2. Estimating the value of illicit drug markets

2.1 Background

The illicit drug industry operates outside the law. Its 'companies' are not listed on any stock exchange, they are not valued by any private accounting firm, and the dynamics of the drug industry are not regularly pored over by analysts, economists and forecasters. Yet the overall size of the illicit drug industry is known to be large and, therefore, a potential threat to a number of economies in terms of the financial power generated. The funds generated can be used to intimidate (including by means of violence) or corrupt government officials or, in some cases, political systems as a whole, as well as to crowd out licit economic activities, thus jeopardizing a country's future. If the illicit drug industry is to be successfully controlled, there is a need to come to an understanding of the likely amount of money involved and where these funds are being generated.

The utility of undertaking such an exercise is clear from both a policy and a trend analysis perspective. Knowledge of the market's value is indisputably useful for policy formulation. An informed estimate of the size of the drug markets also will enable analysts to look at the relative importance of the size of the markets *vis a vis* local economies and it will facilitate the comparison of the importance of different drugs in economic terms. In addition, knowledge of the size of these markets will give us an element for comparison with other illicit markets – an important issue when it comes to allocating scarce economic resources to fight various illegal activities.

The obscurity of the global illicit drug market makes the exercise of estimating its size difficult. This is not because the drug market does not behave like most others in terms of supply and demand - there is a growing acceptance that it does. It is rather because the most basic inputs that are needed for such an estimation – data on production, prices, quantities exported, imported and consumed – are themselves often estimates and are frequently based on deficient data.

A number of attempts to measure the size of the illicit drug industry have been made in the past, including by the Financial Action Task Force and the United Nations. The Financial Action Task Force (FATF) estimated that in the late 1980s, sales of cocaine, heroin and cannabis amounted to approximately US$124 billion per year in the United States and Europe[1], of this total some US$85 billion or 70% was considered to have been available for money laundering and investment.[2] Taking inflation into account, the FATF estimate of the size of the illicit drug industry for the late 1980s would be equivalent today to some US$200 billion (expressed in 2005 US dollars).[3]

Other United Nations estimates, based on cash flows from international banking and capital account statistics, suggested that up to US$300 billion per year could have been available for money laundering in the late 1980s.[4]

---

1   The FATF estimated the retail drug sales turnover during the 1980s at $108 billion in the United States and $16.3 billion in Europe, i.e. a total of $124.3 billion. The largest amount was estimated for cannabis ($74.7 billion), followed by cocaine ($28.8 billion), and heroin ($12 billion). Organisation for Economic Co-operation and Development, *FATF Working Group on Statistical and Methods, Narcotics Money Laundering - Assessment of Scale of the Problem*, 1989, *Financial Action Task Force on Money Laundering*, report, February 7, 1990.

2   Organisation for Economic Co-operation and Development, Financial Action Task Force on Money Laundering, Paris 1990, p. 6, quoted in UNDCP, Economic and Social Consequences of Drug Abuse and Illicit Trafficking, Vienna 1997, p. 27.

3   The $124 billion referred to estimates for 1988; based on the US Consumer Price Index, this amount would be equivalent to $201 billion in 2005 (http://data.bls.gov/cgi-bin/cpicalc.pl).

4   This figure was, however, qualified as "suspect" (probably too high) by the Intergovernmental Expert Group to Study the Economic and Social consequences of Illicit Traffic in Drugs (see E/CN.7/1991/25, p. 25).

Based on 1995 drug production estimates, UNDCP arrived at a global estimate of $360 billion, with a range from $85 billion to $1,000 billion.[5] Given this broad range and the high degree of uncertainty about the validity of some of the assumptions made, UNDCP's 1997 World Drug Report estimated a likely turnover of the illicit drug industry at around $400 billion.[6] This figure was questioned by some experts in the field as possibly too high. However, no alternative calculations on the likely size of the global drug industry were provided.

Another attempt as part of a broader exercise to estimate the total value of money laundered annually (from criminal activities) was started by the Financial Action Task Force in the late 1990s. It was decided to begin this exercise by looking into the illicit drug market, given the fact that it was better studied than most other illegal markets. A number of expert meetings were convened, bringing together expertise from various international, regional and national organisations. Given the extreme data limitations, existing weaknesses and contradictions of some of the data, the experts could not agree on the most appropriate methodological approach. The basic question was whether a top-down approach (starting from global production estimates) or a bottom-up approach (starting from country estimates based on prevalence rate and estimates of expenditure per drug user which would then have to be aggregated) offered a better chance to arrive at a realistic estimate of the total value of the drug market. Recommendations were made to encourage countries to improve their drug data collection systems and to encourage them to undertake drug market estimates at the national level.[7] Thus far only a limited number of country estimates on the value of the illicit drug market are currently available. These alone would be insufficient for generating global estimates.

Using the valuable lessons learned from these past exercises UNODC has continued work in this area. The organisation's objective is to have a reliable idea of the size of the value of the market, and to stimulate further research.

Three principles guided the production of these estimates: first only readily available data were used; second, the methodology and the model were kept straightforward and the assumptions transparent; and third, it was ensured that by distilling the market down to its most basic economic rules, the model would be easily updateable. In addition, the methodology chosen tries to combine, as far as possible, the top-down with the bottom-up approach. While UNODC is fully aware that the results will never have the same level of accuracy as could be expected from a comparable analysis of a licit market, and must be thus treated with caution, the new valuation methodology provides the best possible results, based on existing knowledge and data provided by Member States to UNODC. The methodology used and the results will be discussed in this Chapter.

2.1.1. The model

A global input-output model was developed building on existing UNODC data collection systems, thus making it replicable as well as allowing for expert opinion to be taken into account. The model used data published in last year's World Drug Report (2002/2003 data), supplemented –where data was missing - with data obtained from Member States over the last year. The model was used for the analysis of the main drug markets: opiates, cocaine, cannabis herb, cannabis resin, amphetamines and ecstasy.

Models work on assumptions, but these are made explicit so that they can be improved over time. The main assumption of this model is that what is being produced, less seizures and less losses, is available for consumption and is consumed. The amounts available for consumption in each sub-region are multiplied with the average purity adjusted prices of the respective sub-regions to arrive at the sub-regional market values. These values are then added up to arrive at the total market value. The model looks at the market sub-regionally. Data inconsistencies are detected in large part because the model looks at the market both from the supply side and the demand side.

---

5   This estimate amounted to US$117 billion for cocaine, US$107 billion for opiates, US$62 billion for cannabis herb, US$13 billion for cannabis resin and US$60 billion for synthetic drugs. UNDCP, *Economic and Social Consequences of Drug Abuse and Illicit Trafficking*, UNDCP Technical Series, p. 51.
6   United Nations International Drug Control Programme, *World Drug Report*, (Oxford University Press 1997), p.124.
7   Financial Action Task Force, *Report of the FATF Ad Hoc Group on Estimating the Magnitude of Money Laundering on Assessing Alternative Methodologies for Estimating Revenues from Illicit Drugs*, FATF-XI/PLEN/45 (2000).

The model starts with global drug production per sub-region and allocates it, less local consumption and purity adjusted seizures made in the source countries, either according to seizures made in the different sub-regions (for potential 'supply constrained regions')[8] or according to the 'number of drug users multiplied by per capita drug consumption ratios' (for potential 'demand constrained regions').[9] The model thus allows for different per capita consumption rates for different sub-regions.[10] From the allocated amounts per sub-region, the model deducts purity adjusted seizures and losses (set at 10%) and then multiplies the remaining amounts that are available for consumption in each sub-region with the purity adjusted prices. It uses the purity adjusted wholesale prices to estimate the wholesale value and the purity adjusted retail prices to calculate the final retail value. Adding up these sub-regional values gives the estimates at the global level.

The drug prices and drug purities of each country are weighted by the number of drug users in that country in order to calculate the regional average. The 'typical' drug prices and drug purities, provided by Member States were used. If no such typical prices or purity data were provided, the mid-point estimates of minimum and maximum values were used instead. If for any individual country no price or purity data is available, the model uses the unweighted sub-regional averages as a proxy.

The model allows for a number of calibrations, based on expert knowledge, to adjust, as far as possible, the model's assumptions to reality. Thus, it is possible to adjust for the likely effectiveness of law enforcement bodies in different regions. This affects the calculated interception rates and thus the allocation of the drugs to the various regions. For instance, enforcement effectiveness can be assumed to be higher in North America than in Africa, thus lower drug seizures in Africa can still go hand in hand with substantial levels of drug consumption. The model also has a built-in distribution mechanism that assumes that drugs produced in a region are, first of all, used to supply local demand before being exported. The subsequent distribution of drugs to the destination markets is then a function of geographical proximity (i.e. the closer any specific drug producing region is to another region, the higher the likely proportion of total exports going to such a region). Again, these model assumptions can be altered based on expert knowledge. For instance, special ethnic links and established drug trafficking routes are known to play, in some cases, a far more important role than mere geographic

Table 1. Drug related data routinely collected by UNODC

Production	Trafficking	Consumption
Cultivation	Drug seizures	Annual prevalence
Yields	Origin of drugs	Trends in drug consumption
Manufacture	Transit of drugs	
Laboratory seizures	Destination of drugs	
Prices	Prices	
Purities	Purities	Largely missing: Information on quantities of drugs consumed

8   The main hypothesis for this approach has been that seizures are positively correlated with the size of a drug market. In addition, seizures are, of course, also a function of the effectiveness of law enforcement bodies. This is taken into account by 'rating' the effectiveness of law enforcement of some regions versus others. In regions with a weak enforcement infrastructure even small seizures may indicate a sizeable drug market while the opposite can be true in regions with highly effective law enforcement bodies.

9   As a default value, the model assumes that all regions are 'supply constrained', i.e. people would use as much of a drug as they could secure. For drug producing and main transit countries, such an assumption is however, not very realistic. Such regions are subsequently set to become 'demand constrained'. This requires an assumption of the likely per drug capita consumption. If no additional information was available, it was usually assumed that average consumption of such regions would be close to the global average, estimated as amounts of drugs available (derived from production estimates less seizures and less losses), divided by the total number of drug users. In order to make the results of the two approaches ('supply constrained' and 'demand constrained') comparable, purity adjusted seizures are then added to arrive at the allocated amounts.

10   This is important because, information on per capita consumption rates is still very limited. It is hoped that this will improve over the next few years, which should strengthen the 'bottom-up' approach in the model.

proximity. For some specific cases, theoretical trafficking links could be completely ruled out (such as exports of North American cannabis herb to Africa or South Asia; differences in price levels would mean that traffickers involved in such operations would simply lose money).

One advantage of such a systematic approach with built-in cross-checks is to make explicit to the analyst all potential data inconsistencies. This systematic analysis of existing data is particularly important given well-known data weaknesses. It enables the identification of data that needs to be re-checked and/or indicates new areas of research. Moreover, the model helps to incorporate new estimates, research findings and intelligence whenever they should become available.

