, arising from the fact that the data are collected for administrative purposes and are not statistically significant (Frank 1987; Horowitz 2001; Manski, Pepper and Petrie 2001: 105-17, 282-95; Rhodes and Kling 2001:264-66), they are the only systematic collection of information on prices and have been used in several academic studies in the past.

By multiplying the amount of cocaine exported through the Caribbean to North America by the average price, the value of Caribbean cocaine exports is obtained. The result shows that the real value of cocaine exports through the Caribbean has declined by 80% from 1983 to 2000 - from US\$18bn to US\$3bn. The impressive reduction in cocaine prices plus the decrease in the total

demand are the explanatory factors - the former more important, the latter with more limited effect - in the decline in the value of Caribbean cocaine exports. But this development in cocaine exported through the Caribbean has followed a two-step path. The decrease was limited at first to the 1980s but, since 1992 to 2000, the value of cocaine exports has moved within a range of US\$2.5bn and US\$3bn.

Fifty-five percent of the total reduction in value can be explained by the price effect, that is, the reduction in price of the exported merchandise, the cocaine, in the export market. The remaining 45% is the result of the quantity effect or, in other words, the decrease in the total amount of cocaine being exported through Caribbean countries.





Value of the Caribbean Cocaine Exports to North America, 1981-2000

Year	Cocaine consumed in the United States	Cocaine consumed in Canada	Total cocaine consumed in North America	Cocaine seized in the United States	Cocaine seized in Canada	Domestic losses	Total cocaine introduced in North America	Cocaine introduced through the Caribbean	Cocaine introduced through the Caribbean	Cocaine import price	Total value of the Caribbean cocaine exports to North America
	A	B	C	D	E	F	G	H	I	J	K
			A+B				C+D+E+F		GxH		IxJ
	Mt (metric tons)	mt	mt	mt	mt	mt	mt	%	mt	US\$2000 per gram	US\$2000 billion
1981	267.5	15.8	283.3	1.1	0.0	0.3	284.8	41.9	119.4	112	13.3
1982	302.7	17.9	320.7	3.3	0.0	0.3	324.4	46.7	151.3	107	16.1
1983	335.5	19.9	355.4	6.4	0.1	0.4	362.2	51.1	185.0	99	18.4
1984	355.9	21.1	376.9	8.4	0.1	0.4	385.8	51.8	199.8	83	16.6
1985	368.3	21.8	390.1	18.0	0.1	0.4	408.5	55.0	224.5	70	15.8
1986	375.9	22.3	398.1	35.4	0.1	0.4	434.0	55.3	239.9	59	14.1
1987	389.7	23.1	412.8	46.3	0.1	0.4	459.6	51.4	236.5	46	10.8
1988	389.7	23.1	412.8	86.0	0.2	0.4	499.4	49.0	244.5	36	8.9
1989	378.6	22.1	400.8	104.9	0.6	0.4	506.6	34.8	176.1	35	6.2
1990	334.5	19.3	353.8	59.5	0.2	0.4	413.8	29.4	121.5	34	4.1
1991	292.6	16.7	309.3	94.3	1.0	0.3	404.9	26.8	108.4	34	3.7
1992	260.9	14.7	275.6	94.2	3.0	0.3	373.0	28.1	104.7	30	3.2
1993	254.6	14.2	268.7	82.1	1.4	0.3	352.5	28.6	100.9	28	2.8
1994	249.9	13.7	263.6	98.0	4.3	0.3	366.2	33.1	121.1	27	3.2
1995	228.6	12.4	241.0	78.7	0.8	0.2	320.8	34.6	111.0	25	2.8
1996	247.3	13.3	260.6	88.5	1.4	0.3	350.8	37.8	132.7	25	3.3
1997	201.0	10.6	211.6	69.4	1.1	0.2	282.3	43.2	122.1	23	2.9
1998	213.9	11.2	225.1	78.0	1.3	0.2	304.7	44.7	136.3	22	3.1
1999	217.5	11.2	228.8	72.7	0.5	0.2	302.2	47.3	143.1	21	3.1
2000	193.5	9.9	203.4	68.1	0.8	0.2	272.5	47.7	130.0	21	2.7

CARIBBEAN MARIJUANA EXPORTS TO NORTH AMERICA

Within the Western Hemisphere, Caribbean countries export marijuana to the American and Canadian markets. Beside the exports of locally produced marijuana, there is also evidence of Colombian marijuana passing through some countries in the Caribbean to be re-exported to the United States. For the present research, the Colombian cannabis that stops in the Caribbean for later re-export will not be taken into account because its significance is minor. Only the locally-grown marijuana, exported mainly from Jamaica and Belize, will be estimated.

During the 1990s, St. Vincent and Grenadines developed a capacity to produce marijuana that is capable of meeting both local and external demand primarily affecting the markets of the Eastern Caribbean. However, unlike Belize in the early 1980s, marijuana produced in St. Vincent and the Grenadines has not been the object of systematic large-scale illicit exports beyond the region. This situation is being monitored through the seizure data presented by the law enforcement agencies and will be reported on in the annual trends analysis report produced by the United Nations Office on Drugs and Crime (UNODC) Caribbean Regional Office. One of the difficulties anticipated in identifying the source of the marijuana will be the capacity of the local forensic laboratory to trace the marijuana to its source.

In spite of the limited field of the study, the estimate is much more complex and lacking in many important details than in the case of cocaine. As a second resort, the data about world cannabis cultivation that are annually published by the United States may be used. But the reliability of those data is so low, and is so influenced by unexplained changes, that the demand-based research is preferred. Renter (1996:67-8), for example, estimated that consuming only the estimated 1989 Mexican production of marijuana —leaving the Jamaican, Colombian and homegrown marijuana apart — would have required that a half of the total American population between fifteen and thirty-five years old smoke more than a kilogram of marijuana in that year, which seems an unrealistic scenario.

According to the Office of National Drug Control

Policy (2002a), 1,046MT of marijuana were consumed in the United States in 2000. This represents a meagre increase over 1988, the first year of their analysis, when only 900MT of marijuana were used in that country. Unlike cocaine, marijuana use in the United States rose by 20% in the 1990s. Chalsma and Boyum (1994) reached similar conclusions about the total amount of marijuana used in the United States by using demand-based methods as well, and the Bureau of Justice Statistics (1992:36) offered the figure of US\$10bn as the total expenditure of Americans on marijuana, which is also consistent with the figure offered here. The figures provided by the Office of National Drug Control Policy (2002a) are based on a simple function: multiplying the average number of marijuana cigarettes used by the average user by the average quantity of marijuana smoked in every cigarette - (1.39 grams. The sources of this information are various: while the quantity of marijuana per cigarette is provided by Rhodes *et al.* (1998), the figures about the average number of cigarettes smoked come from a specific item asked in the National Household Survey about Drug Abuse, carried out annually by the United States Health Department. However, this question was expunged from the survey in 1994 and the research has assumed that the weekly number of marijuana cigarettes smoked by the average user has remained unchanged since then. This is a questionable decision because the number of

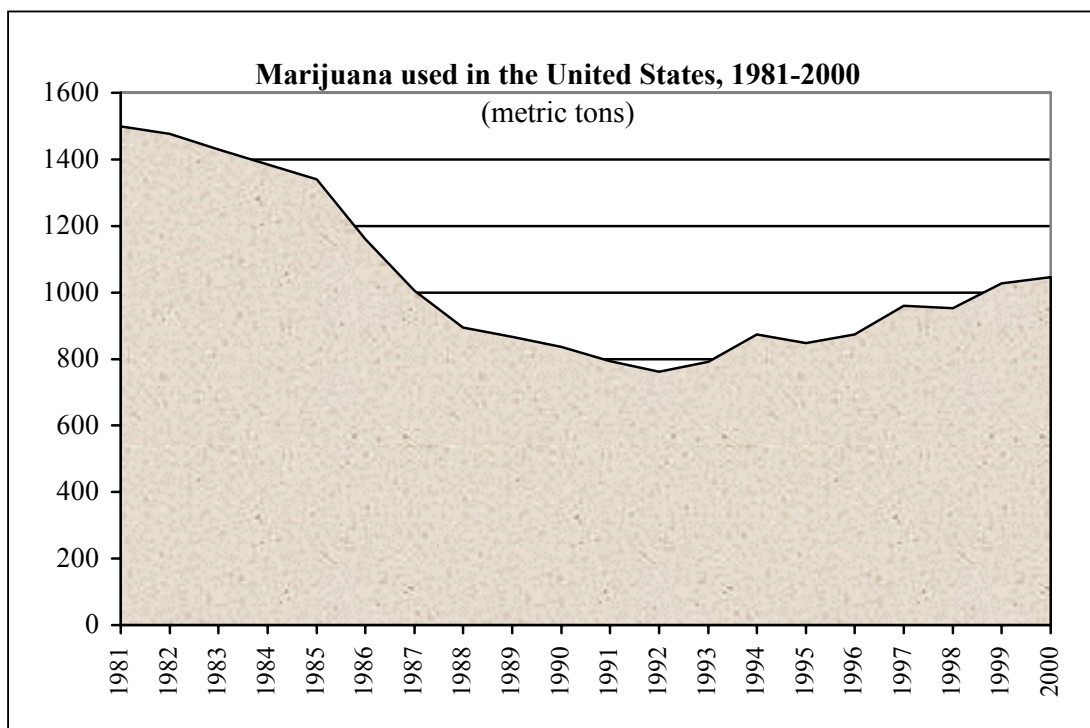
Unlike Belize in the early 1980s, marijuana produced in St. Vincent and the Grenadines has not been the object of systematic large-scale illicit exports beyond the region.

cigarettes used may have been reduced in the 1990s since the narcotic substance in the marijuana, the delta-9 tetrahydrocannabinol, has increased as a result of better cultivation technologies and the development of a market for high-quality marijuana seeds. According to the Marijuana Potency Monitoring Program of the University of Mississippi, the amount of this narcotic substance in commercial marijuana increased from 3.97% in 1992 to 5.57% in 1998 (quoted in Drug Enforcement Administration 1999a).

At any rate, the study by the Office of National Drug Control Policy (2002a) considered only the period from 1988 to 2000. For the earlier years until 1988, this study will use the methodology, applied by the Office of National Drug Control Policy (2002a), of multiplying the number of users observed in national surveys by the average amount of marijuana used by the average user according to the figures provided by Office of National Drug Control Policy (2002b) and by Fishburne *et al.* (1980). To estimate the annual

amount of marijuana used by the average user, this study will linearly correlate the data and the years of those data, thus obtaining the result that the amount of marijuana per user - both the average amount of marijuana included in a cigarette and the number of marijuana cigarettes smoked by users - shows an upward path over time, and the correlation will be applied to earlier years. With these figures included, the result shows that the total amount of marijuana consumed in the United States declined from 1,500 MT in 1981 to 750MT in 1992, after which the level of marijuana demand in the United States recovered to over 1000 MT in the period 1999-2000.

To estimate the demand for marijuana in Canada, the same method that was used for cocaine will be used on the assumption that marijuana consumption has followed a similar path to that in the United States for those years in which no national data from national surveys are available. The only national surveys show that the annual prevalence of cannabis use in Canada was 7.4% in 1994, slightly over the figure of 6.5% reported for 1989



Health Canada (1995). Based on these considerations the results show that the amount of marijuana used in Canada was 180MT in 1981, going into a steady decline reaching figures of under 120MT between 1989 and 1994. After that date, the amount of marijuana used increased to 160MT in 2000.

From aggregating both sets of data, it was found that the total use of marijuana in North America declined by 500MT between 1981 and 2000. For the latter year, the total amount of marijuana consumed reached 1,200MT. To obtain the total demand in North America it is necessary to aggregate the internal seizures. Data are obtained from the corresponding law enforcement agencies in both the United States and Canada. The result then is that the total amount of marijuana available in North America decreased from 4,500MT in 1981 to 1000 MT in late 1980s. At the end of the period studied, 2000, the amount of marijuana available in North America rose to over 2000MT.

From that figure, the amount of marijuana imported will be the difference between the internal production and the total amount of marijuana available. Kleiman (1989) estimated that in 1982 85% of the marijuana used in the United States was imported. That leaves a domestic production of 15% for that year. Coincidentally, the drug Enforcement Administration estimated that in the early 1980s local production met 12% of the United States demand. That share had increased to 25% in 1990 (cited in Gettman 1992). In 1986, the President's Commission on Organized Crime (1986) wrote, in this respect: "because significant amounts of the drug are cultivated in all 50 States, American traffickers need not travel to a foreign source country for a marijuana supply". The latest data on local production generated by the United States official bodies date back to 1992 and are not consistent. On one hand, the Drug Enforcement Administration estimated that domestic production reached 3000MT after two years of eradication efforts that had cut local production by a half (cited in Harrison, Backenheimer and Inciardi 1995:185). On the other hand, an inter-agency task force commanded by the Drug Enforcement Administration revealed that domestic production for the very same year of 1992 was between

6000MT and 6,500MT (National Narcotics Intelligence Consumers Committee 1994:62). In both cases, no methodology is presented. Comparing those figures with the estimates for production in foreign markets (Bureau of International Narcotics and Law Enforcement Effects 2001) and adjusted for international captures, the share of local production in the local *market* was 33%.