Key to the outcome of the model are, of course, the inputs used. The main inputs into the model are drug production estimates, seizures, drug price data (farm-gate, wholesale and retail prices), drug purity data (wholesale and retail level), estimated number of drug users and estimates of per capita drug consumption. Most of these data are routinely collected by UNODC.

Seizure, price and purity data are collected annually from countries through UNODC's Annual Reports Questionnaires and are supplemented by information collected from other international or regional bodies (such as INCB, Interpol, WCO, Europol, OAS etc.). Seizure data is thus the most complete data set. In addition, countries report typical drug trafficking patterns to UNODC, including the most typical trafficking routes. This information entered the model in the form of ex-post calibrations.

Prevalence data is basically collected through UNODC's Annual Reports Questionnaires. However, this data set is not as complete as seizure data as many governments still do not have appropriate monitoring systems in place. Thus, UNODC developed over the years a special methodology to estimate annual prevalence data from partially available data sets (e.g. extrapolating annual prevalence data from life-time prevalence data, from student surveys or from treatment data using annual prevalence data from other countries in the region as benchmark figures).

Largely missing – and not part of any routine data collection – is information on the per capita consumption of drugs by drug users. The lack of this information has been one of the biggest constraints to market analysis on the demand side and thus a main stumbling block to almost every attempt to gain greater insight into the market from the consumption side. There is almost no systematic and comparable data on the quantities of individual substances consumed per users in different regions. The information which does exist is limited and often contradictory. More research efforts in this area are clearly needed.

UNODC's strongest data sets are is for the cultivation of coca and opium poppy. Through its International Crop Monitoring Programme, UNODC, in cooperation with the respective national governments, uses ground and satellite based survey methods to measure the extent of cultivation (for coca, opium poppy and cannabis resin[11]). In combination with yield surveys, drug production estimates can thus confidently be established.

Production estimates on cannabis herb have been taken from replies to UNODC's Annual Reports Questionnaire as well as from other Government reports. The problem here is that most of these estimates are not based on rigorous scientific studies. In addition, for many countries the information is missing altogether. A number of countries in Africa, Asia and Europe, for instance, have been frequently identified by other countries as important source countries, but they did not provide any cannabis production estimates to UNODC. In such cases, it was assumed that the countries cover their local demand and use a certain percentage for export purposes. The total cannabis herb production estimate thus increased from otherwise 35,000 mt to 42,000 mt for the year 2003. However, a similar amount (5,000 mt) was subsequently deducted again as 'extraordinary losses' from one sub-region (North America) as available production estimates in this sub-region, reported to UNODC by various national authorities, seemed to exceed realistic consumption estimates.[12]

In the case of ATS indirect estimation methods were used, as described in other parts of this report, based on ATS consumption, ATS seizures and ATS precursor seizures.

---

11 For Morocco.
12 This had to be done as a possible alternative explanation - exports - does not apply in this case; no information is available to UNODC that cannabis herb produced in North America is being exported to any other region in significant quantities.

2.2 Results

Based on the inputs and the calculations explained above, the value of the global illicit drug market for the year 2003 was estimated at US$13 bn at the production level, at $94 bn at the wholesale level (taking seizures into account), and at US$322bn based on retail prices and taking seizures and other losses into account. This indicates that despite seizures and losses, the value of the drugs increase substantially as they move from producer to consumer.

Fig. 1: Size of the global illicit drug market in 2003
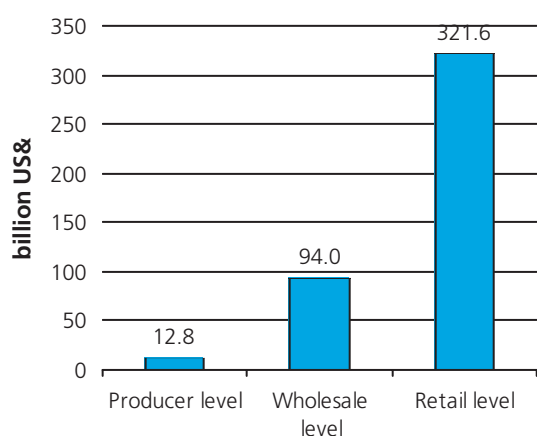
Source: Illicit Drug Market Estimation Model, based on UNODC, Annual Reports Questionnaire Data, Govt. reports and UNODC production and consumption estimates.

The largest market, according to these estimates, is cannabis herb (with a retail market size of $113 bn), followed by cocaine (US$71 bn), the opiates (US$65bn) and cannabis resin (US$29 bn). The ATS markets together (methamphetamine, amphetamine and ecstasy) amount to US$44 bn. The valuation does not take into account the value of other drugs.

While UNODC is reasonably confident with its estimations on opiates, cocaine and the ATS, the degree of certainty is far lower for cannabis, notably for cannabis herb, as information for production and consumption

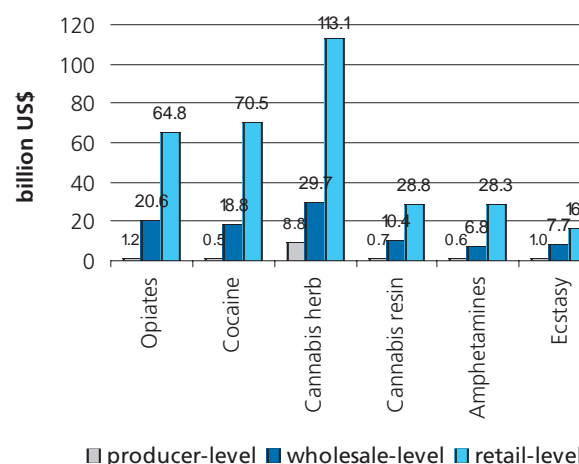**Fig. 2: Size of the global illicit drug market in 2003 by substances**

Source: Illicit Drug Market Estimation Model, based on UNODC, Annual Reports Questionnaire Data, Govt. reports and UNODC production and consumption estimates.

of this substance is highly contradictory. If better information becomes available, a major revision cannot be ruled out.

If compared to global licit exports (US$7,503 bn in 2003)[13] or compared to global GDP (US$35,765 bn in 2003)[14] the estimated size the global illicit drug market may not appear to be particularly high (0.9% of global GDP at retail level or 1.3% of global exports measures at wholesale level).[15]

Nonetheless, the size of the global illicit drug market is substantial. The value, measured at retail prices, is higher than the GDP of 88% of the countries in the world (163 out of 184 for which the World Bank has GDP data) and equivalent to about three quarters of Sub-Saharan Africa's combined GDP (US$439 bn in 2003). The sale of drugs, measured at wholesale prices, was equivalent to 12% of global export of chemicals (US$794 bn), 14% of global agricultural exports (US$674 bn) and exceeded global exports of ores and other minerals (US$79 bn) in 2003. Such sales of drugs were also higher than the combined total licit agricultural exports from Latin America (US$75 bn) and the Middle East (US$10 bn) in 2003.[16]

---

13 World Trade Organisation, *International Trade Statistics 2004*, p. 19.
14 World Bank, *World Development Indicators 2005 Report*, http://www.worldbank.org/data/wdi2005/.
15 The comparison with wholesale prices is more appropriate as export prices are usually closer to wholesale than to retail prices.
16 World Bank, World Development Indicators database, April 2005.

Fig. 3. Value of illicit drugs at wholesale level (in billion US$) compared to the export values of selected agricultural commodities in 2003
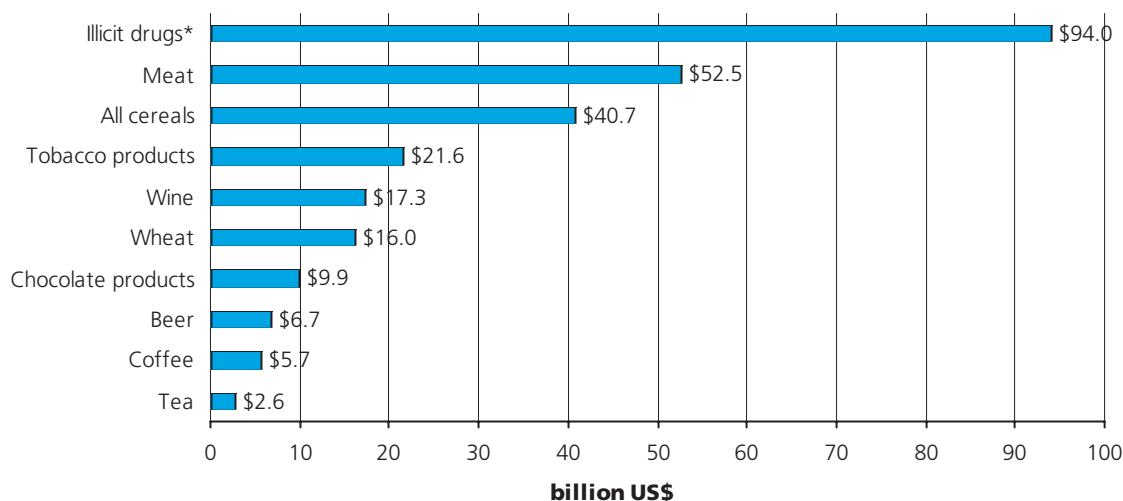
* illicit drugs measured at the wholesale level, used as a proxy for the export price

Sources: UNODC, Illicit Drug Market Estimation Model, FAO, FAOSTAT and ICO, *Annual Review 2003/04.*

The relative importance of the size of illicit drugs market becomes more pronounced if compared to the exports of individual products. Exports of wine (US$17.4 bn) and beer (US$6.7 bn) are equivalent to just a quarter of the wholesale value of illicit drugs.[17] Coffee, one of the world's most ubiquitous beverages, used to generate some US$15bn in export revenue in the 1990s,[18] falling to less than US$6 bn in 2003.[19] Global exports of tobacco products (including cigarettes) are equivalent to about a fifth of the global wholesale value of illicit drugs. Wheat, a staple of a large portion of the global population, generated US$16bn in export revenue in 2003. All cereal exports together resulted in export revenue of $41 bn,[20] less than half the wholesale value of the global illicit drugs market.

In terms of the regional distribution, the world's largest drug market – in economic terms – was identified to be North America,[21] accounting for 44% of the world's total drug sales at the retail level, followed by Europe (33%). Within Europe, West and Central Europe[22] is the dominant drug market (27% of total). The next largest retail drug markets are Asia (11%) followed by Oceania (5%) and Africa (4%).

Fig. 4: Regional breakdown of the global illicit drug market in billion US $ (N = $322 bn)
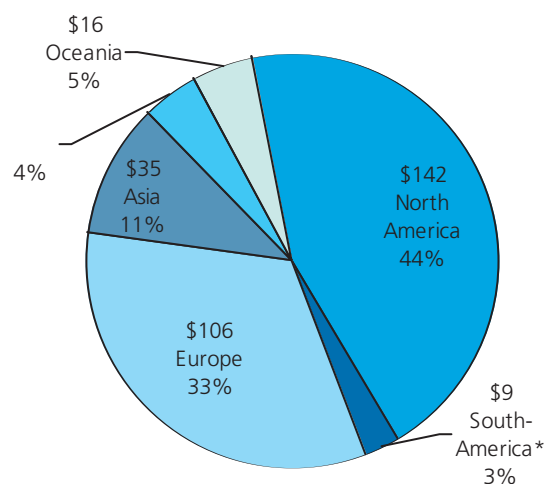
* Including Caribbean and Central America.

Sources: UNODC, Illicit Drug Market Estimation Model.

17   Food and Agriculture Organization of the United Nations, FAOSTAT, http://faostat.fao.org/faostat/collections?version=ext&hasbulk=0.
18   Aksoy, M.A. and Beghin, J.C. eds., Global Agriculture and Trade in Developing Countries, World Bank, Washington DC, 2005, p 297 (evaluated at 1997-98 average prices and volumes.)
19   International Coffee Organization, *Annual Review 2003/04*, p. 6.
20   Food and Agriculture Organization of the United Nations, FAOSTAT, http://faostat.fao.org/faostat/collections?version=ext&hasbulk=0
21   North America is defined to include: Canada, Mexico and the United States of America.
22   West & Central Europe includes the 25 EU countries, the EFTA countries and small countries such as Monaco, Andorra and San Marino.

Fig. 5: Per capita expenditure on drugs (in current US$)
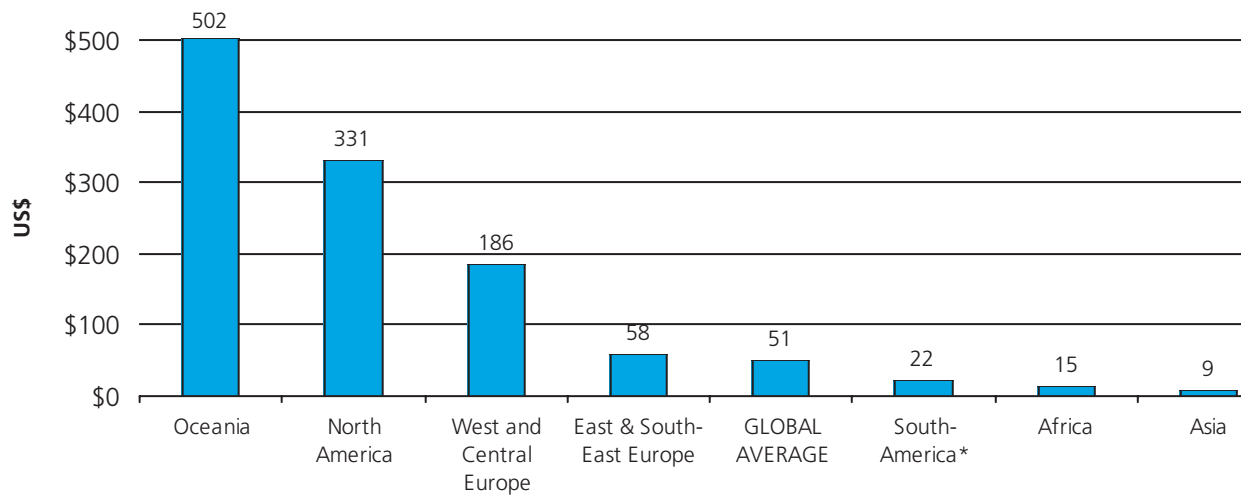
* Including Caribbean and Central America.

Sources: UNODC, Illicit Drug Market Estimation Model, United Nations, Population Division, Department of Economic and Social Affairs, *World Population Prospects: The 2002 Revision (POP/DB/WPP/Rev.2002/4/F1)*.

Fig. 6: Expenditure on drugs in % of GDP (2003)
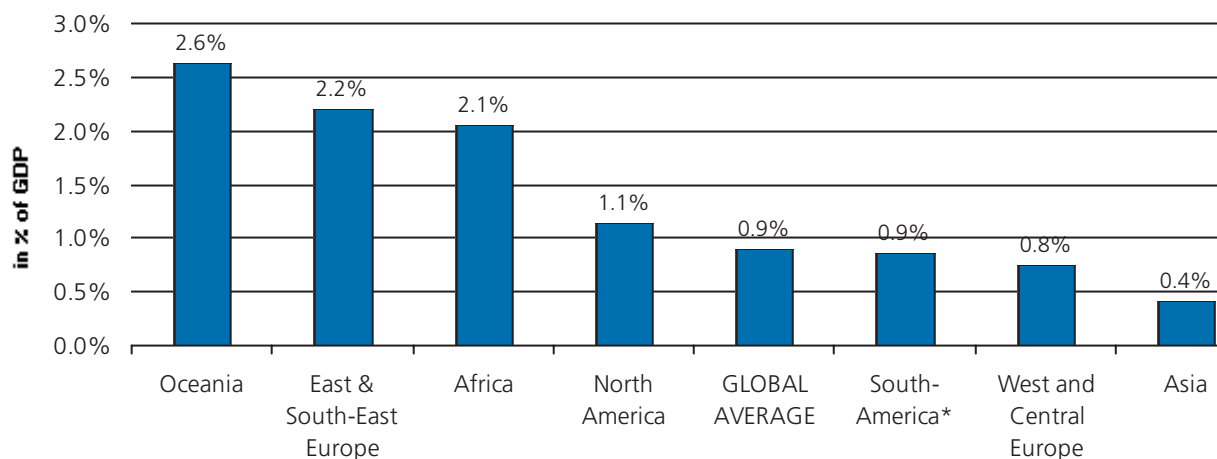
* Including Caribbean and Central America.

Sources: UNODC, Illicit Drug Market Estimation Model, World Bank, *World Development Indicators 2005*.

On a per capita basis, the results of the model suggest that the highest expenditures on drugs per year (expressed in current US-dollars) are found in the Oceania region, followed by North America and West and Central Europe. Below average expenditures on drugs are seen in Asia, Africa and South America. This is mainly the result of far lower drug prices in these countries. Global expenditures on drugs amount to about US$50 per person per year.

Expressed as a percentage of GDP, drug sales (at the retail level) seem to be most important in the Oceania region, followed by East and South-East Europe[23] and Africa. The lowest importance of retail sales of drugs as compared to the size of the overall economy is in Asia. Though only about a third of the world's drug users are located in OECD countries, about three quarters of the world's retail drug market – in economic terms - is found in the industrialized world (some US$245 bil-

23   East Europe is defined to include the European countries of the C.I.S. (Russian Federation, Ukraine, Belarus, Rep. Of Moldavia); South-East Europe is defined to include Turkey and the (non EU-25) Balkan countries.

Fig. 7: Distribution of the ' value added' of the illicit drug industry (N = $322 bn)
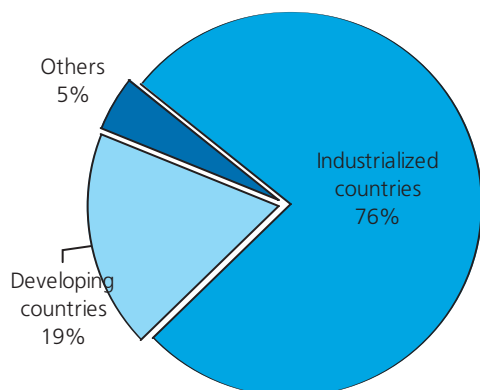
Sources: UNODC, Illicit Drug Market Estimation Model, World Bank.

lion).

The calculations also show that, in absolute terms, the highest profits are made between the wholesale and the retail level. Given the concentration of the retail markets in the industrialized countries, the results suggest that most of the 'value-added' (gross profits) of the illicit drug industry actually takes place in the industrialized world. Of the total 'value-added' of the illicit drug industry, 76% is generated in the industrialized countries, 19% in developing countries and the rest in transition countries. Total producer income is, on average, 4% of the final retail value. For heroin and cocaine, it is close to 1% of the final retail value.

2.3   Results of the individual markets

2.3.1 The cocaine trade - valued at over US$70 bn per year (retail level)

Table 2 presents an analysis of levels of production in source countries and distribution to consumer countries. For a variety of reasons, it was necessary to base the cocaine production estimates on a three-year average (2001-2003), resulting in a figure of 761 mt This amount, however, does not reach the consumers. After

deducting seizures in the source countries (Colombia, Peru, Bolivia), the amount available for shipment to consumers was 653 mt Based on these data and average cocaine base prices of US$808 per kilogram, the local income from cocaine base production in South America was estimated at US$527 million.

In order to determine the destination of this production, the number of consumers in each region was first considered. In addition, the cycle of the epidemic plays an important role. Countries or regions in an early stage of a drug epidemic can be expected to have many recreational users but only a limited number of hard-core addicts, while the opposite is true in more advanced situations. Based on a limited number of studies on the per capita consumption patterns of drug users, it was estimated that the average cocaine user in North America consumes 44 grams of pure cocaine per year while the average cocaine user in Western and Central Europe and in South America consumes some 35 grams per year.

Taking the information on the estimated number of cocaine users and the estimated number of per capita consumption rates into account, the model calculates the amount of drugs consumed in these sub-regions. Factoring in the purity adjusted seizures made in these sub-regions, the model arrives at the likely amounts of cocaine being imported. Based on these calculations, it would appear that the bulk of the cocaine produced in the Andean region goes to North America (352 mt), with lesser amounts being received in West and Central Europe (134 mt), the Caribbean (17 mt) and Central America (16 mt). About 101 mtare retained in South America for domestic consumption. Between them, these regions account for the bulk of the cocaine trafficked (96%). Deducting purity adjusted seizures and losses (set at 10%), the model calculates the amounts actually available for consumption[24] in North America (280 mt of pure cocaine), West and Central Europe (107 mt), and South America (69 mt). For other regions, see Table 2.

Multiplying these amounts with the purity adjusted average cocaine prices (i.e. prices calculated for 100% pure cocaine) gives a wholesale value for the region. Adding up the wholesale-values from all regions gives a total market value of US$18.8 bn, including the large

---

24 The model does not differentiate between seizures made at the wholesale level and those made at the retail level. The implicit assumption here is that most of the seizures and losses take place in the shipment of cocaine from the Andean region to the destination countries; seizures at a later stage, i.e. at the retail distribution level, are considered to be rather small. Such seizures are already included in the overall seizures figures at the wholesale level.