All estimates, whatever the specific figure for the weight of local production, are consistent in pointing out a rising incidence of local production in the United States market during the 1980s and 1990s. For example, the Drug Enforcement Administration (1999c) acknowledges this: "U.S. drug law enforcement reporting suggests increased availability of domestically-grown marijuana." During the 1990s, the share of locally-grown marijuana continued its expansion in the United States market to a highest point in which "the majority of marijuana smoked in the United States is now grown in North America, the [DEA Drug Enforcement Administration] says. About a third of that is grown indoors, according to the Florida Department of Law Enforcement" (*The Miami Herald*, February 20, 2000). This fact, supported in the note by the estimation that marijuana "is now Florida's second most popular crop — second only to citrus", is privately shared by many in the United States law enforcement agencies. The former boss of the United States presidential drug

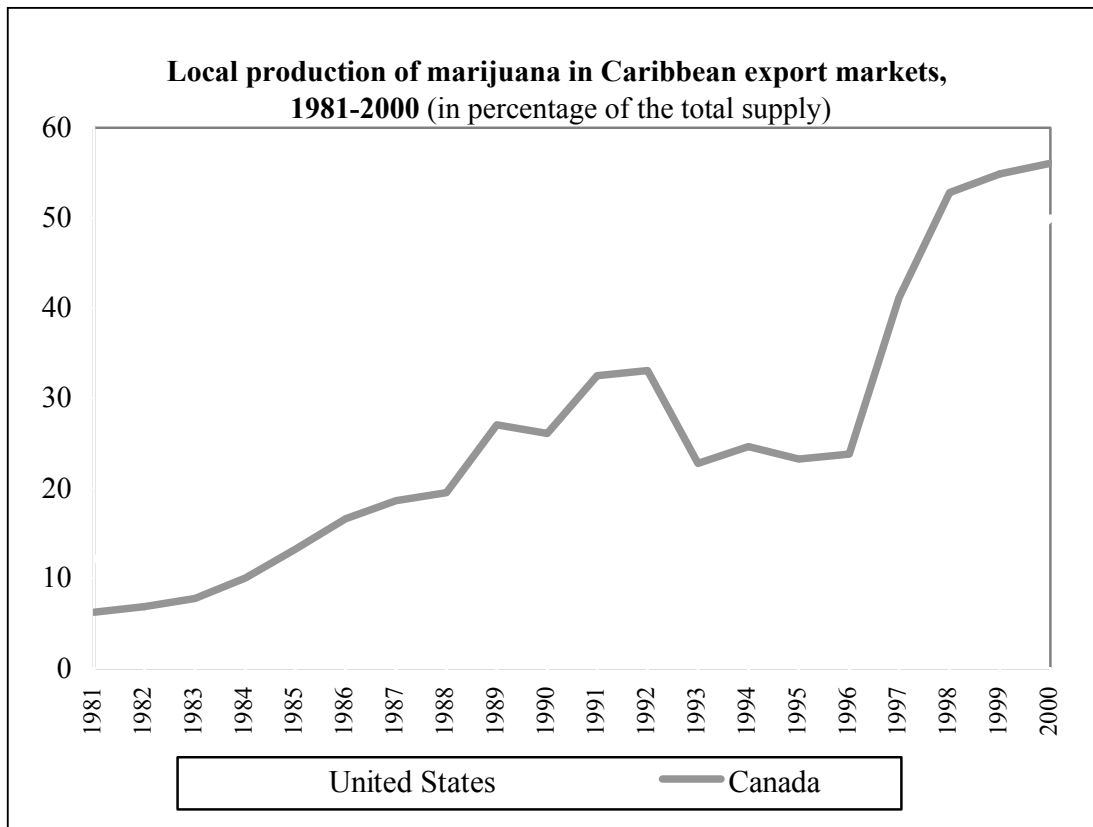
... because significant amounts of the drug are cultivated in all 50 States, American traffickers need not travel to a foreign source country for a marijuana supply.

office, Barry McCaffrey, accepted this fact in a Senate hearing: “We do not know how much marijuana the U.S. produces. My own sort of teaching device is probably half of it comes in from outside and half of it we are growing domestically” (United States Senate 1998:18). This situation is implicitly accepted by Drug Enforcement Administration (1999a, 1999b, 2001) reports, when they point out that “Mexico is the main *foreign* source of the marijuana used in the United States” (italics added.)

For calculation purposes, in this study the percentage of local production will go from the 12% estimated in 1981; to 15 % in 1982; 30% in 1990; 33% in 1992 and, finally, 50% in 2000. These estimates and its sources have been previously made explicit in this text. For those years for which no estimate is available, constant growth – in absolute terms, that is, metric tons – it is assumed between the two nearest years. Assuming that marijuana coming from each source

has the same likelihood of being confiscated by local authorities, the results are that the amount of imported marijuana in the United States has declined four-fold from 4000MT in 1981 to 1100MT in 2000. Nevertheless, this downward trend has not been constant during this two-decade period. In fact, from 1992 to 2000, the amount of marijuana demanded by American citizens in foreign markets increased by over fifty percent.

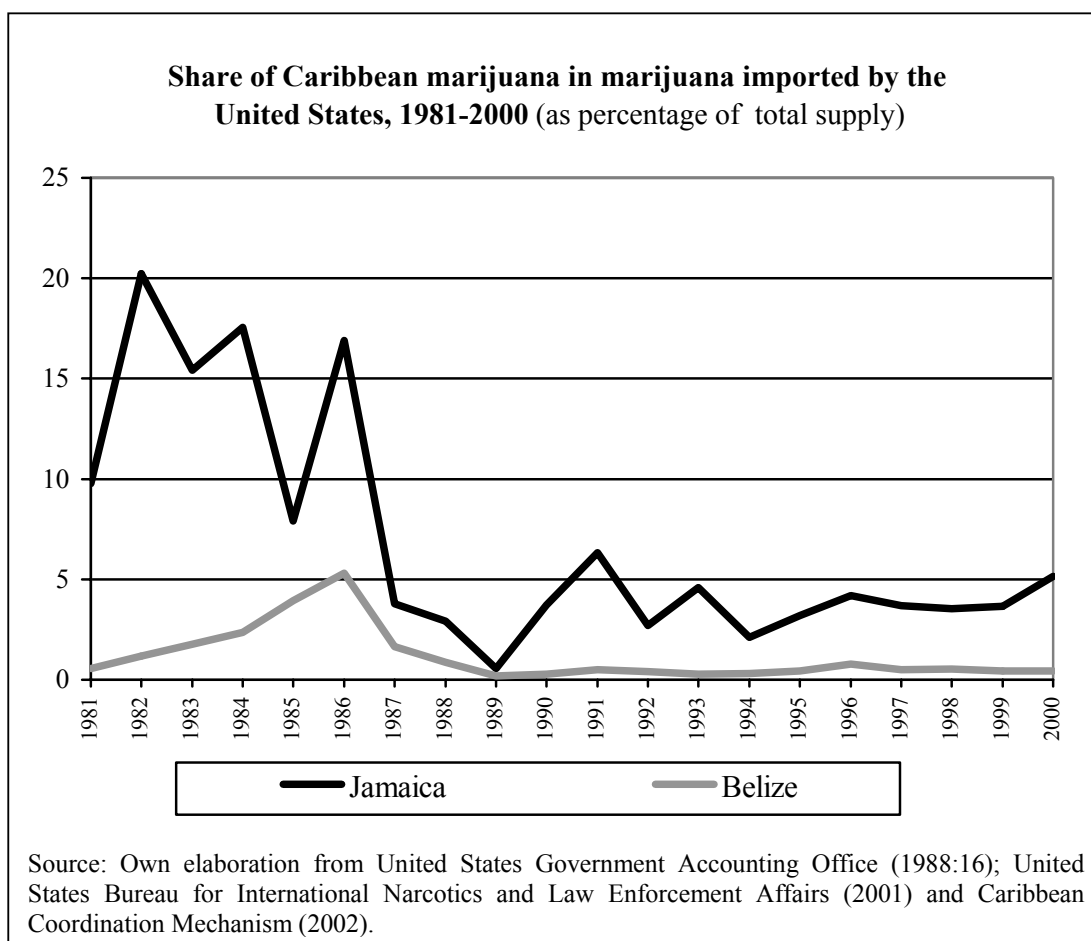
In the case of Canada the growth of a local marijuana industry, from production to distribution, has been shorter and seems to go deeper, although there is no clear evidence on this apart from the recurrent news pieces about the British Columbia production of marijuana. In 1984, a mere 10% of the local consumption of marijuana in Canada was met by local production (Stamler, Fahlman and Vigeant 1985). That was less than 20MT in absolute terms. In 2000 the Royal Canadian Mounted Police (2002) estimated that 100MT of foreign marijuana were introduced



into Canada. That leaves a local production of 130MT – or 55% of the total supply. While no other data are available, this study will consider a constant increase in the local production between those years.

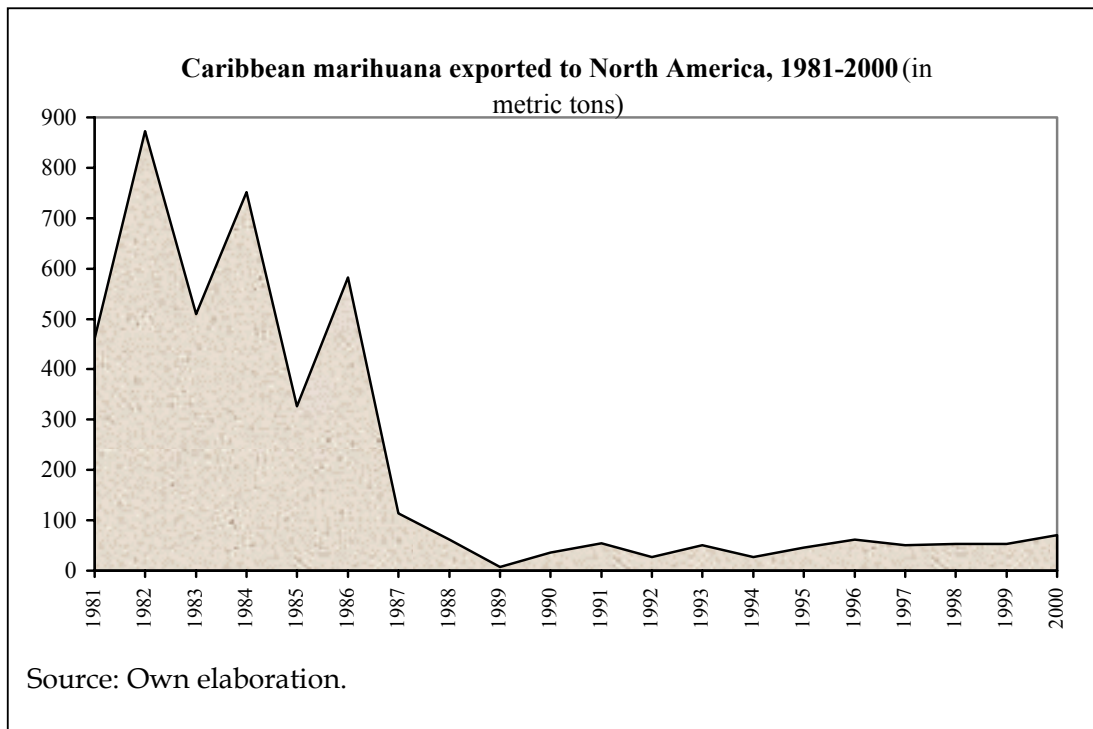
Kleiman (1992) attributes this expansion to the disincentive effect created for marijuana importation activities by successive interdiction operations. The primacy of

the part of the United States government, the effect of which has been to impose a high tariff on marijuana imports while home-grown production has been exempt from that levy. A technological change, that has made it easier to cultivate highly productive marijuana indoors at affordable prices, has also helped to displace imported marijuana by homegrown cannabis. In the United States,



interdiction efforts in border areas over eradication on the home front, which is politically much more expensive and is a labour-intensive activity, has resembled a non-intentional import substitution policy on

the outdoor cultivation takes place most intensively in California, Hawaii, Kentucky, and Tennessee, but production in open spaces can be found in every



state with extraordinary results in terms of quality and productivity.