Table 2. Cocaine: Production and distribution from source countries to destination countries

Producer Regions	Total Production in Source Country (Kg Cocaine Equiv)	Total Seized/Lost in Source Country (Kg Cocaine Equiv)	Total Available for Sale (Kg Cocaine Equiv)	Transferred to Markets (Kg Cocaine Equiv)	Total Seized/lost in Transit (Kg Cocaine Equiv)	East Africa	North Africa	South Africa	West & Central Africa	Caribbean	Central America	North America	South America	Central Asia & Transcaucasus	East & Southeast Asia	Near & Middle East /SW Asia	South Asia	East Europe	West & Central Europe	Southeast Europe	Oceania	All Countries
											Consumer Regions											
East Africa	0	0	0	830	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Africa	0	0	0	1,194	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Africa	0	0	0	5,456	298	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West and Central Africa	0	0	0	7,054	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caribbean	0	0	0	17,110	11,350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central America	0	0	0	15,599	8,880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North America	0	0	0	352,766	72,776	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South America	761,000	108,381	652,619	100,630	31,796	830	1,194	5,456	7,054	17,110	15,599	352,766	100,630	4	2,999	1,403	755	3,190	133,806	2,373	7,451	652,619
Central Asia & Transcaucasus	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East and South-East Asia	0	0	0	2,999	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Near & Middle East /SW Asia	0	0	0	1,403	102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Asia	0	0	0	755	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Europe	0	0	0	3,190	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Western & Central Europe	0	0	0	133,806	26,444	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South East Europe	0	0	0	2,373	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oceania	0	0	0	7,451	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
All Countries	**761,000**	**108,381**	**652,619**	**652,619**	**151,898**	**830**	**1,194**	**5,456**	**7,054**	**17,110**	**15,599**	**352,766**	**100,630**	**4**	**2,999**	**1,403**	**755**	**3,190**	**133,806**	**2,373**	**7,451**	**652,619**

Table 3. Cocaine: Supply and demand in destination countries

	East Africa	North Africa	South Africa	West & Central Africa	Caribbean	Central America	North America	South America	Central Asia & Transcaucasus	East & Southeast Asia	Near & Middle East /SW Asia	South Asia	East Europe	West & Central Europe	Southeast Europe	Oceania	All Countries
									Regions								
Production:																	
Total Production in Source Country (Kg Cocaine Equiv)	0	0	0	0	0	0	0	761,000	0	0	0	0	0	0	0	0	761,000
Total Seized/Lost in Source Country (Kg Cocaine Equiv)	0	0	0	0	0	0	0	108,381	0	0	0	0	0	0	0	0	108,381
Total Available for Sale (Kg Cocaine Equiv)	0	0	0	0	0	0	0	652,619	0	0	0	0	0	0	0	0	652,619
Farmgate Price at Origin (US$/Kg Cocaine Equiv)								808									808
Producer Income (US$mill)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**527**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**527**
Supply:																	
Total Intended for Consumption (Kg Cocaine Equiv)	830	1,194	5,456	7,054	17,110	15,599	352,766	100,630	4	2,999	1,403	755	3,190	133,806	2,373	7,451	652,619
Total Seized/Lost at Destination (Kg Cocaine Equiv)	9	13	298	26	11,350	8,880	72,776	31,796	0	44	102	11	47	26,444	43	58	151,898
Total Available for Consumption (Kg Cocaine Equiv)	820	1,181	5,158	7,028	5,760	6,719	279,990	68,834	4	2,955	1,301	744	3,144	107,361	2,329	7,393	500,721
Wholesale price at Destination US$ /gm	133	150	25	33	11	13	32	4	60	43	65	70	101	64	92	140	38
Wholesaler Income (US$mill)	**109**	**177**	**128**	**229**	**64**	**88**	**9,089**	**247**	**0**	**128**	**85**	**52**	**319**	**6,831**	**214**	**1,037**	**18,797**
Demand:																	
Estimated User Population (Thousands)	65	66	265	540	164	191	6,382	1,961	5	94	30	26	108	3,059	172	211	13,339
Estimated Actual Consumption per year (Kg Cocaine Equiv)	738	1,063	4,642	6,325	5,760	6,719	279,990	68,834	4	2,660	1,170	669	2,829	107,361	2,096	7,393	498,255
Implied Consumption per user (gms Cocaine Equiv)	11	16	18	12	35	35	44	35	1	28	39	26	26	35	12	35	37
Average Retail Price US$ /gm	348	520	47	60	49	20	156	46	183	253	121	227	124	161	208	380	141
Retailer Income (US$mill)	**257**	**553**	**220**	**378**	**281**	**132**	**43,570**	**3,172**	**1**	**673**	**141**	**152**	**351**	**17,328**	**437**	**2,809**	**70,455**

markets of North America (US$ 9.1 bn), West and Central Europe (US$6.8 bn), and South America (US$0.3 bn). The South American figure reflects, however, only the gross income of wholesalers supplying the domestic market. The total wholesale income in South America, where much of the cocaine is not destined for local consumption but for exports, is much larger. The total gross income of wholesalers in South America would be equivalent to about US$2.6 bn.

Retail values were calculated by multiplying the amounts available for consumption by the purity adjusted retail prices, resulting in remarkably high figures in North America (US$44 bn), West and Central Europe (US$17 bn), and South America (US$3 bn). The global retail market for cocaine adds up to US$70.5 bn. The results of the model suggest that North America (62%), followed by Europe (26%) are, in economic terms, the largest cocaine markets.

Fig. 8: Regional distribution of cocaine retail sales in 2003 in billion US$ (N = US$70.5 bn)
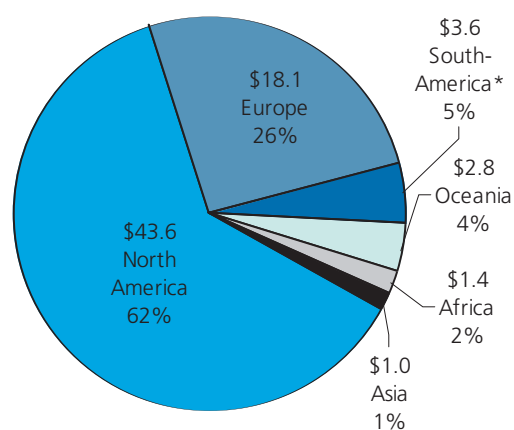
* including Caribbean and Central America
Sources: UNODC, Illicit Drug Market Estimation Model.

2.3.2 The opiates trade - valued at US$65 bn per year(retail level)

Global production of opiates is estimated at 476.5 mt (in heroin equivalents) in 2003, most of which is produced in the Near and Middle East/South-West Asia sub-region (365 mt), which includes Afghanistan. In contrast to cocaine, however, opiate production takes place in more than one region. The second most important production region is East and South-East Asia (94 mt), mainly Myanmar and Laos. Other production areas of importance are in North America (reflecting production in Mexico) and in South America (mainly reflecting production in Colombia).

For each of these production areas, distinct distribution patterns can be identified. Most of the opiates produced in the Near and Middle East/South-West Asia sub-region are either consumed locally (more than a fifth) or exported to Europe (about half). The rest goes to other regions. In the case of East and South-East Asia, two thirds are for consumption within the region. All of the opiates produced in North America remain within this region (mainly destined for the US market) and opiates produced in South America are for the local market and for the market in North America.

According to the results of the model, close to 100 mt of heroin are destined for the markets of West and Central Europe, about 90 mt for East Europe and 10 mt for South-East Europe. Deducting seizures and losses (assumed to amount to 10%), 84 mt are actually available for consumption in West and Central Europe, equivalent to 58 grams per heroin user per year. This is higher than the average at the global level (28 grams). However, one internal study, commissioned by UNODC, found that average heroin consumption among heroin users in the three months prior to undergoing drug treatment was close to 68 grams of pure heroin per year.[25] According to reports from the Swiss heroin maintenance program, which covers a group of hard-core heroin addicts, 135 grams per addict are consumed annually.[26] Against this background, a per capita consumption of 58 grams of heroin per year in West and Central Europe appears to be feasible.

---

25 These results were based on the results of a UK study on people entering treatment in 1997 (Gossop et al., "National Treatment Outcome Research Study in the United Kingdom", *Psychol. Addictive Behaviours, 1997*). The study showed an average consumption of 0.6 grams per day, and a consumption of, on average, 22 days per month. Average consumption per month was thus 14.9 grams of heroin (at street purity), which amounts to 179 grams per year. Applying the average purity of around 38 % reported by forensic laboratories in the UK in 1997 (The Forensic Science Service, "Drug Abuse Trends", various issues), average annual consumption would be 68 grams of pure heroin per problem drug user.

26 Institut für Suchtforschung, Universität Zürich, Institut für Sozial und Präventivmedizin, *Versuche für eine ärztliche Verschreibung von Betäubungsmitteln, Synthesebericht,* (Ambros Uchtenhagen), June 1997.

Table 4. Opiates: Production and distribution from source countries to destination countries

| Producer Regions	Total Production in Source Country (Kg Heroin Equiv)	Total Seized/Lost in Source Country (Kg Heroin Equiv)	Total Available for Sale (Kg Heroin Equiv)	Transferred to Markets (Kg Heroin Equiv)	Total Seized/lost in Transit (Kg Heroin Equiv)	East Africa	North Africa	South Africa	West & Central Africa	Caribbean	Central America	North America	South America	Central Asia Transcaucasus	East & Southeast Asia	Near & Middle East /SW Asia	South Asia	East Europe	West & Central Europe	Southeast Europe	Oceania	All Countries
East Africa	0	0	0	2,293	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Africa	714	0	714	3,410	35	0	714	0	0	0	0	0	0	0	0	0	0	0	0	0	0	714
Southern Africa	0	0	0	1,099	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West and Central Africa	0	0	0	9,954	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caribbean	0	0	0	364	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central America	0	0	0	783	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North America	8,400	209	8,191	28,735	6,621	0	0	0	0	0	0	8,191	0	0	0	0	0	0	0	0	0	8,191
South America	5,268	440	4,829	3,255	399	0	0	0	0	0	0	0	3,255	0	0	0	0	0	0	0	0	4,829
C. Asia & Transcaucasus	770	0	770	12,076	2,748	0	0	0	0	0	0	0	0	770	0	0	0	0	0	0	0	770
East and South-East Asia	94,050	582	93,468	59,928	6,885	240	267	119	1,076	39	85	2,050	0	1,222	59,928	0	6,663	9,483	10,508	1,028	762	93,468
Nr & M.East /SW Asia	365,150	9,551	355,599	78,352	27,723	2,053	2,429	980	8,878	325	698	16,920	0	10,084	0	78,352	55,003	78,283	86,740	9,180	5,673	355,599
South Asia	0	0	0	61,666	252	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Europe	2,147	0	2,147	89,913	923	0	0	0	0	0	0	0	0	0	0	0	0	2,147	0	0	0	2,147
Western & Central Europe	0	0	0	97,248	3,994	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South East Europe	0	0	0	10,208	4,713	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oceania	0	0	0	6,436	198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
All Countries	**476,500**	**10,781**	**465,719**	**465,719**	**54,856**	**2,293**	**3,410**	**1,099**	**9,954**	**364**	**783**	**28,735**	**3,255**	**12,076**	**59,928**	**78,352**	**61,666**	**89,913**	**97,248**	**10,208**	**6,436**	**465,719**