To estimate the percentage of marijuana being introduced in both markets, this research will use different methodology for the United States and Canada. In the United States, the production estimates of each importing country will be used to calculate the shares of Jamaica and Belize on the United States markets (United States Government Accounting Office 1988:16; United States Bureau for International Narcotics and Law Enforcement Affairs 2001; Caribbean Coordination Mechanism 2002). For years, these official sources have been a measure of supply in the United States rather than of foreign production in spite of the methodology reportedly used. Marijuana produced outside the Western Hemisphere will not be taken into account because the marijuana cultivated there has only reached the United States in limited amounts. According to this calculation, the share of marijuana imports coming from the Caribbean has declined from 20% in the early 1980s to one percent in late 1990s. Jamaican marijuana's presence in the United States market reached its

peak in early 1980s, when their contribution was over 15% of the total supply. In the 1990s, the share of Jamaican exports in the United States market remained somewhat stable under the 5% threshold. Meanwhile, Belize's contribution to United States markets was important in the mid-1980s, when 5% of the marijuana used in that country came from Belize. During the 1990s, Belizean exports to the United States were negligible. The burgeoning production of marijuana in both Mexico and Colombia, and successful eradication efforts in Jamaica and Belize, drove Caribbean marijuana out of the United States market. In absolute terms, this decline of Caribbean marijuana exports to the United States has meant a reduction from over 600MT in the early 1980s to 50MT in the 1990s.

For the Canadian case, the data about marijuana exports from the Caribbean are much more scattered. Stamler, Fahlman and Keele (1983, 1985), using data from the Canadian law enforcement authorities, estimated that in early 1980s the percentage of Jamaican marijuana in the Canadian market was between 10% and 25%

depending on the year. That represents from 20MT to 50MT of Jamaican marijuana imports in that period. No significant amount of Belizean marijuana is reported in Canada during the period studied. In late 1990s, the Royal Canadian Mounted Police (2002) estimated that Jamaica exported from six to eight metric tons of cannabis derivatives – 7% of the total imports. In the years between, from 1985 to 1997, this study will assume that the share of Jamaican imports in the Canadian market followed a rather similar path to that observed in the United States. That is consistent with the fact that supply in Canada and elsewhere is highly dependent on production in Jamaica. The share of Jamaican marijuana in Canada's imports was 20% higher in the period 1981-1984 than was observed in the United States, but was 55% higher in the period 1998-2000. Accordingly, the share of Jamaican marijuana in Canada's imports of marijuana will follow the formula:

$$SCEC_i = SCEUSA_i \times \theta_i, \text{ where}$$

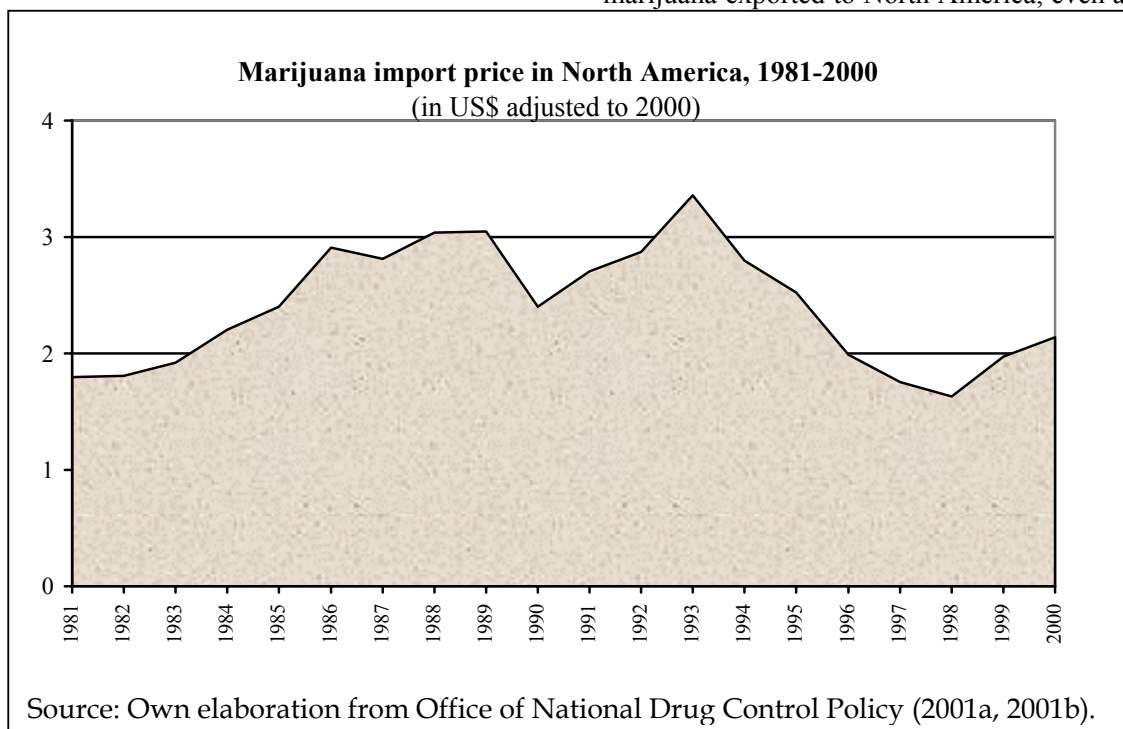
- $SCEC_i$ is the share of Jamaican marijuana imports in the total marijuana imported into Canada;
- $SCEUSA_i$ is the share of Jamaican

marijuana imports in the total marijuana imported into the United States; and

- θ_i is the ratio of Jamaican marijuana share in Canada with respect to the same share in the United States, and which has evolved from 1:19 in 1984 to 1:56 at a constant rate of annual of increase at 1.95%.

Using this formula shows that Caribbean exports of marijuana have declined from 50MT in 1982 to less than 10MT during the whole decade of the 1990s. In total, Caribbean marijuana exports to North America have declined from well over 500MT in the early 1980s to an annual export figure of less than 100MT in the whole of the 1990s. Most of this decline took place in the late 1980s, when eradication programmes were successfully implemented in the two largest producers, Jamaica and Belize. In fact, during the 1990s, marijuana exports to the United States have kept on a rising track.

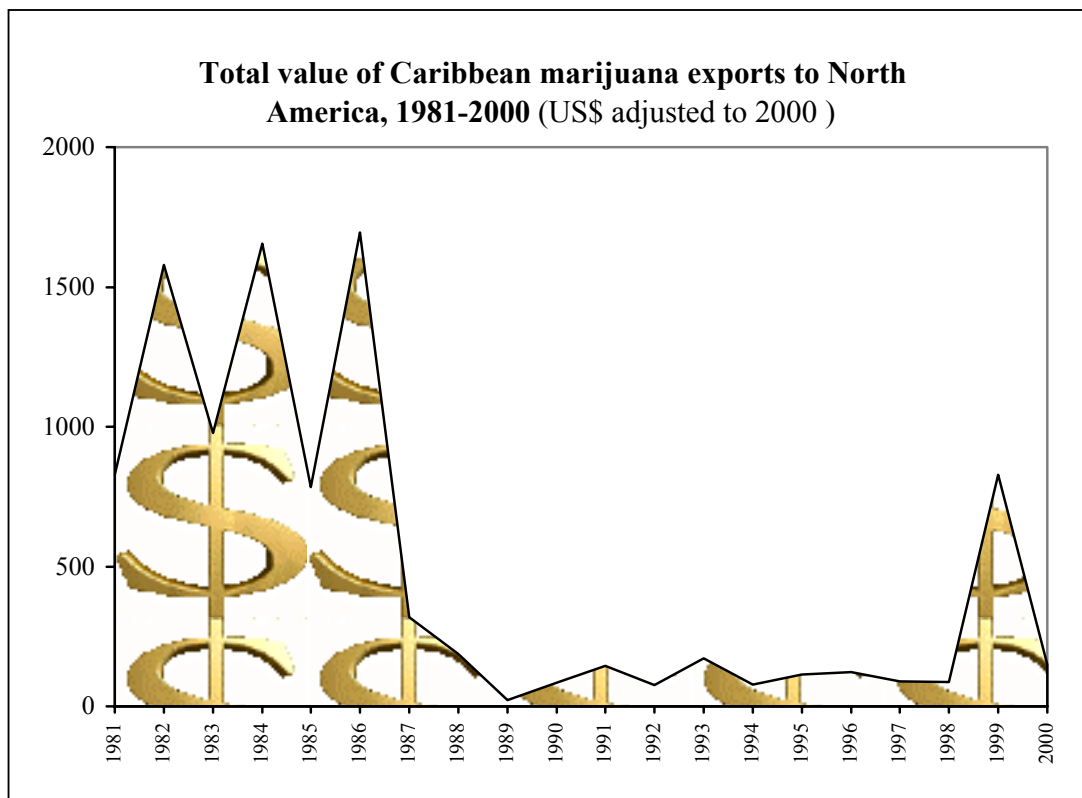
This amount of marijuana will be multiplied by the average export price. This study will consider the wholesale price of marijuana — the price for over one kilogram of marijuana — in the South Eastern part of the United States as a rough equivalent of the export price for marijuana. Much of the marijuana exported to North America, even a large



part of the Jamaican marijuana that is introduced into Canada, arrives — and is paid for — through Florida. Because there are few examples of prices of large amounts of marijuana in that area, this research will include the three-period moving average. The price of marijuana in the South Eastern part of the United States has been inconsistent. In summary, it increased during a large part of the 1980s and declined during the 1990s, although prices recovered in the late 1990s. The price in 2000 was slightly over US\$2000 per kilogram.

marijuana exports to North America plummeted to negligible amounts. During the decade of the 1990s the value of Caribbean marijuana exports was constant in real terms around US\$100mn although in some instances year-to-year movement varied greatly.

Finally, on multiplying the amount of Caribbean marijuana exported into North America by the average export price, it is shown that the total value of Caribbean exports of marijuana reached its highest level during the 1981-1986 period. During that time, marijuana exports contributed from US\$700 to US\$1.7bn (adjusted to 2000) to the local economy. From 1987 to 1989 Caribbean



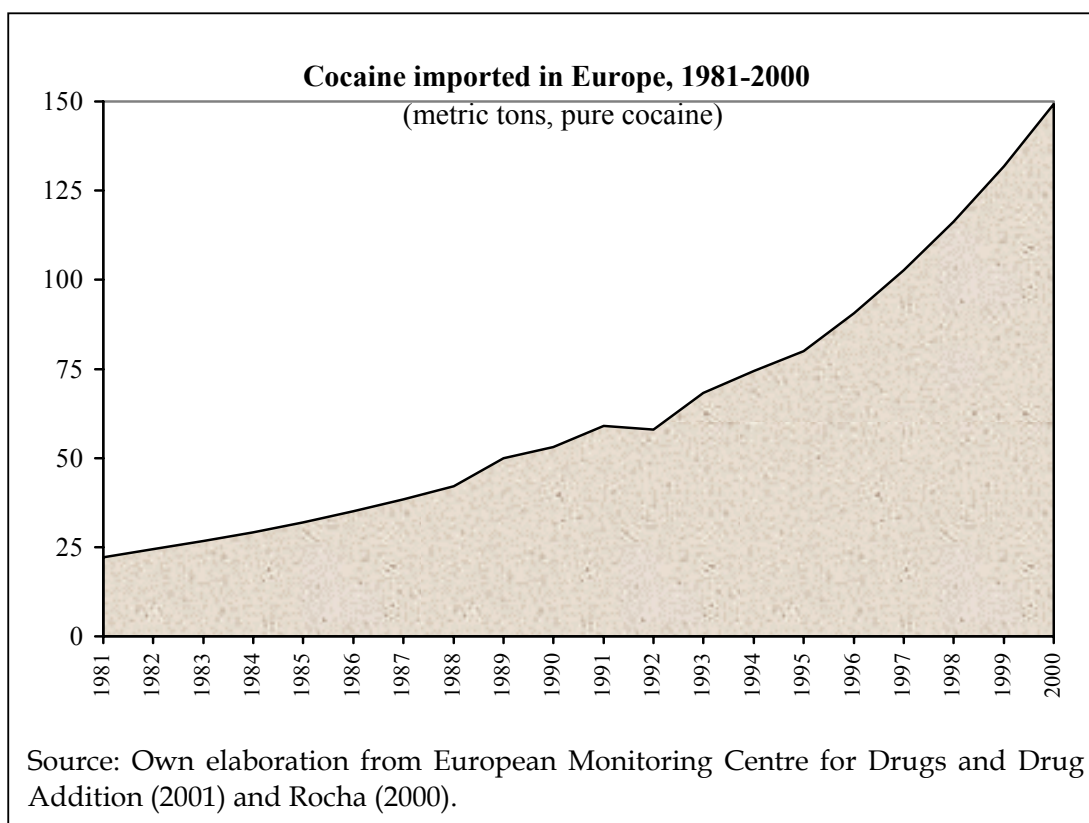
Value of the Caribbean marijuana exports to North America, 1981-2000