Table 5. Opiates: Supply and demand in destination countries

	East Africa	North Africa	South Africa	West & Central Africa	Caribbean	Central America	North America	South America	Central Asia Transcaucasus	East & Southeast Asia	Near & Middle East /SW Asia	South Asia	East Europe	West & Central Europe	Southeast Europe	Oceania	All Countries
Production:																	
Total Production in Source Country (Kg Heroin Equiv)	0	714	0	0	0	0	8400	5268	770	94050	365150	0	2147	0	0	0	476500
Total Seized/Lost in Source Country (Kg Heroin Equiv)	0	0	0	0	0	0	209	440	0	582	9551	0	0	0	0	0	10781
Total Available for Sale (Kg Heroin Equiv)	0	714	0	0	0	0	8191	4829	770	93468	355599	0	2147	0	0	0	465719
Farmgate Price at Origin (US$/Kg Heroin Equiv)										1339	2830						2520
Producer Income (US$mill)	**0**	**2**	**0**	**0**	**0**	**0**	**21**	**12**	**2**	**125**	**1006**	**0**	**5**	**0**	**0**	**0**	**1173**
Supply:																	
Total Intended for Consumption (Kg Heroin Equiv)	2293	3410	1099	9954	364	783	28735	3255	12076	59928	78352	61666	89913	97248	10208	6436	465719
Total Seized/Lost at Destination (Kg Heroin Equiv)	47	35	7	51	80	180	6621	399	2748	6885	27723	252	923	3994	4713	198	54856
Total Available for Consumption (Kg Heroin Equiv)	2246	3375	1092	9903	285	603	22113	2856	9328	53042	50629	61413	88990	93254	5496	6237	410863
Wholesale price at Destination US$ /gm	28	42	28	15	38	73	98	25	21	38	7	71	36	73	26	140	50
Wholesaler Income (US$mill)	**63**	**142**	**30**	**153**	**11**	**44**	**2175**	**71**	**194**	**2022**	**379**	**4355**	**3198**	**6779**	**145**	**874**	**20635**
Demand:																	
Estimated User Population (Thousands)	84	108	85	524	21	24	1301	286	370	2105	2009	3102	2406	1450	180	99	14154.3
Estimated Actual Consumption per year (Kg Heroin Equiv)	2021	3038	983	8913	285	603	22113	2856	9328	53042	50629	61413	80091	83929	5496	5614	390353
Implied Consumption per user (gms Heroin Equiv)	24.2	28.0	11.5	17.0	13.5	25.2	17.0	10.0	25.2	25.2	25.2	19.8	33.3	57.9	30.6	56.5	27.6
Average Retail Price US$ /gm	40	124	81	57	41	83	402	101	51	108	12	123	133	302	183	561	166
Retailer Income (US$mill)	**82**	**377**	**80**	**508**	**12**	**50**	**8886**	**288**	**480**	**5725**	**596**	**7567**	**10681**	**25340**	**1006**	**3148**	**64825**

Multiplied with purity adjusted retail prices, weighted by the number of consumers in each country, the value of the opiate market in West and Central Europe is estimated at US$25 bn. This is in line with previous UNODC estimates on the size of West Europe's heroin market. The total retail market value of Europe's opiate market (including those of East and South-East Europe) is estimated at US$37 bn. Europe accounts thus for 56% of the global opiates retail market, valued at around US$65 bn. The next largest retail market – in economic terms – is Asia, accounting for 22% of the total. The third largest market is North America, which consumes US$9 bn worth of the drug or 14% of the total.[27]

Fig. 9: Regional distribution of opiate retail sales in 2003 in billion US$ (N = US$64.8 bn)
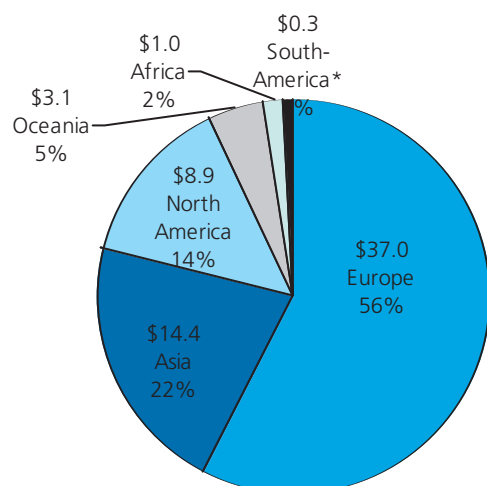
* including Caribbean and Central America
Sources: UNODC, Illicit Drug Market Estimation Model.

2.3.3. The cannabis trade, valued at over US$140 bn per year (retail level)

There are two distinctly different cannabis markets: herbal cannabis, valued at US$113 bn and cannabis resin, valued at US$28 bn.

A great deal of effort has gone into modelling the cannabis markets. Nonetheless, a word of caution is needed. The potential error between the estimations shown below and the 'true value' of the cannabis market could be significant, much higher than the potential errors that could be expected from the calculation of the heroin or the cocaine market. This is due to apparent data inconsistencies that make it difficult to reconcile supply-based estimates with demand-based estimates. Nonetheless, as far as possible, such an attempt was made, based on the assumption that the 'truth' is somewhere in the middle. The resulting estimates are the best that could be made, given the current level of information. This does not rule out the possibility that substantial changes could occur (notably for cannabis herb), once better, scientifically generated information becomes available.

Valuation of cannabis herb

Production estimates were taken from Member States' replies to UNODC's Annual Reports Questionnaires and official Government reports. Very strong year-to-year changes, particularly with regard to yields, suggest that these estimates were based on limited information and are not always reliable. One example of the data weakness in this area is the lack of credible production estimates for Africa. A number of African countries are frequently reported as important source countries for cannabis herb imported into Europe, but these countries do not provide production estimates to UNODC. Based strictly on available data, the model would predict that North America should be exporting cannabis to Africa, a trafficking route that does not, in fact, exist. The same applied to a significant number of countries from other regions as well.

Against this background, a systematic review was undertaken of all the countries that, over the last decade, had been reported by other countries as a source of cannabis or themselves reported the seizure of whole cannabis plants. The seizure of whole plants is indicative of domestic cultivation, because only a portion of the plant is used as a drug, and so whole plants are rarely trafficked across borders. For these countries, production was estimated to cover domestic demand, multiplying

---

27 Estimates for North America, however, highlighted a problem that still needs to be resolved in future. There are some apparent contradictions as to the origin of heroin and its reported availability. According to US Government reports, heroin produced in Colombia and Mexico account for the bulk of illegal heroin imports in the USA. However, current production estimates available for these countries are not sufficient to cover the bulk of the North American demand for heroin.

the number of estimated cannabis users by the average global cannabis herb consumption rate, derived from the initial calculations. For countries that were identified as cannabis producing countries but were not identified as major cannabis exporting countries, a certain percentage of domestic demand was used to estimate local production. The percentages chosen depended on quantitative and qualitative information available for different regions. For instance, based on estimates provided by the authorities of some European countries, local cannabis herb production from European countries, which (i) apparently had domestic production but (ii) had not provided a production estimate to UNODC, was set at 25% of calculated domestic demand. Clearly, this is not an ideal estimation technique but, in a number of cases, subsequent indications of likely orders of magnitude of cannabis production, referred in scientific literature, came rather close to these results.

Proceeding along these lines on a country-by-country basis, global cannabis production estimates increased from 35,000 mt to 42,000 mt Looking at the seizure figures, this would suggest an interdiction rate of around 14%, which is not unrealistic. After the model was run with these 'adjusted' production figures, the distribution pattern with regard to importing and exporting regions fell into line with what is known about actual trafficking patterns. The basic pattern reflected in this model is that, for most countries, local production is destined for domestic demand and only relatively small amounts are destined for export. The most important importer is West and Central Europe, while the largest market is North America.

One problem remained with regard to reconciling these production estimates with consumption figures: North America. Cannabis production estimates in North America exceed estimated consumption levels. This problem has been highlighted by US authorities elsewhere[28], but no solution has been found to overcome this data discrepancy. One potential explanation – that cannabis herb is being exported from North America –

can be also ruled out, as cannabis prices are high in North America and exports to most markets would result in losses for the traffickers.

Both demand side estimates and supply side estimates seem to be based on scientific research, and this makes it difficult to simply ignore one or the other. Assuming that the truth is probably somewhere in the middle, UNODC tried to find a compromise solution. The approach was to choose the lowest available production estimates (14,370 mt for Mexico, the USA and Canada,[29] instead of production estimates of around 25,000 mt for the region[30]) and to subsequently deduct another 5,000 mt (about a third of the lower production estimates) as 'extraordinary losses'. After deducting seizures made in the region, this resulted in an estimate of 5.9 mt of cannabis herb available for consumption in North America, equivalent to a per capita consumption

Fig. 10: Regional distribution of cannabis herb retail sales in 2003 in billion US\$ (N = US\$113.1 bn)
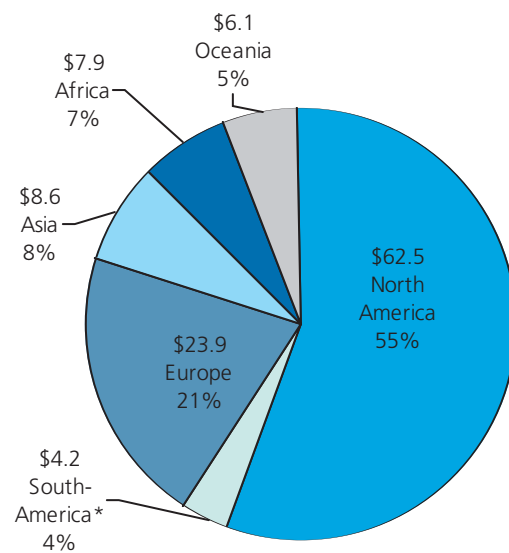
* including Caribbean and Central America
Sources: UNODC, Illicit Drug Market Estimation Model.

---

28 Drug Availability Steering Committee, *Drug Availability Estimates in the United States, December 2002,* http://www.whitehousedrugpolicy.gov/publications/pdf/drugavailability.pdf; see also UNODC, *World Drug Report 2004.*

29 Estimate for cannabis herb production in North America: Mexico: 7,900 tons in 2002 (US. Dept. of State, *International Narcotics Control Strategy Report, 2004*), USA: 5,670 tons in 2003 (UNODC, ARQ), Canada: 800 tons in 2003 (UNODC, ARQ).

30 According to the National Drug Intelligence Center, National Drug Threat Assessment 2005, cannabis herb production increased in 2003 in Mexico to 13,500 tons; US cannabis production, according to ONDCP, may have amounted to more than 10,000 tons (ONDCP, National Drug Control Strategy 2003) and the upper estimate of production in Canada was reported at 2000 tons. (National Drug Intelligence Center, National Drug Threat Assessment 2005).