	Marijuana consumed in the United States	Marijuana seized in the United States	Total marijuana available in the United States	United States production over total	Marijuana imports of the United States	Jamaican marijuana in the total United States'	Belizean marijuana in the total United States' imports	Total marijuana exported from the Caribbean to the United States	Marijuana consumed in Canada	Marijuana seized in Canada	Total marijuana available in Canada	Canadian production over total supply	Marijuana imports of Canada	Jamaican marijuana in the total Canadian	Total marijuana exported from the Caribbean to Canada	Total marijuana exported from the Caribbean to North America	Caribbean marijuana import price	Total value of Caribbean marijuana to North America
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
mt	mt	A+B	%	Dx(1-B)	%	%	(F+G)xD	mt	mt	I+J	%	mt	%	OxM	H+O	US\$2000 per gram	PxQ	
1981	1,499	3,195	4,694	12	4,130	10	1	426	180	7	187	6	175	20	35	461	1,8	828
1982	1,476	3,072	4,548	15	3,865	20	1	828	174	18	192	7	179	25	45	873	1,8	1,579
1983	1,431	2,054	3,484	18	2,864	15	2	492	169	23	192	8	177	10	18	510	1,9	978
1984	1,385	2,805	4,190	13	3,625	18	2	722	164	6	169	10	152	20	30	752	2,2	1,656
1985	1,340	1,828	3,168	16	2,654	8	4	314	142	4	146	13	126	10	12	326	2,4	784
1986	1,161	1,828	2,989	16	2,521	17	5	560	123	8	131	17	109	21	23	583	2,9	1,695
1987	1,005	1,420	2,424	18	1,998	4	2	108	106	26	133	19	108	5	5	113	2,8	319
1988	894	1,003	1,897	20	1,509	3	1	57	118	25	144	20	116	4	4	61	3,0	186
1989	866	393	1,259	28	906	1	0	7	114	4	118	27	86	1	1	8	3,0	23
1990	837	233	1,070	30	749	4	0	30	123	16	139	26	103	5	5	35	2,4	85
1991	793	225	1,018	34	675	6	0	46	119	7	126	32	85	9	8	54	2,7	146
1992	761	345	1,106	33	741	3	0	23	127	14	141	33	94	4	4	27	2,9	77
1993	791	410	1,201	34	796	5	0	39	139	93	233	23	180	7	13	51	3,4	172
1994	874	475	1,349	33	898	2	0	22	148	96	244	25	184	3	6	28	2,8	77
1995	848	628	1,476	34	975	3	0	34	144	149	293	23	225	5	11	45	2,5	114
1996	874	639	1,513	37	957	4	1	45	148	177	325	24	248	7	16	61	2,0	122
1997	960	699	1,659	37	1,041	4	0	43	163	51	213	41	126	6	8	51	1,8	89
1998	952	1,093	2,045	34	1,359	3	0	46	161	27	189	53	89	8	7	53	1,6	87
1999	1,028	1,235	2,263	34	1,501	3	0	46	161	45	206	55	93	8	7	53	2,0	91
2000	1,047	646	1,693	50	846	7	1	63	157	70	227	56	100	7	7	70	2,1	150

CARIBBEAN COCAINE EXPORTS TO EUROPE, 1981 - 2000

Arriving at estimates or finding reliable statistics on European drug markets is tremendously more difficult than in the United States. Beyond the intrinsic problems marking research on illegal markets, there are two elements that increase the difficulties. On one hand, the information is scattered in pieces according to the nation states. The aggregation of data, even within the European Union, is precarious and troublesome because social science research methods and time spans are variable (Bless et al 1997). On the other hand, for many countries there is not even reliable data about the number of users or drug prices. Just a few countries carry out regular surveys that would allow comparison over time. Only a limited number of co-operative academic studies and the efforts of the United Nations Drug Control Programme, now the United Nations Office for Drugs and Crime, and the European Union-funded, Lisbon-based European Monitoring Centre on Drugs and Drug Addiction have

According to the United Nations Office for Drug Control and Crime Prevention (2002) in the late 1990s there were over three million annual users of cocaine. This figure is corroborated by the data of some national use surveys presented in the European Monitoring Centre for Drugs and Drug Addiction (2002). Assuming that European users show similar patterns of drug use, and this may be questionable because crack cocaine consumption is still unusual in most European countries, will result in an annual use of cocaine in Europe of 135 MT. This estimate would connect to the figures on cocaine use in Europe in previous years provided by Rocha (2000), who shows a rapidly expanding market for cocaine in Europe in the 1980s and 1990s - a perception that is consistent with the scattered data on annual prevalence measured in surveys (Hartnoll 1999; Observatorio Europeo de la Droga y las Toxicomanias 2001; Bless, Kemmesies and Dienjel 2001). All together, the total consumption of cocaine in



Europe has shown a six-fold increase from 20MT of pure cocaine in 1981 to nearly one 150MT in 2000. Once the amount of cocaine seized and the non-intentional losses — again at a rate of 0.1% — are added, the total imports of pure cocaine into Europe rise from 25MT in 1981 to 170MT in 2000.

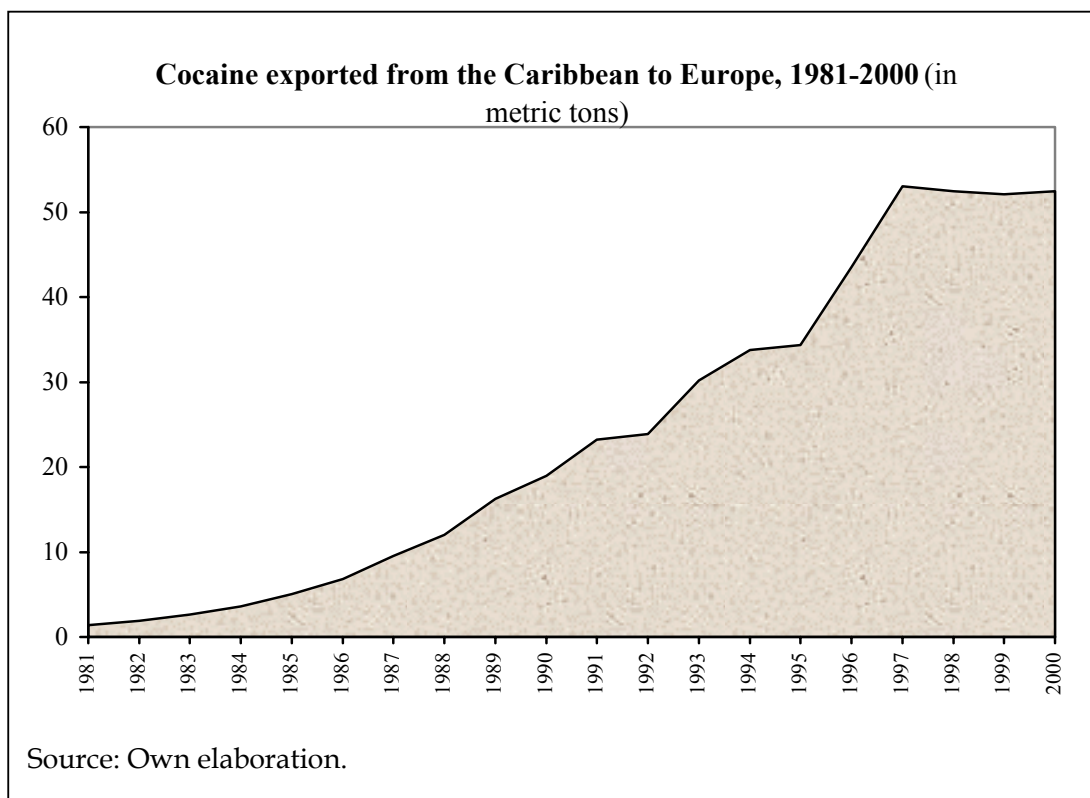
The only figures available on the participation of Caribbean countries in cocaine exports from South America to Europe were provided by the Caribbean Co-ordination Mechanism (2002) for 1999 and 2000. In those years, the amount of cocaine transiting the Caribbean countries en route to Europe was slightly over 50MT. That accounts for 30% of total European imports. To apply this figure to previous years, this study will

second, the use of Caribbean countries as a transshipment point for cocaine en route to Europe is proportionally related to the efforts made by European countries to stop cocaine coming directly from Colombia. Thus, the Caribbean share of European imports of cocaine will follow this formula:

$$CSECI_i = \varepsilon \sqrt{CEMC_i \times IREC_i}$$

where

- $CSECI_i$ is the share of Caribbean countries in the total imports of cocaine into Europe in the year i ;
- $CEMC_i$ is the percentage of cocaine exports coordinated through Colombia during the year i



make two assumption: first, only Colombian cocaine - or cocaine transshipment coordinated through Colombia - ends up in Caribbean countries as a first step on its way to Europe and,

according to the data provided by Rocha (2000:180);

- $IREC_i$ is the interception rate for cocaine in

Europe in the year i measured through a three-period moving average to avoid specific incidents;

\mathcal{E} is a variable to adjust the result to the reported percentage in 2000— that is, 0.82%.

By applying this formula, it is shown that cocaine exports from Caribbean countries to Europe have risen from 6% in 1981 to over one-third during the whole of the 1990s. The highest rate of participation of Caribbean countries in European cocaine imports, in relative terms, was reached in 1997 after years of constant increase. In that year 36% of the total imports into Europe went through the Caribbean. In absolute terms, the amount of pure cocaine moving from Caribbean countries to Europe increased from negligible amounts in the 1980s to over 5OMT in the late 1990s.

To estimate a price level for cocaine in Europe is extremely difficult due to the lack of homogeneous prices and, especially, the time series for prices. In 1999, most Western European countries reported the average wholesale price for cocaine to the European Monitoring Centre for Drugs and Drug Addiction (2002). To obtain a common price for Europe that takes a different weight for every country in the import price through the best proxy available - the amount of cocaine seized - this study will use the following formula:

$$IPCE = \sum_{j=1}^8 WPC_j \times P_j \times CS_j$$

where

- $IPCE$ is the import price for cocaine in Europe in the reported year - 1999;
- WPC_j is the wholesale price of cocaine in the importing country j -- Belgium, France, Germany, Italy, the Netherlands, Portugal, Spain, and the United Kingdom;
- P_j is the purity of cocaine at a wholesale level in the country; and
- CS_j is the percentage of cocaine seizures in the country j over the total seizures in the eight importing countries.

The result of this calculation is that, for 1999, the import price of pure cocaine was twenty-three

euros —US\$24.4 (at current rates, or US\$23.6 at 2000 rates). To extend this price to the whole period studied, this study will follow a primary formula:

$$IPCE_i = \frac{IPEU_{99} \times \left(\frac{WPUN_i}{PUSA_i} \right)}{\left(\frac{WPUN_{99}}{PUSA_{99}} \right)}$$

where

- $IPCE_i$ is the import price for cocaine in Europe in the year i
- $IPEU_{99}$ is the previously estimated import price of cocaine in 1999;
- $WPUN_i$ is the wholesale price for impure cocaine in the year i as in the data provided by the United Nations Programme for Drug Control and Crime Prevention (2002), United Nations Drug Control Programme (2000) and Rocha (2000); and
- $PUSA_j$ is the purity of cocaine at a wholesale level in the United States during the year i , assuming that the evolution of import quality is the same in Europe and the United States because the cocaine purity cuts start once the cocaine is in the consuming market.

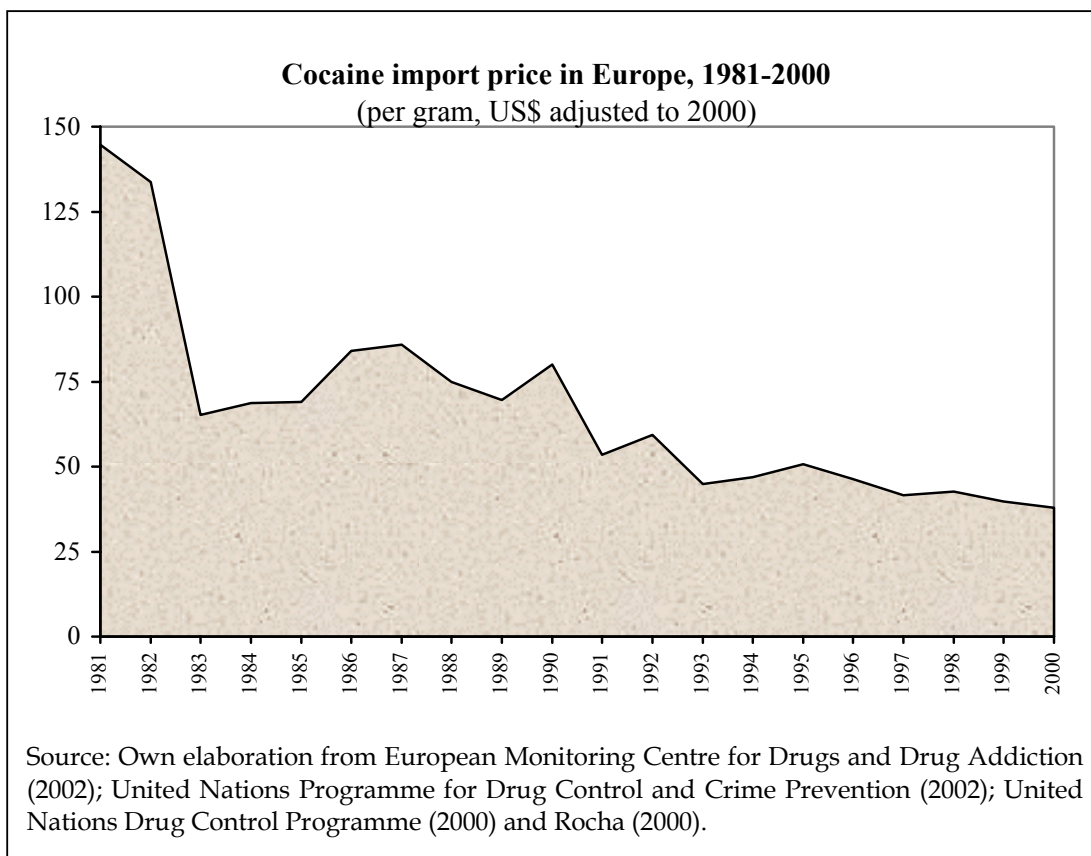
By using this formula, the result is that the import price of cocaine in Europe has declined from US\$150 in 1981(US\$ adjusted to 2000) to US\$40 in 2000.

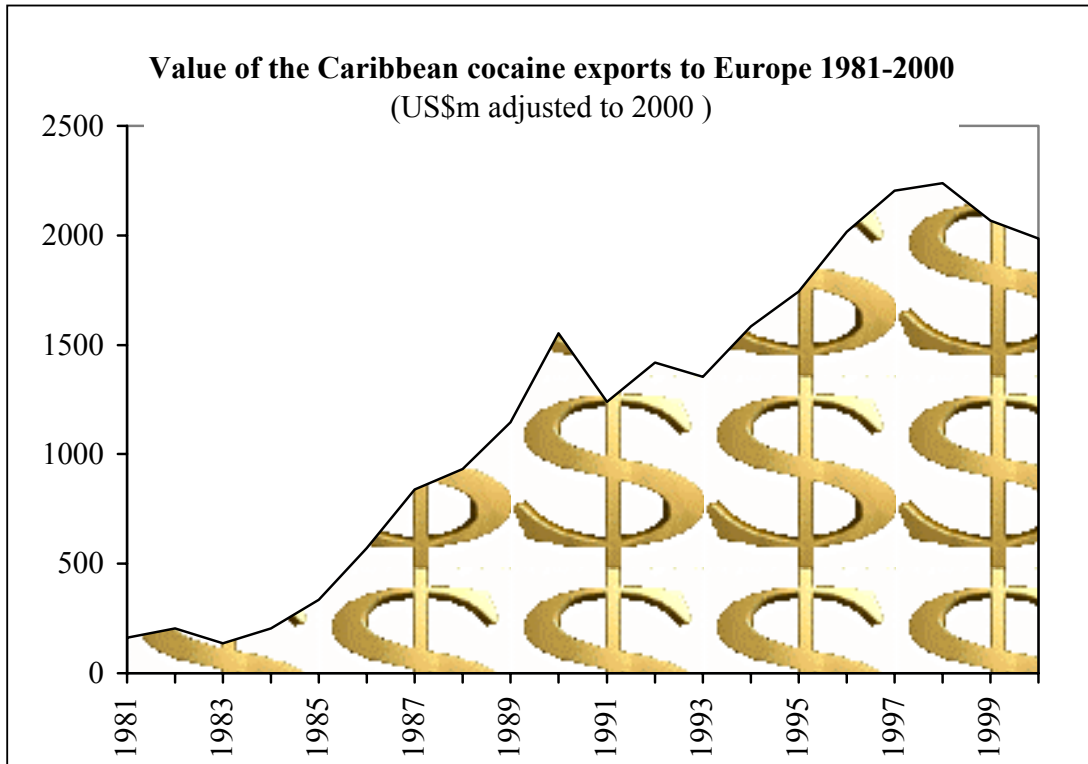
In absolute terms, the amount of pure cocaine moving from Caribbean countries to Europe increased from negligible amounts in the 1980s to over 5OMT in the late 1990s.

By multiplying the two figures, the import price for cocaine in Europe and the amount of cocaine exported from Caribbean countries, it is found that

the total value of Caribbean cocaine exports has increased ten-fold from US\$160mn in 1981 to over US\$2bn in the late 1990s. The growth was higher in the late 1980s and 1990s, when the increase in cocaine use in Europe encouraged larger exports and prices rose. The value of cocaine exports from the Caribbean was highest in 1997 and 1998.

Export revenues were then over US\$2bn. Since then, revenues to the Caribbean from cocaine exports to Europe started on a decline that is related to the use of different routes for cocaine exports to Europe - particularly through Brazil.





Year	Cocaine consumed in Europe	Cocaine seized in Europe	Domestic losses	Total cocaine introduced in Europe	Cocaine introduced through the Caribbean	Cocaine introduced through the Caribbean	Cocaine import price in Europe	Total value of the Caribbean cocaine exports to Europe
	A	B	C	D	E	F	G	H
				A+B+C		DxE		FxG
	mt	mt	mt	mt	%	mt	US\$2000 per gram	US\$2000 billion
1981	22.3	0.1	0.0	22.4	6.3	1.4	86	0.2
1982	24.4	0.3	0.0	24.7	7.8	1.9	80	0.2
1983	26.7	0.6	0.0	27.3	9.7	2.7	39	0.1
1984	29.2	0.8	0.0	30.0	11.9	3.6	41	0.2
1985	32.0	1.3	0.0	33.4	15.2	5.1	41	0.3
1986	35.0	2.0	0.0	37.1	18.4	6.8	50	0.6
1987	38.4	3.3	0.0	41.8	22.7	9.5	51	0.8
1988	42.0	5.8	0.0	47.9	25.1	12.0	45	0.9
1989	50.0	6.0	0.1	56.2	28.9	16.2	41	1.1
1990	53.3	10.5	0.1	64.1	30.2	19.3	48	1.6
1991	59.0	10.5	0.1	69.8	33.3	23.2	32	1.2
1992	58.0	13.5	0.1	71.9	33.3	23.9	35	1.4
1993	68.3	13.5	0.1	82.2	36.7	30.2	27	1.4
1994	74.3	22.5	0.1	97.4	34.7	33.8	28	1.6
1995	80.0	16.2	0.1	96.6	35.6	34.4	30	1.7
1996	90.6	24.9	0.1	116.2	37.4	43.5	28	2.0
1997	102.7	37.5	0.1	141.1	37.6	53.1	25	2.2
1998	116.4	25.1	0.1	142.1	36.9	52.5	25	2.2
1999	131.8	33.1	0.2	165.7	31.4	52.1	24	2.1
2000	149.4	20.3	0.2	170.2	30.8	52.5	23	2.0

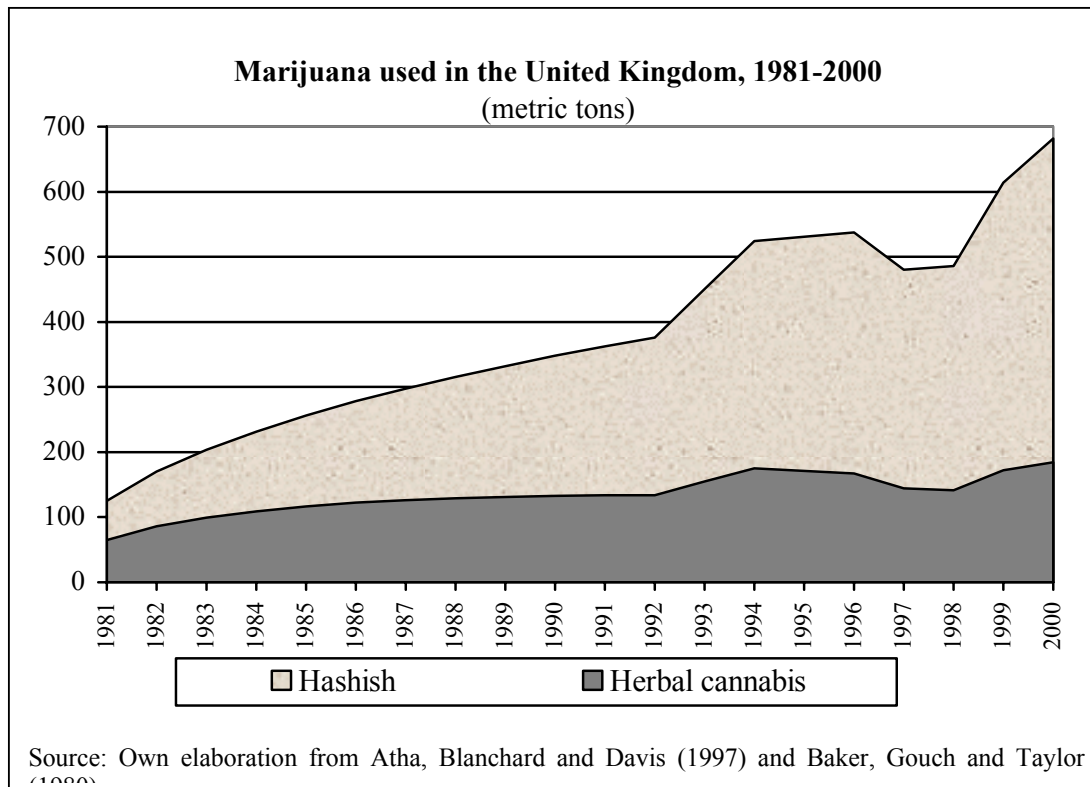
CARIBBEAN MARIJUANA EXPORTS TO EUROPE

Cannabis exports from the Caribbean to Europe are rather limited. Although there is anecdotal evidence of seizures of Caribbean marijuana in some countries of Europe, the only persistent trade relationship between Europe and the Caribbean for marijuana production has been the connection between the United Kingdom and the Caribbean, especially through Jamaica. Thus, an evaluation of Caribbean marijuana exports to Europe will limit its scope to the United Kingdom market for cannabis derivatives and the Caribbean presence there.

Bramley-Harker (2001), based on several surveys of illegal drug use, both nationally and for specific groups, estimated in 1998 that 486MT of cannabis were consumed in the United Kingdom. That amount of marijuana was smoked by 3.2 million people, or 9% of the British population between the ages of 15- and 74-years old — an estimate derived from the arrestees who tested positive in drug control and the British Crime Survey for the year 1998.

Because there are no surveys of arrestees to fol-

low up the development of "regular users", this study will assume that the number of regular users has been a constant percentage of the total users found in the national surveys for previous years (Athol, Blanchard and Davis 1997; Dorn et al. 2001; Ramsay *et al.* 1997, 1999, 2001). Using arithmetic means for those years in which no national survey was conducted, the number of marijuana users has increased from 600,000 people in 1981 to nearly 3.5 million consumers in 2000. Atha, Blanchard and David (1997), through their own surveys, provide data on the average use of marijuana by British consumers for the 1980s and 1990s. This data will be used to estimate the trend in average cannabis use assuming that the figure given by Bramley-Harker (2001) of 24gm per user for the year 1998 is the absolute pivotal figure. Average marijuana use by the British consumers has moved between 20gm and 30gm per year with small year-to-year variation and no specific trend for the overall period studied. By multiplying the total number of British users of marijuana by the average annual consumption, the total use of marijuana in the United Kingdom was



found to have risen from 200MT in the early 1980s to just under 700MT in 2000.