Table 6. Cannabis herb: Production and distribution from source countries to destination countries

Producer Regions	Total Production in Source Country (Kg Cannabis Equiv)	Total Seized/Lost in Source Country (Kg Cannabis Equiv)	Total Available for Sale (Kg Cannabis Equiv)	Transferred to Markets (Kg Cannabis Equiv)	Total Seized/lost in Transit (Kg Cannabis Equiv)	Consumer Regions East Africa	North Africa	South Africa	West & Central Africa	Caribbean	Central America	North America	South America	Central Asia & Transcaucasus	East & Southeast Asia	Near & Middle East /SW Asia	South Asia	East Europe	West & Central Europe	Southeast Europe	Oceania	All Countries
East Africa	632,513	0	632,513	632,513	774,031	632,513	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	632,513
North Africa	4,155,141	0	4,155,141	1,793,604	69,060	393,873	1,793,604	0	640,920	0	73,813	0	0	0	0	0	0	479,355	768,571	0	5,004	4,155,141
Southern Africa	2,969,520	0	2,969,520	1,811,648	62,779	193,118	0	1,811,648	314,246	0	36,191	0	0	0	0	0	0	235,030	376,834	0	2,454	2,969,520
West and Central Africa	4,152,362	0	4,152,362	5,176,379	562,161	0	0	0	4,152,362	0	0	0	0	0	0	0	0	0	0	0	0	4,152,362
Caribbean	558,881	0	558,881	473,486	133,443	0	0	0	0	473,486	7,438	0	0	0	0	0	0	0	77,452	0	504	558,881
Central America	173,351	0	173,351	331,427	7,657	0	0	0	0	0	173,351	0	0	0	0	0	0	0	0	0	0	173,351
North America	14,370,000	8,440,349	5,929,651	5,929,651	9,889	0	0	0	0	0	0	5,929,651	0	0	0	0	0	0	0	0	0	5,929,651
South America	3,209,502	0	3,209,502	2,153,740	482,186	0	0	0	0	0	40,633	0	2,153,740	0	0	0	325,401	263,881	423,092	0	2,755	3,209,502
Central Asia & Transcaucasus	2,250,981	0	2,250,981	624,050	26,431	0	0	0	0	0	0	0	0	624,050	555,337	0	343,501	278,559	446,626	0	2,908	2,250,981
East and South-East	1,767,688	0	1,767,688	2,425,686	46,699	0	0	0	0	0	0	0	0	0	1,767,688	0	0	0	0	0	0	1,767,688
Near & Middle East /SW Asia	1,938,236	0	1,938,236	1,526,315	88,153	42,312	0	0	68,851	0	0	0	0	0	102,661	1,526,315	63,500	51,495	82,564	0	538	1,938,236
South Asia	3,539,378	0	3,539,378	4,271,781	82,239	0	0	0	0	0	0	0	0	0	0	0	3,539,378	0	0	0	0	3,539,378
Eastern Europe	87,520	0	87,520	1,449,034	41,845	0	0	0	0	0	0	0	0	0	0	0	0	87,520	0	0	0	87,520
Western & Central Europe	966,307	0	966,307	3,226,732	66,368	0	0	0	0	0	0	0	0	0	0	0	0	0	966,307	0	0	966,307
South East Europe	540,476	0	540,476	401,439	46,513	0	0	0	0	0	0	0	0	0	0	0	0	53,194	85,288	401,439	555	540,476
Oceania	680,099	0	680,099	694,817	13,606	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	680,099	680,099
All Countries	41,991,953	8,440,349	33,551,605	33,551,605	2,513,060	1,261,816	1,793,604	1,811,648	5,176,379	473,486	331,427	5,929,651	2,153,740	624,050	2,425,686	1,526,315	4,271,781	1,449,034	3,226,732	401,439	694,817	33,551,605

Table 7. Cannabis herb: Supply and demand in destination countries

Regions	East Africa	North Africa	South Africa	West & Central Africa	Caribbean	Central America	North America	South America	Central Asia & Transcaucasus	East & Southeast Asia	Near & Middle East /SW Asia	South Asia	East Europe	West & Central Europe	Southeast Europe	Oceania	All Countries
Production:																	
Total Production in Source Country (Kg Cannabis Equiv)	632,513	4,155,141	2,969,520	4,152,362	558,881	173,351	14,370,000	3,209,502	2,250,981	1,767,688	1,938,236	3,539,378	87,520	966,307	540,476	680,099	41,991,953
Total Seized/Lost in Source Country (Kg Cannabis Equiv)	0	0	0	0	0	0	8,440,349	0	0	0	0	0	0	0	0	0	8,440,349
Total Available for Sale (Kg Cannabis Equiv)	632,513	4,155,141	2,969,520	4,152,362	558,881	173,351	5,929,651	3,209,502	2,250,981	1,767,688	1,938,236	3,539,378	87,520	966,307	540,476	680,099	33,551,605
Farmgate Price at Origin (US$/Kg Cannabis Equiv)	1	1	4	1	483	113	936	16	27	30	50	32	665	1,385	33	1,476	258
Producer Income (US$mill)	1	15	13	4	270	20	5,552	52	62	54	97	114	58	1,338	18	1,004	8,671
Supply:																	
Total Intended for Consumption (Kg Cannabis Equiv)	1,261,816	1,793,604	1,811,648	5,176,379	473,486	331,427	5,929,651	2,153,740	624,050	2,425,686	1,526,315	4,271,781	1,449,034	3,226,732	401,439	694,817	33,551,605
Total Seized/Lost at Destination (Kg Cannabis Equiv)	774,031	69,060	62,779	562,161	133,443	7,657	9,889	482,161	26,431	46,699	88,153	82,239	41,845	66,368	46,513	13,606	2,513,060
Total Available for Consumption (Kg Cannabis Equiv)	487,785	1,724,544	1,748,869	4,614,218	340,042	323,770	5,919,762	1,671,554	597,619	2,378,987	1,438,162	4,189,542	1,407,189	3,160,364	354,926	681,211	31,038,545
Wholesale price at Destination US$ /gm	1	1	0	0	2	0	2	0	1	1	0	0	1	3	0	3	1
Wholesaler Income (US$mill)	488	318	120	299	549	61	11,759	376	194	2,178	522	280	1,914	8,537	159	2,106	29,860
Demand:																	
Estimated User Population (Thousands)	2,439	5,159	5,485	20,974	1,360	935	35,877	8,358	1,827	11,343	4,198	24,207	4,900	15,802	1,775	3,406	148,043
Estimated Actual Consumption per year (Kg Cannabis Equiv)	487,785	1,552,090	1,573,982	4,614,218	340,042	291,393	5,919,762	1,671,554	537,857	2,141,089	1,294,346	3,770,588	1,266,471	3,160,364	354,926	681,211	29,657,677
Implied Consumption per user (gms Cannabis Equiv)	200	301	287	220	250	312	165	200	294	189	308	156	258	200	200	200	200
Average Retail Price US$ /gm	2	1	0	1	7	2	11	1	1	3	1	0	2	6	5	9	4
Retailer Income (US$mill)	1,160	815	553	4,651	2,217	443	62,488	1,545	352	6,228	1,808	581	3,147	19,116	1,726	6,128	112,959

rate of 165 grams. This is about twice the rate indicated by some previous US studies,[31] but it is in line with the orders of magnitude shown in studies or reports from a few other countries. It also seems to be a feasible order of magnitude, taking the distribution pattern between infrequent and intensive cannabis users as well as information about the amounts of cannabis herb taken by such groups[32] in North America into account.

Multiplying these consumption estimates by reported prices (US$10.6 per gram at the retail level), the North American cannabis herb market was calculated to amount to some US$63 bn. This is far more than previous estimates, starting from the demand side, had suggested, but it is the lowest estimate UNODC could come up with without completely disregarding North American cannabis production estimates. The next largest market, using similar per capita consumption rates of around 200 grams per year, are Europe (US$24 bn), followed by Asia (US$9bn) and Africa (US$8 bn).

In short, there are existing data weaknesses on both the supply and the demand side with regard to cannabis herb. An attempt was made, based on the triangulation of existing data and information, to reconcile, as far as possible, the data discrepancies. This resulted in an overall estimate of the amounts available for consumption of 30,000 mt of cannabis herb, giving a global farmgate value of cannabis production of U$9 bn, a wholesale value of U$30 bn and a retail value of US$113 bn.

Valuation of cannabis resin

An evaluation of global cannabis resin production was done by UNODC, for the first time, for last year's World Drug Report. In co-operation with the Government of Morocco using modern remote sensing technology, ground verification and a yield survey, UNODC estimated resin production in that country at 3,070 mt in 2003. This led to a minimum global cannabis resin production estimate of 5,100 mt Based on a slightly different approach, analysing cannabis herb and cannabis resin seizures, a final global production estimate of 7,400 mt was established.[33]

Fig. 11: Regional distribution of cannabis resin retail sales in 2003 in billion US$ (N = US$28.8 bn)
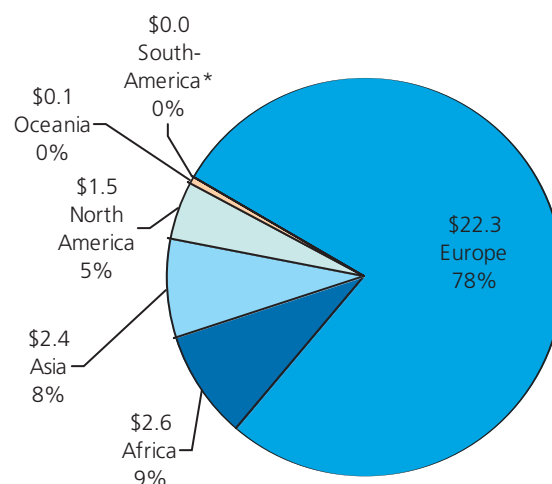
* including Caribbean and Central America
Sources: UNODC, Illicit Drug Market Estimation Model.

Making use of existing cannabis resin estimates from the previous year and information from the main source countries, the remaining 4,330 mt were allocated to the different regions.[34] This resulted in an estimate of close to 2,000 mt for the Near and Middle East/South-West Asia region, mainly reflecting production in Afghanistan, Pakistan and Lebanon, and an estimate of around 600 mt for the Central Asia and Caucasus sub-region, reflecting, in particular, important levels of production in Kazakhstan and Kyrzystan.

The model assumes that the main destination for the cannabis resin produced in North Africa is Europe, notably West and Central Europe, while the bulk of cannabis resin produced in Near and Middle East/South-West Asia region is for local consumption and only smaller amounts are destined for markets in Western Europe. The bulk of cannabis resin consumed in East Europe is assumed to originate in Central Asia. Cannabis resin produced in the Caribbean (mainly

---

31 Abt Associates, *What America's Users Spend on Illegal Drugs*, 1988-1998, December 2000.
32 The 1998 US household survey distinguished between three groups of cannabis users: those consuming it on 51 days or more (36% of all cannabis users), those consuming it on 12 to 51 days (20%) and those consuming it on less than 12 days (44%). Assuming that a group of 'hard-core' cannabis users smokes up to 4 grams (8 joints) for, on average, 107 days a year (equivalent to 1.2 grams of cannabis herb or 2.4 joints per day, every day), that the second group uses a daily cannabis dose of 1.5 grams for 31.5 days a year, and the third group uses a dose of 0.5 grams for 6 days a year, and applying the cannabis prevalence data from the 2003 Survey on Drug Use and Health to this distribution pattern, the average cannabis consumption per user (annual prevalence) would be equivalent to 165 grams.
33 UNODC, 2004 World Drug Report, Volume 1: Analysis, p. 129.
34 The allocation is of cannabis production according to regions is intended to show the production pattern, but is not critical for the final outcome of the wholesale or retail values of the cannabis resin market.