But the use of cannabis derivatives in the British market, unlike in the United States, is divided between hashish and herbal marijuana. In 1994 only one third of the total demand was met by herbal cannabis (Atha, Blanchard and Davis 1997). A study by Baker, Gouch and Taylor (1980), using 1,600 samples of unweighed seized cannabis derivatives for the period 1974-1979

found that 62% were herbal cannabis. All sources are consistent with the fact that consumer preferences have changed during the 1980s and 1990s in favour of the more potent hashish, increasingly available from Morocco, over herbal cannabis from other sources. This study will assume this decrease has been constant through the whole period. With these data in hand, the amount of herbal cannabis consumed in the United Kingdom was found to have risen from 70MT in 1981 to 200MT in 2000. The seizures of herbal cannabis

Composite variable to estimate the share of Caribbean marijuana in the United Kingdom over the total herbal marijuana available

	Supply (50%)	Demand (50%)	Average
1981	23.0	34.5	28.7
1982	21.2	69.8	45.5
1983	19.5	57.5	38.5
1984	18.0	61.6	39.8
1985	16.6	19.7	18.2
1986	15.3	57.6	36.5
1987	14.1	15.1	14.6
1988	13.0	13.3	13.2
1989	12.0	6.2	9.1
1990	11.1	27.1	19.1
1991	10.2	21.1	15.6
1992	9.4	8.6	9.0
1993	8.7	16.5	12.6
1994	7.4	6.8	8.0
1995	7.4	6.8	7.1
1996	7.4	11.7	9.5
1997	7.4	7.0	7.2
1998	7.4	7.0	7.2
1999	7.4	7.0	7.2
2000	7.4	7.0	7.2

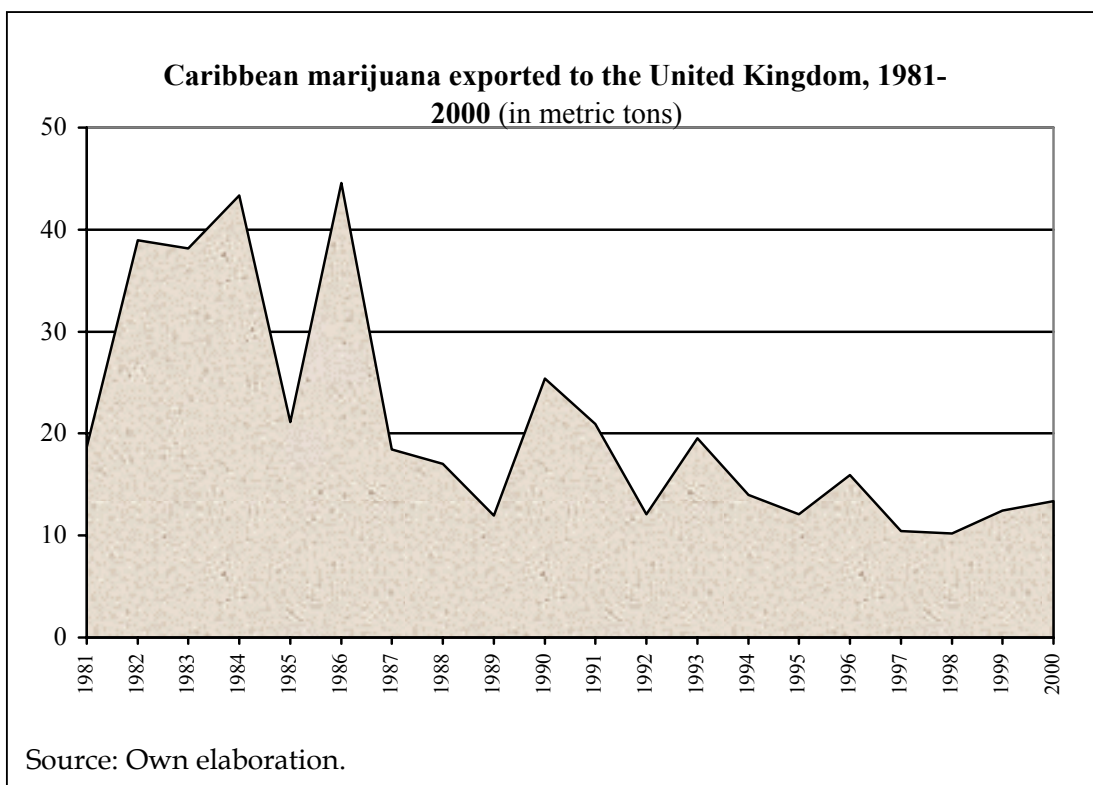
Note: Supply is the development of Jamaica's estimated production and the demand is the constant reduction in the share of Jamaica's participation in the United Kingdom market due to increasing competition.

Source: Own elaboration from data of the Atha, Blanchard and Davis (1997); Baker, Couch and Taylor (1980); and Bureau for International Narcotics and Law Enforcement Affairs (2001).

in the United Kingdom, which contributed to the total consumption account for the entire supply of herbal cannabis, have varied from 3MT to 5OMT in the whole period (Cookery 1991, 2002).

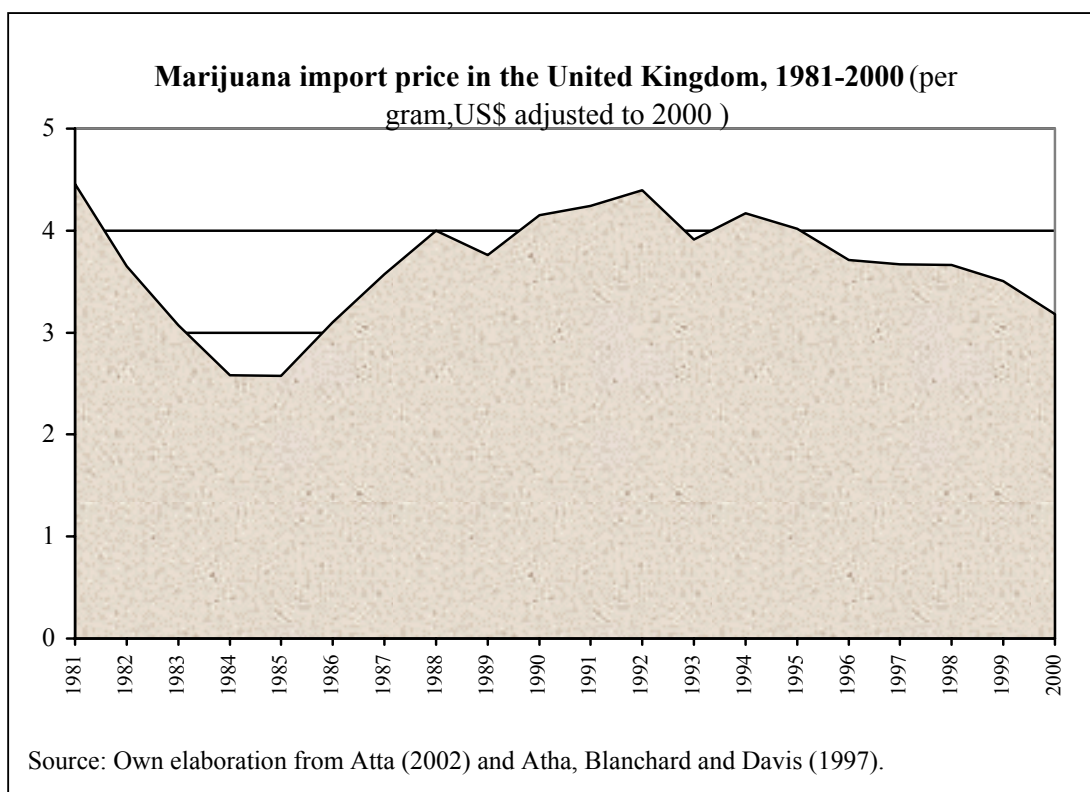
According to the estimates given by Atha, Blanchard and Davis (1997), based on surveys of specific groups, Caribbean marijuana accounted for only 8% of the British herbal marijuana market in 1994. This share of Caribbean

marijuana is a function of demand and supply. Thus, 50% of the variability will be explained by a constant reduction in the market share of Jamaican marijuana due to increasing competition in the local market, specially from home-grown herbal cannabis, and the remaining 50% will be the result of the evolution of production in Jamaica as estimated by the United States government (Bureau for International Narcotics



penetration in the British market is much lower than that observed by Baker, Couch and Taylor (1980) in the late 1970s, when one third of the herbal cannabis market in the United Kingdom was covered by Jamaican marijuana. The reasons for this decrease are the burgeoning homegrown herbal cannabis that doubled its share of the British market up to one third of the total sales, and the decline in Jamaican production. To estimate the evolution between both years, this study will assume that the share of Jamaican

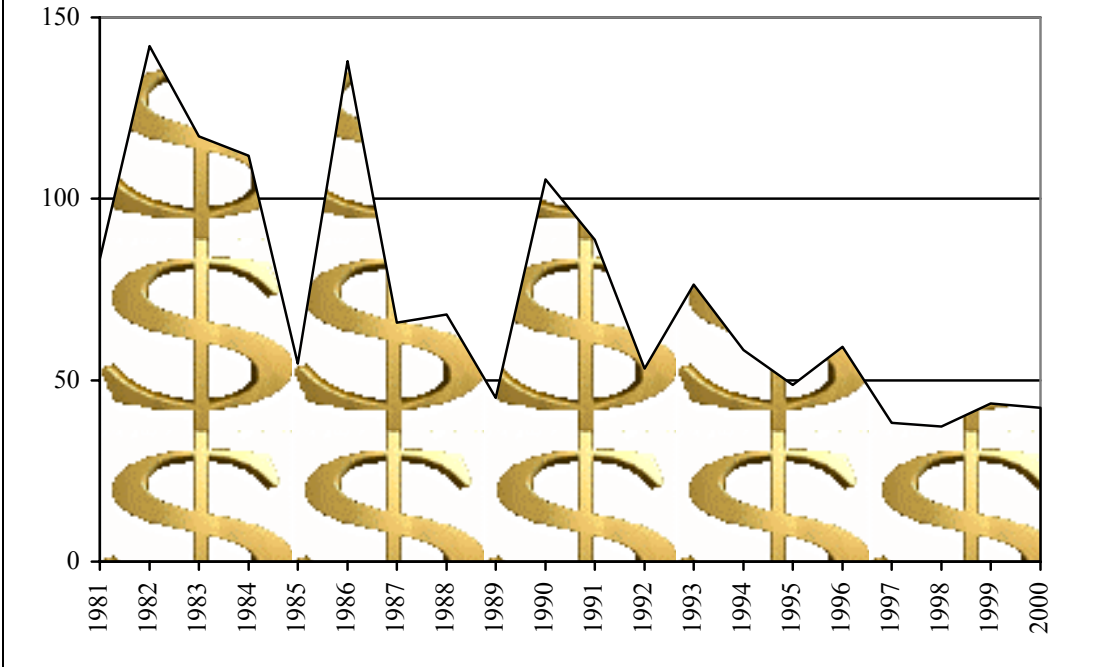
and Law Enforcement Affairs 2001). By applying this estimate to the total amount of herbal marijuana available in the United Kingdom, it is seen that the demand for Caribbean herbal marijuana in the United Kingdom has fallen from 4OMT in the mid 1980s to less than 2OMT in the 1990s.



Atha (2002) provides, from his own survey, data on the price of Caribbean marijuana in the United Kingdom for 2000. For transactions of over one kilogram, the average price of Caribbean marijuana was £2.1 sterling per gram in 2000 — or US\$3.2. Assuming constant ratios for sales at kilogram and ounce level, the price of Caribbean marijuana has gone through the following steps: 2.09 pounds in 1997, £2.34 in 1994 and £1.2 in 1984, all prices in current pounds sterling (Atha, Blanchard and Davis 1997). It is assumed that prices evolved constantly over the two closest years. Although in nominal terms the Jamaican marijuana in the United Kingdom has almost doubled in price, in constant U.S. dollars the price has fallen from US\$4.5 in 1981 to US\$3.2 in 2000.

The result of multiplying the average price by the overall revenues generated by the export of Caribbean marijuana to the United Kingdom only occasionally exceeds US\$100mn — and always in the 1980s. In spite of a somewhat stable price for Caribbean marijuana and increasing demand by the British population, the reduction in the market for herbal cannabis in general and for Caribbean exports in particular has driven the total income down from US\$140mn in 1982 to US\$40mn in the period 1997-2000. The value of Caribbean marijuana at the wholesale level accounts for a negligible part of the total marijuana market in the United Kingdom - less than 1%.

Total value of Caribbean marijuana exports to the United Kingdom, 1981-2000 (US\$m adjusted to 2000)



Value of the Caribbean marijuana exports to the United Kingdom, 1981-20

Marijuana users in the United Kingdom	Average use of marijuana by users	Total marijuana consumed in the United Kingdom	Percentage of herbal cannabis in consumption	Total herbal cannabis consumed in the United Kingdom	Seizures of herbal cannabis in the United Kingdom	Total herbal cannabis available in the United Kingdom	Caribbean marijuana in the total United Kingdom herbal cannabis market	Total marijuana exported from the Caribbean to the United Kingdom	Caribbean marijuana import price in the United Kingdom	Caribbean marijuana import price in the United Kingdom	Total value of Caribbean marijuana to the United Kingdom	
A	B	C	D	E	F	G	H	I	J	K	L	
		AxB		CxD		E+F		GxH			KxI	
millions	grams	mt	%	mt	Mt	mt	%	mt	Current UK£ per gram	US\$2000 per gram	US\$2000 million	
1981	0.7	29.7	125	52	65	3	68	28.7	19	1.2	4.5	83.4
1982	0.9	29.6	170	50	86	4	90	45.5	39	1.2	3.7	142.2
1983	1.1	29.4	204	49	99	5	104	38.5	38	1.2	3.1	117.2
1984	1.3	29.3	232	47	109	6	115	39.8	43	1.2	2.6	112.0
1985	1.4	29.2	256	45	116	6	123	18.2	21	1.3	2.6	54.5
1986	1.5	29.1	278	44	122	9	131	36.5	45	1.3	3.1	138.1
1987	1.7	28.9	298	42	126	10	137	14.6	18	1.4	3.6	65.9
1988	1.8	28.8	316	41	129	10	139	13.2	17	1.5	4.0	68.1
1989	1.9	28.7	332	40	131	7	139	9.1	12	1.7	3.8	45.1
1990	2.0	28.5	348	38	133	9	142	19.1	25	1.8	4.2	105.4
1991	2.0	28.4	362	37	134	10	143	15.6	21	1.9	4.2	88.8
1992	2.1	28.3	376	36	134	12	146	9.0	12	2.0	4.4	53.2
1993	2.6	28.2	450	34	155	12	167	12.6	20	2.2	3.9	76.4
1994	3.0	28.1	524	33	175	56	231	8.0	14	2.3	4.2	58.3
1995	3.1	27.8	531	32	171	13	184	7.1	12	2.3	4.0	48.7
1996	3.1	27.5	537	31	167	34	201	9.5	16	2.2	3.7	59.3
1997	3.2	24.0	480	30	144	31	176	7.2	10	2.1	3.7	38.2
1998	3.3	23.8	486	29	141	22	163	7.2	10	2.1	3.7	37.3
1999	3.4	29.3	614	28	172	16	188	7.2	12	2.1	3.5	43.5
2000	3.5	31.6	682	27	185	25	210	7.2	13	2.1	3.2	42.5

ILLEGAL DRUG IMPORTS

Although there is some evidence of wild coca bush in the region before the arrival of the Europeans (Observatoire Géopolitique des Drogues 1996), this plant has disappeared from the Caribbean flora. No transformation of coca leaves into cocaine takes place in the Caribbean. Therefore, the exported cocaine has to be previously imported – paid for – into the region from the production areas in the Andean mountains. This study will try to evaluate the funds used to pay for the imported cocaine by using the following formula:

$$VCCI_i = PECC_i \times (CEC_i + CSC_i + CCC_i + LC_i)$$

where

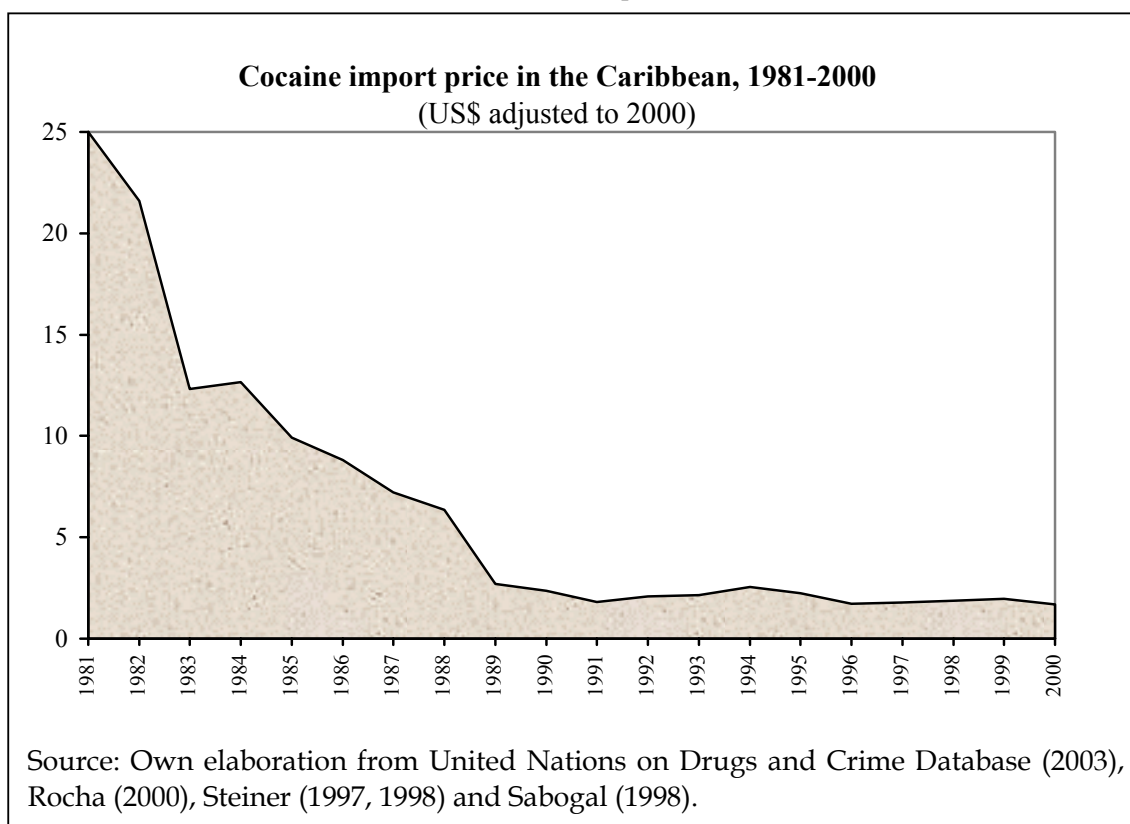
- $VCCI_i$ is the total value of the Caribbean's cocaine imports in the year i ;
- $PECC_i$ is the exporting price of cocaine in Colombia, where a large part of cocaine imports in the Caribbean comes from, in the

year i ;

- CEC_i is the amount of cocaine exported from the Caribbean in the year i ;
- CSC_i is the amount of cocaine seized in the Caribbean in the year i ;
- CCC_i is the amount of cocaine consumed in the Caribbean in the year i ; and
- LC_i is the loss of cocaine in the Caribbean in the year i .

The latter four variables account for the total amount of cocaine imported from the producing region in South America to the Caribbean region.

The amount of cocaine exported from the Caribbean to North America and Europe has been previously estimated for the 1981-2000 period – from 120MT in 1981 to a maximum of 260MT in 1989 and then dropping to less than 200MT during the 1990s. The weight of cocaine seized in the Caribbean, which will be added to the cocaine exports, comes from the United Nations Office on

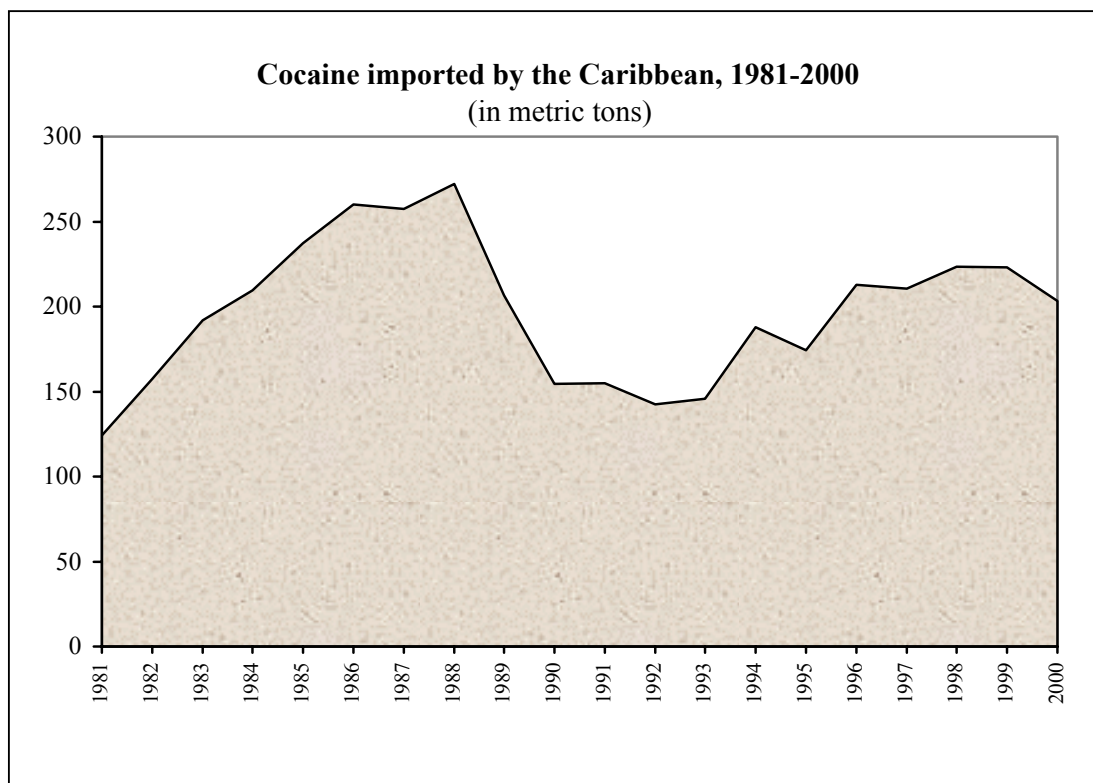


Drugs and Crime Database and the Caribbean Coordination Mechanism (2002). They increase from 100kg in 1981 to 31MT in 1994 and 1996. As the data shows, the seizures in raw cocaine had to be transformed into pure cocaine to continue with the calculation in pure terms. Because cocaine is usually mixed with other substances to reduce its quality, and in the Caribbean it is exported in the same state as it is imported from Colombia, average cocaine purity for the Caribbean seizures would be assumed to be that observed in Colombia for wholesale or export cocaine. The result of this calculation is that the weight of pure cocaine seized has almost constantly increased from 100kg in the early 1980s to over 20MT in the late 1990s.

The Caribbean Coordination Mechanism (2002) estimated that 3.9MT of cocaine were consumed in the Caribbean during 2000. As there are no measures for the purity of the cocaine consumed in the Caribbean, this study will assume that the

purity will be that reported for retailing cocaine in the United States (Office of National Drug Control Policy 2001b). And, to construct the time-series, given the unavailability of official estimates of drug use for years other than 2000, this study will consider a constant annual 10% increase in non-pure cocaine use for the whole period, that is consistent with the general perception in the Caribbean region. With these assumptions in mind, the total cocaine consumed in the Caribbean rose from less than 1MT in the early 1980s to over 3MT in the late 1990s. Finally, the losses in the area will be estimated at a rate of 2% of the total flow.

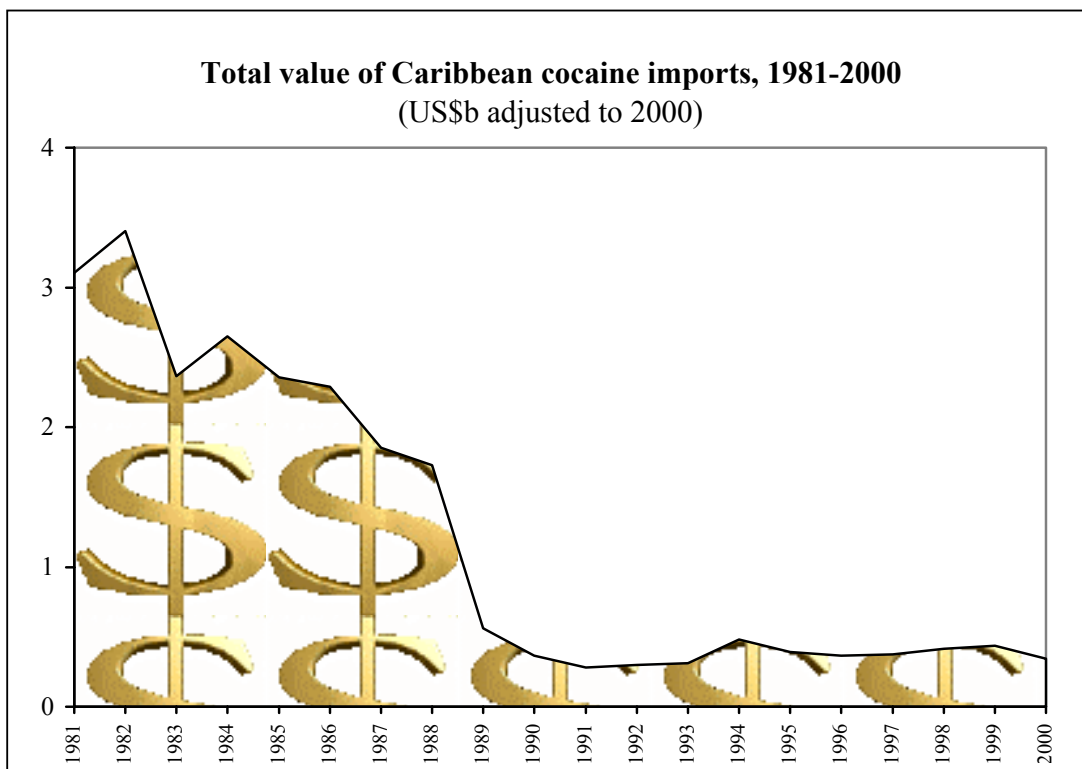
The addition of cocaine exported, seized, lost and consumed in the Caribbean, equal to the amount of cocaine imported, shows how cocaine imports in the region have grown from 125MT of pure cocaine in 1981 to 260MT in 1986. Then the flow decreased to 140MT in 1992 and then increased again to almost 225MT in 1998 and 1999.



The price paid for that amount of cocaine is paid would be estimated through a set of data that includes, on one hand, the wholesale price reported by the Colombian authorities to the United Nations Office on Drugs and Crime from 1985 to 2000 and, on the other hand, the price of coca base quoted by Rocha (2000), Steiner (1997, 1998) and Sabogal (1998). With these time-series, the price of a kilogram of impure cocaine for export fell, in nominal terms, from US\$13,000 in 1981 to US\$1600 in 2000. In real terms, the price of pure cocaine declined even more – from US\$25,000 (at 2000 prices) in 1981 to less than US\$2000 in 2000. The price fell at an increasing rate during the 1980s and then stabilized at the

lower prices.