Table 8. Cannabis resin: Production and distribution from source countries to destination countries

Producer Regions	Total Production in Source Country (Kg Cannabis Equiv)	Total Seized/Lost in Source Country (Kg Cannabis Equiv)	Total Available for Sale (Kg Cannabis Equiv)	Transferred to Markets (Kg Cannabis Equiv)	Total Seized/lost in Transit (Kg Cannabis Equiv)	East Africa	North Africa	South Africa	West & Central Africa	Caribbean	Central America	North America	South America	Central Asia & Transcaucasus	East & Southeast Asia	Near & Middle East /SW Asia	South Asia	East Europe	West & Central Europe	Southeast Europe	Oceania	All Countries
East Africa	121,932	0	121,932	71,099	1,886	71,099		0	1,522	0	0	1,357	0	0	0		0	68	47,851		34	121,932
North Africa	3,080,000	66,394	3,013,606	778,600	4,206	0	778,600	0	87,904	0	0	78,401	0	0	0		0	3,941	2,062,786	0	1,974	3,013,606
Southern Africa	142,041	0	142,041	125,490	1,744	0	0	125,490	496	0	0	442	0	0	0		0	22	15,580	0	11	142,041
West and Central Africa	36,027	0	36,027	147,665	2	0	0	0	36,027	0	0	0	0	0	0		0	0	0	0	0	36,027
Caribbean	256,777	0	256,777	2,106	560	0	0	0	0	2,106	0	6,574	0	0	0		0	353	247,568	0	177	256,777
Central America	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
North America	0	0	0	114,758	780	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
South America	20,000	0	20,000	2,470	1,341	0	0	0	0	0	0	483	2,470	0	0		0	24	17,011	0	12	20,000
Central Asia & Transcaucasus	638,014	0	638,014	67,551	238	0	0	0	0	0	0	0	0	67,551	0		0	268,738	301,510	0	215	638,014
East and South-East Asia	60,000	0	60,000	17,059	752	0	0	0	0	0	0	0	0	0	17,059		0	61	42,850	0	31	60,000
Near & Middle East /SW Asia	1,991,733	85,126	1,906,606	1,226,378	151,089	0	0	0	21,716	0	0	18,126	0	0	0	1,226,378	0	911	639,018	0	456	1,906,606
South Asia	679,584	0	679,584	338,962	25,322	0	0	0	0	0	0	9,376	0	0	0		338,962	0	330,539	0	236	679,584
Eastern Europe	20,000	0	20,000	294,894	1,434	0	0	0	0	0	0	0	0	0	0		0	20,000	0	0	0	20,000
Western & Central Europe	0	0	0	3,942,650	730,650	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
South East Europe	353,891	0	353,891	115,482	1,615	0	0	0	0	0	0	0	0	0	0		0	303	237,937	115,482	170	353,891
Oceania	0	0	0	3,316	56	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
All Countries	**7,400,000**	**151,520**	**7,248,480**	**7,248,480**	**921,676**	**71,099**	**778,600**	**125,490**	**147,665**	**2,106**	**0**	**114,758**	**2,470**	**67,551**	**17,059**	**1,226,378**	**338,962**	**294,894**	**3,942,650**	**115,482**	**3,316**	**7,248,480**

Table 9. Cannabis resin: Supply and demand in destination countries

Regions	Total Production in Source Country (Kg Cannabis Equiv)	Total Seized/Lost in Source Country (Kg Cannabis Equiv)	Total Available for Sale (Kg Cannabis Equiv)	Farmgate Price at Origin (US$/Kg Cannabis Equiv)	Producer Income (US$mill)	Total Intended for Consumption (Kg Cannabis Equiv)	Total Seized/Lost at Destination (Kg Cannabis Equiv)	Total Available for Consumption (Kg Cannabis Equiv)	Wholesale price at Destination US$ /gm	Wholesaler Income (US$mill)	Estimated User Population (Thousands)	Estimated Actual Consumption per year (Kg Cannabis Equiv)	Implied Consumption per user (gms Cannabis Equiv)	Average Retail Price US$ /gm	Retailer Income (US$mill)
East Africa	121,932	0	121,932		12	71,099	1,886	69,214	1	56	461	69,214	150	1	62
North Africa	3,080,000	66,394	3,013,606	95	285	778,600	4,206	774,394	2	1,168	5,163	774,394	150	2	1,455
South Africa	142,041	0	142,041		13	125,490	1,744	123,746	3	412	825	123,746	150	3	604
West & Central Africa	36,027	0	36,027		3	147,665	2	147,663	2	269	984	147,663	150	3	443
Caribbean	256,777	0	256,777		24	2,106	560	1,546	1	1	10	1,546	150	10	15
Central America	0	0	0		0	0	0	0		0			8		0
North America	0	0	0		0	114,758	780	113,979	6	635	760	113,979	150	13	1,459
South America	20,000	0	20,000		2	2,470	1,341	1,129	1	1	8	1,129	150	2	2
Central Asia & Transcaucasus	638,014	0	638,014		60	67,551	238	67,313		52	449	67,313	150	1	93
East & Southeast Asia	60,000	0	60,000		6	17,059	752	16,306		67	109	16,306	150	22	364
Near & Middle East /SW Asia	1,991,733	85,126	1,906,606		181	1,226,378	151,089	1,075,290		336	7,169	1,075,290	150	2	1,711
South Asia	679,584	0	679,584		64	338,962	25,322	313,640		122	2,091	313,640	150	1	226
East Europe	20,000	0	20,000		2	294,894	1,434	293,460		1,128	1,956	293,460	150	4	1,279
West & Central Europe	0	0	0		0	3,942,650	730,650	3,212,000		5,968	17,829	2,890,800	162	7	20,723
Southeast Europe	353,891	0	353,891		34	115,482	1,615	113,867		128	759	113,867	150	3	329
Oceania	0	0	0		0	3,316	56	3,260		21	22	3,260	150	24	79
All Countries	**7,400,000**	**151,520**	**7,248,480**	**95**	**687**	**7,248,480**	**921,676**	**6,326,804**	**2**	**10,364**	**38,594**	**6,005,604**	**156**	**5**	**28,845**

138

Jamaica) is destined for North America. Cannabis resin produced in South Asia (mainly Nepal) is destined for consumption within the region and for export to West and Central Europe.

After seizures and losses, the model assumes that about 6,000 mt of cannabis resin are available for consumption. The number of cannabis resin users was deduced from the total number of cannabis users, based on the split between cannabis resin and total cannabis seizures over a ten-year period, and taking the possibility of some overlap between cannabis herb and resin consumption into account. This estimate resulted in a per capita estimate of 150 grams of cannabis resin per user. This is in line with some estimates on per capita consumption of cannabis resin obtained from countries in Europe. It is also in line with reports that the average potency of cannabis resin is still higher than the average potency of cannabis herb (even though there are important exceptions when it comes to hydroponically produced cannabis), which means that per capita consumption of cannabis resin is usually lower than per capita consumption of cannabis herb.

Based on prevalence data and per capita consumption figures, the largest cannabis market resin market is that of West and Central Europe (2,900 mt), which, when multiplied with average retail prices, gives a market value of US$21 bn. Europe thus accounts for 78% of the global cannabis resin market, followed by Africa (9%) and Asia (8%). The main cannabis resin market in Asia is the Near and Middle East; the main market in Africa is North Africa.

2.3.4 Amphetamine-type stimulants trade - valued at US$44 bn per year (retail level)

The ATS market consists of three main products: methamphetamine, amphetamine and ecstasy. Methamphetamine, amphetamine and related stimulants are combined under the category of 'amphetamines' . The global amphetamines retail market was valued at US$ 28 bn. The global ecstasy retail market, including MDMA and related substances, was valued at US$16 bn. Taken together, the ATS retail markets add up to US$44 bn. The largest ATS retail markets in economic terms are North America (57%), followed by Asia (20%), Europe (11%) and Oceania (9%).

Fig. 12: Regional distribution of ATS retail sales in 2003 in billion US$ (N = US$44.3 bn)
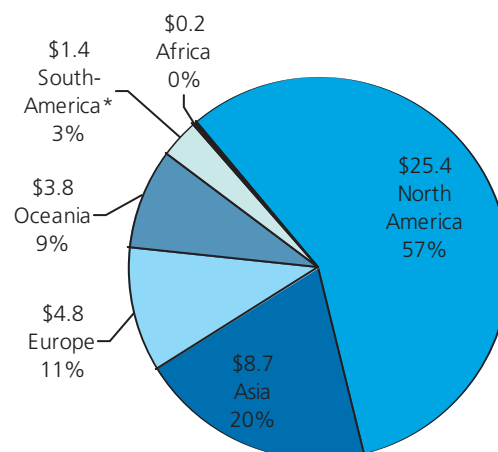
* including Caribbean and Central America
Sources: UNODC, Illicit Drug Market Estimation Model.

Valuation of the amphetamines market

The valuation of the amphetamines market started from a global production estimate of 332 mt (range: 278 – 401 mt), derived from production estimates based on extrapolation from seizures of amphetamines, seizures of precursors and consumption estimates. This production was 'allocated' to countries based on identifications as a source country by other countries; the number of dismantled laboratories; and seizures made in countries with dismantled laboratories that were identified by other countries as significant source countries. In addition, information from production estimates from North America was used to adjust the weights given to the different indicators. According to ONDCP, methamphetamine production in North America is estimated to range between 106 and 144 metric mt[35]

The results of these calculations suggests that the largest share of the world's production of amphetamines is in East and South-East Asia (162 tons), followed by North America (114 mt) and West and Central Europe (39 mt). While most of the production in East and South-East Asia and in North America concerns methamphetamine, European production is mainly focused on amphetamine.