By multiplying the cocaine imported into the Caribbean every year by the corresponding cocaine prices, in both cases for pure cocaine, it is shown that the Caribbean paid over US\$3bn for imported cocaine in 1981 and 1982. Afterwards, the cost of imported cocaine fell to less than US\$1bn during the early and late 1980s. From then on, the cost cocaine fluctuated between US\$300mn and US\$600mn.



Value of Caribbean Cocaine Imports, 1981-2000

	Cocaine exported from the Caribbean	Cocaine seized in the Caribbean	Cocaine consumed in the Caribbean	Cocaine losses in the Caribbean	Cocaine imported into the Caribbean	Export price of cocaine in Colombia	Export price of cocaine in Colombia	Total value of Caribbean cocaine to North America
	A	B	C	D	E	Q		R
					A+B+C+D			PxQ
	mt	mt	mt	%	mt	US\$ (adjusted to 2000) per impure gram	US\$ (adjusted to 2000) per pure gram	US\$m (adjusted to 2000)
1981	121	0	0	2	124	12.9	25.0	3.106
1982	153	0	1	3	158	11.9	21.6	3.404
1983	187	0	1	4	192	7.0	12.3	2.366
1984	203	1	1	4	209	7.5	12.7	2.650
1985	229	2	1	5	237	6.1	9.9	2.355
1986	247	8	1	5	260	5.5	8.8	2.291
1987	246	5	1	5	257	4.7	7.2	1.855
1988	257	10	1	5	272	3.9	6.4	1.728
1989	193	10	1	4	207	1.8	2.7	560
1990	141	9	1	3	154	1.6	2.4	365
1991	132	19	1	3	155	1.4	1.8	279
1992	129	10	2	3	143	1.7	2.1	298
1993	131	10	2	3	146	1.6	2.1	312
1994	155	28	2	4	188	2.0	2.6	482
1995	145	23	2	3	175	2.0	2.2	391
1996	176	30	2	4	213	1.6	1.7	367
1997	175	29	2	4	211	1.6	1.8	373
1998	189	28	2	4	224	1.7	1.9	416
1999	195	21	3	4	223	1.8	2.0	437
2000	182	18	3	4	203	1.6	1.7	342

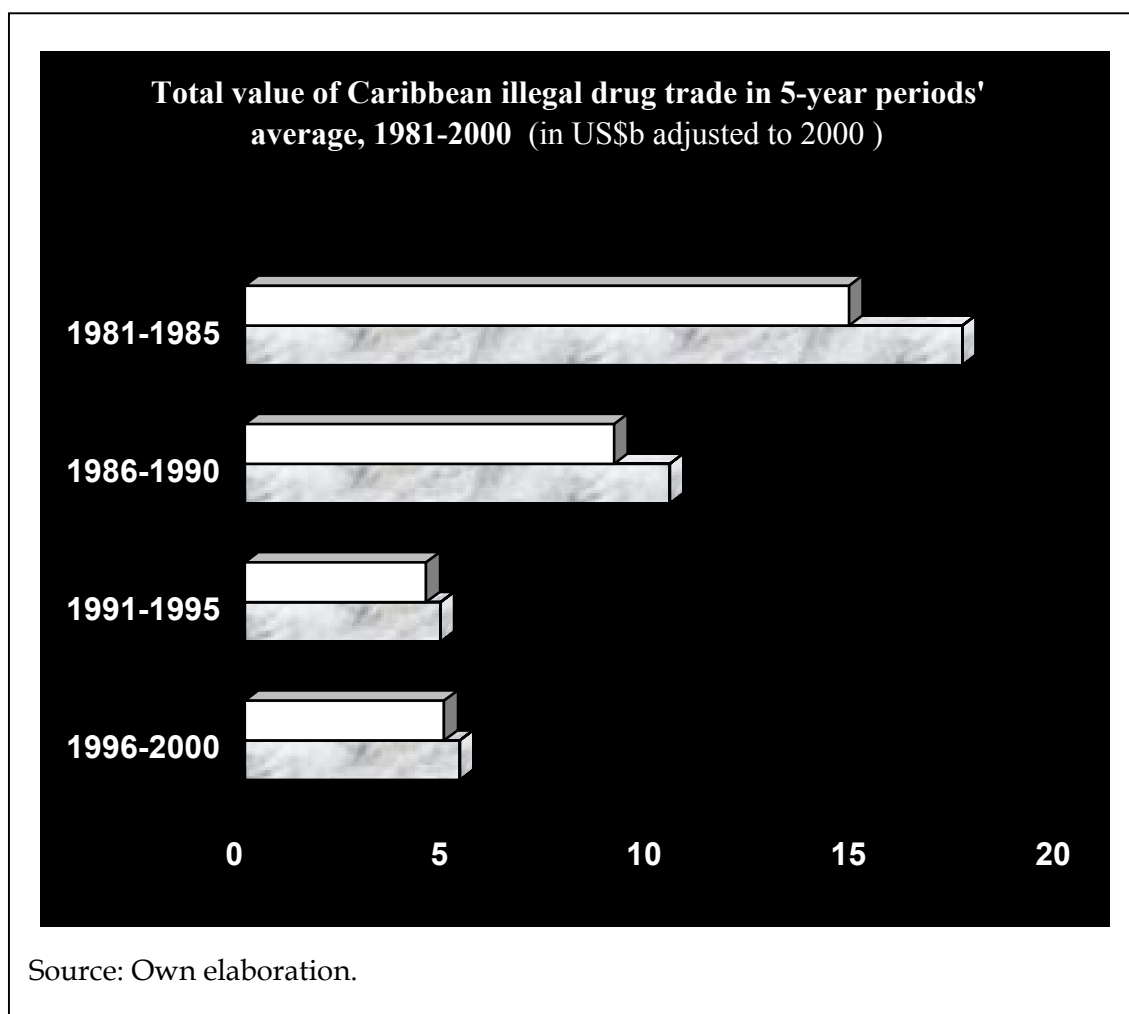
CONCLUDING REMARKS

The value of illegal drug exports from the Caribbean during the past two decades has fallen into two very well differentiated periods. The first period, from 1981 to 1990, was an epoch of impressive depression in the total value of the Caribbean drugs exports – from an income over US\$20bn at its peak in 1983 to US\$5bn in 1991. Since 1991, the value of Caribbean exports of illegal drugs has stabilised around US\$5bn.

Cocaine exports to North America are largely responsible for this decline in the total value during the 1980s and its stabilisation in the 1990s. Although cocaine exports to the northern part of the Western Hemisphere dropped as a proportion of total Caribbean illegal drug exports from over 95% in the early 1980s to 70% in 2000, this component of Caribbean industry continues to be the

overwhelming income-producer in the region.

Accordingly, variations in the value of cocaine exports to North America have been fundamental in explaining the size of the illegal drug industry in the Caribbean. In the first decade researched, three factors – two external and one internal – were responsible of the decline in exports of cocaine: the sharp decline in the cocaine export prices, which fell by two thirds; a booming cocaine market in the United States and Canada; and increased law enforcement efforts by local and United States authorities to stop the cocaine trade through the Bahamas and the Florida peninsula, which drove the cocaine flow to North America out of the Caribbean Sea to Mexico. In the 1990s cocaine exports from the Caribbean to North America remained at a level of US\$3.5bn because the import price and demand-consumption reductions in North

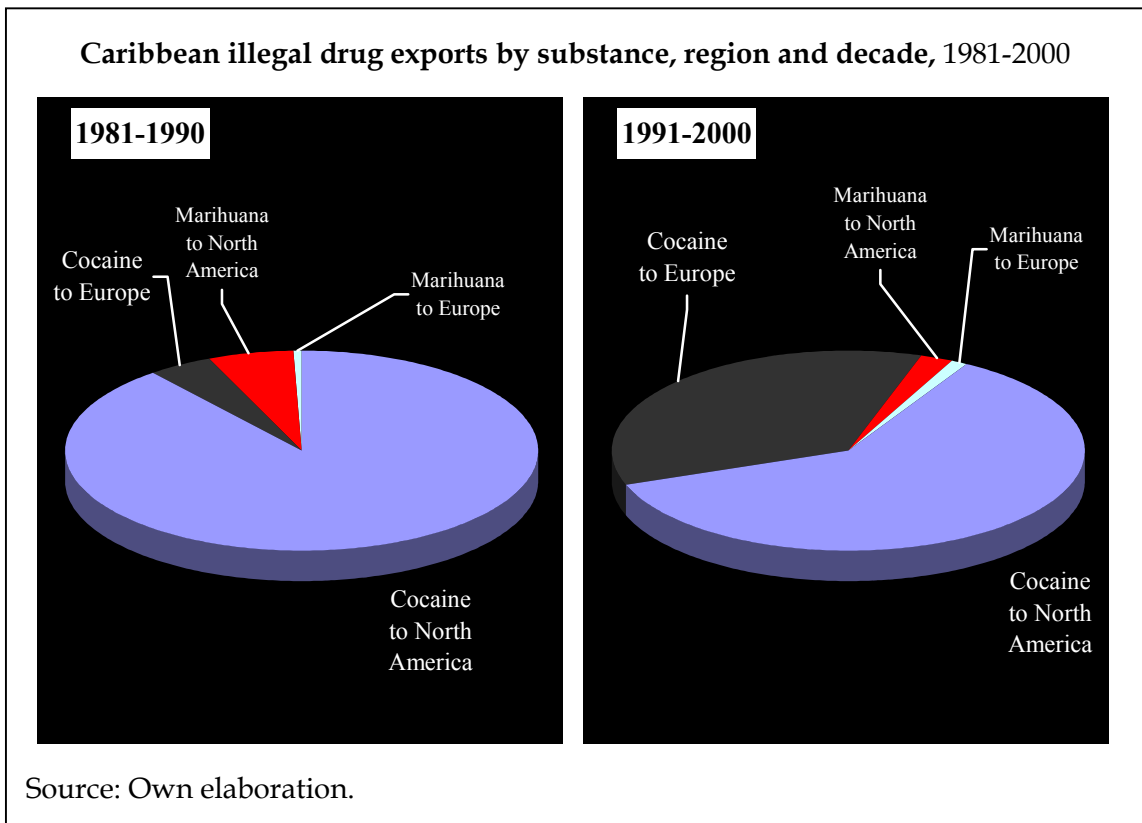


America were compensated for, especially in the later years of the decade, by an increasing participation of Caribbean countries in total North American imports. The intensified efforts to stop the cocaine flow across the Mexican-American border had the undesired consequence of sending the transportation of cocaine back to the Caribbean.

The evolution of other variables involved has been mixed. Cannabis, the region's traditional illegal crop that has acquired fame all around the globe, performed poorly during the 1980s and 1990s. Driven out of the main exporting markets by high-quality domestic production and other cheap imported varieties, the value of the Caribbean marijuana exports plummeted in those two decades. Accordingly, the marijuana market in the Caribbean is now an internal common market rather than an export-oriented production. However, the turning point of this reduction took place because of the largely successful eradication programs both in Jamaica and Belize. After a rising trend in the early 1980s, accounting in 1986 for 7% of the total Caribbean illegal drug

exports in just four years, from 1986 to 1989, the value of Caribbean marijuana exports fell by 90%. A meagre recovery in production during the 1990s was insufficient to regain the absolute levels reached in the early 1980s. But, in relative terms, the contribution of marijuana to total illegal drug exports has remained constant in both decades — 3.9% in the 1980s and 3.3% in the 1990s. What has changed is the destination of marijuana exports in relative terms. During the golden years of marijuana in Jamaica and Belize in the early 1980s, marijuana exports to Europe accounted for less than 10% of the total exports; in the 1990s exports to Europe reached one third of the total income generated by marijuana.

The value of cocaine exports to Europe has followed dissimilar patterns. During the 1980s and the 1990s, the relative increase in total demand was larger than the price reduction, thus increasing the size of the European cocaine import market. Meanwhile, intensifying law enforcement efforts and co-ordination by European authorities have compelled the cocaine traffickers to use the



Caribbean region more extensively as a transshipment point for cocaine exports to Europe. As a result Caribbean cocaine exports to Europe increased ten-fold in the last two decades. This expansion was larger, in relative terms, in the 1980s than in the 1990s, when the market was growing rapidly.

The public policy conclusion from these data is two-fold. In some cases, such as the local marijuana eradication efforts or extensive law enforcement around the Florida peninsula in the 1980s,

public policies have been successful in checking the value of illegal drug exports and thus their pernicious and financially profitable contribution to the economy. This point is, however, still under discussion. But outside forces are at least equally important in explaining the developments in the Caribbean illegal drug economy. Factors such as demand, tastes and prices in the importing and consuming markets have been the most relevant elements inducing expansion or depression in the Caribbean illegal drug economy.

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