---

35 The White House, T*he National Drug Control Strategy, February 2003*.

139

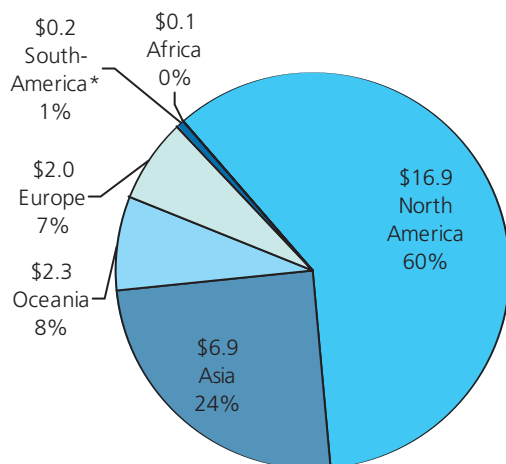## Table 10. ATS (excluding ecstasy): Production and distribution from source countries to destination countries

Producer Regions	Total Production in Source Country (Kg ATS (excl. ecstasy) Equiv)	Total Seized/Lost in Source Country (Kg ATS (excl. ecstasy) Equiv)	Total Available for Sale (Kg ATS (excl. ecstasy) Equiv)	Transferred to Markets (Kg ATS (excl. ecstasy) Equiv)	Total Seized/lost in Transit (Kg ATS (excl. ecstasy) Equiv)	East Africa	North Africa	South Africa	West & Central Africa	Caribbean	Central America	North America	South America	Central Asia & Transcaucasus	East & Southeast Asia	Near & Middle East /SW Asia	South Asia	East Europe	West & Central Europe	Southeast Europe	Oceania	All Countries
East Africa	0	0	0	1,105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Africa	0	0	0	705	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Africa	2	0	2	2,019	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
West and Central Africa	0	0	0	6,264	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caribbean	0	0	0	533	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central America	0	0	0	2,229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North America	113,713	1,114	112,599	111,195	491	0	0	0	0	79	331	111,195	913	0	0	0	0	0	0	0	82	112,599
South America	0	0	0	6,148	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central Asia & Transcaucasus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East and South-East Asia	161,528	4,818	156,710	152,105	9,312	282	0	514	0	116	484	0	1,334	0	152,105	1,080	0	0	0	0	796	156,710
Near & Middle East /SW Asia	0	0	0	2,328	466	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Asia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Europe	2,282	0	2,282	1,010	56	66	57	121	505	27	114	0	314	0	0	40	0	1,010	0	0	28	2,282
Western & Central Europe	39,013	0	39,013	28,666	3,979	539	461	984	4,102	221	926	0	2,555	0	0	328	0	0	28,666	0	229	39,013
South East Europe	7,311	0	7,311	2,475	547	218	186	398	1,658	89	374	0	1,032	0	0	880	0	0	0	2,475	0	7,311
Oceania	8,151	0	8,151	9,286	569	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,151	8,151
All Countries	332,000	5,931	326,069	326,069	15,437	1,105	705	2,019	6,264	533	2,229	111,195	6,148	0	152,105	2,328	0	1,010	28,666	2,475	9,286	326,069

Table 11. ATS (excluding ecstasy): Supply and demand in destination countries

	East Africa	North Africa	South Africa	West & Central Africa	Caribbean	Central America	North America	South America	Central Asia & Transcaucasus	East & Southeast Asia	Near & Middle East /SW Asia	South Asia	East Europe	West & Central Europe	Southeast Europe	Oceania	All Countries
Production:																	
Total Production in Source Country (Kg ATS (excl. ecstasy) Equiv)	0	0	0	0	0	0	113,713	0	0	161,528	0	0	2,282	39,013	7,311	8,151	332,000
Total Seized/Lost in Source Country (Kg ATS (excl. ecstasy) Equiv)	0	0	0	0	0	0	1,114	0	0	4,818	0	0	0	0	0	0	5,931
Total Available for Sale (Kg ATS (excl. ecstasy) Equiv)	0	0	0	0	0	0	112,599	0	0	156,710	0	0	2,282	39,013	7,311	8,151	326,069
Laboratory Price at Origin (US$/Kg ATS (excl. ecstasy) Equiv)	848	404	1,120	25	111	982	3,028	639	25	855	897	64	1,014	2,065	1,686	7,099	1,926
Producer Income (US$mill)	0	0	0	0	0	0	341	0	0	134	0	0	2	81	12	58	628
Supply:																	
Total Intended for Consumption (Kg ATS (excl. ecstasy) Equiv)	1,105	705	2,019	6,264	533	2,229	111,195	6,148	0	152,105	2,328	0	1,010	28,666	2,475	9,286	326,069
Total Seized/Lost at Destination (Kg ATS (excl. ecstasy) Equiv)	12	3	2,017	0	533	0	491	0	0	9,312	466	0	56	3,979	547	569	15,437
Total Available for Consumption (Kg ATS (excl. ecstasy) Equiv)	1,105	693	2,017	6,261	533	2,229	110,704	6,148	0	142,793	1,862	0	953	24,687	1,928	8,718	310,632
Wholesale price at Destination US$ /pure m	8	4	4	0	1	10	31	6	0	17	9	1	14	13	12	63	22
Wholesaler Income (US$mill)	9	3	7	3	1	22	3,426	3	0	2,416	16	0	14	321	22	550	6,813
Demand:																	
Estimated User Population (Thousands)	221	249	403	1,252	89	372	3,459	1,025	3	17,855	143	152	156	2,057	161	794	28,391
Estimated Actual Consumption per year (Kg ATS (excl. ecstasy) Equiv)	1,105	624	2,017	6,261	533	2,229	110,704	6,148	0	128,514	1,862	0	858	24,687	1,928	7,846	295,317
Implied Consumption per user (gms ATS (excl. ecstasy) Equiv)	5	3	5	5	6	6	32	6	0	7	13	0	6	12	12	10	10
Average Retail Price US$ / puregm	43	11	11	1	1	56	153	5	0	53	49	1	40	76	26	293	96
Retailer Income (US$mill)	47	7	22	8	1	125	16,896	33	0	6,761	91	0	34	1,886	49	2,296	28,256

The model also reflects the general perception that amphetamines are mainly traded intra-regionally. Thus, most of the production of East and South-East Asia is for consumption within the region, and the same applies to North America and to West and Central Europe. Out of the total of 332 mt, 295 mt are estimated to be available for consumption after seizures and losses are deducted. The model assumes that 129 mt are available for consumption in East and South-East Asia, 111 mt in North America, and 25 mt in West and Central Europe. The implied per capita consumption is high for North America (32 grams per user per year)[36] and much lower in West and Central Europe (12 grams) and in East and South-East Asia (7 grams). This is a consequence of the rather high production levels estimated by the authorities in North America, and the fact that there is no information of methamphetamine or amphetamine produced in North America being shipped to other regions. Thus, all of the amphetamines produced in North America, less seizures and losses, are presumably consumed there. Using these consumption levels, the amphetamines market in North America was estimated at US$17 bn, in East and South-East Asia at US$7 bn and in Oceania and in Europe at US$2 bn each. The total market was valued at US$28 bn.
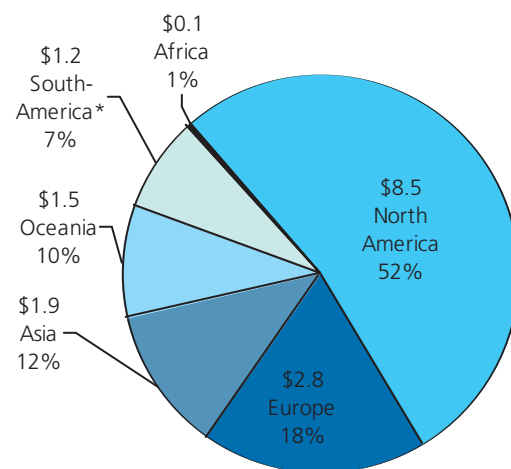
The model shows some trafficking of amphetamines to countries in Africa and South America. This, however, is only partially correct. Both Africa and South America have, in terms of ATS users, quite substantial ATS markets, but much of these markets are sourced from legally produced ATS which are subsequently diverted, rather than from illicitly produced ATS. This is a problem for the current model, as such diverted drugs were not considered in the initial phase when the model was designed. This means that the overall markets for amphetamines (licit and illicit) in Africa and South America are larger than what is reflected in this model.

Valuation of the ecstasy market

Global production of ecstasy – extrapolated from seizures of ecstasy, from seizures of ecstasy precursors and from consumption estimates was estimated at 90 mt (range: 45 – 141 mt). The allocation of production to countries/regions was based on dismantled laboratories, citations as countries of origin by other countries, and seizures (for countries that had laboratories and which were cited as countries of origin).

Using this approach, data suggest that the bulk of ecstasy production (69 mt out of 90 mt or 77%) continues to take place in West and Central Europe. The

Fig. 13: Regional distribution of amphetamines retail sales in 2003 in billion US$ (N = US$28.3 bn)

* including Caribbean and Central America
Sources: UNODC, Illicit Drug Market Estimation Model.

Fig. 14: Regional distribution of ecstasy retail sales in 2003 in billion US$ (N = US$16.1 bn)

* including Caribbean and Central America
Sources: UNODC, Illicit Drug Market Estimation Model.

---

36 Per capita consumption of amphetamines, according to these estimates, is still lower in North America than the corresponding estimates for cocaine, another stimulant.

Table 12. Ecstasy: Production and distribution from source countries to destination countries

Producer Regions	Total Production in Source Country (Kg Ecstasy Equiv)	Total Seized/Lost in Source Country (Kg Ecstasy Equiv)	Total Available for Sale (Kg Ecstasy Equiv)	Transferred to Markets (Kg Ecstasy Equiv)	Total Seized/lost in Transit (Kg Ecstasy Equiv)	East Africa	North Africa	South Africa	West & Central Africa	Caribbean	Central America	North America	South America	Central Asia & Transcaucasus	East & Southeast Asia	Near & Middle East /SW Asia	South Asia	East Europe	West & Central Europe	Southeast Europe	Oceania	All Countries
East Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Africa	931	0	931	1,135	59	0	0	931	0	0	0	0	0	0	0	0	0	0	0	0	0	931
West and Central Africa	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caribbean	0	0	0	612	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central America	0	0	0	568	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North America	12,269	824	11,445	36,327	32	0	0	0	0	0	0	11,445	0	0	0	0	0	0	0	0	0	11,445
South America	1,179	0	1,179	4,075	206	0	0	0	0	0	0	0	1,179	0	0	0	0	0	0	0	0	1,179
Central Asia & Transcaucasus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East and South-East Asia	4,087	0	4,087	5,920	367	0	0	0	0	0	0	0	0	0	4,087	0	0	0	0	0	0	4,087
Near & Middle East /SW Asia	207	0	207	456	100	0	0	0	0	0	0	0	0	0	0	207	0	0	0	0	0	207
South Asia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Europe	0	0	0	762	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Western & Central Europe	69,150	3,092	66,058	28,601	1,623	0	0	204	22	612	568	24,882	2,896	0	1,833	249	0	762	28,601	274	5,156	66,058
South East Europe	1,594	0	1,594	1,867	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,594	0	1,594
Oceania	784	0	784	5,940	748	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	784	784
All Countries	**90,200**	**3,916**	**86,284**	**86,284**	**3,182**	**0**	**0**	**1,135**	**22**	**612**	**568**	**36,327**	**4,075**	**0**	**5,920**	**456**	**0**	**762**	**28,601**	**1,867**	**5,940**	**86,284**

Table 13. Ecstasy: Supply and demand in destination countries

	East Africa	North Africa	South Africa	West & Central Africa	Caribbean	Central America	South America	North America	Central Asia & Transcaucasus	East & Southeast Asia	Near & Middle East /SW Asia	South Asia	East Europe	West & Central Europe	Southeast Europe	Oceania	All Countries
Production:																	
Total Production in Source Country (Kg Ecstasy Equiv)	0	0	931	0	0	0	1,179	12,269	0	4,087	207	0	0	69,150	1,594	784	90,200
Total Seized/Lost in Source Country (Kg Ecstasy Equiv)	0	0	0	0	0	0	0	824	0	0	0	0	0	3,092	0	0	3,916
Total Available for Sale (Kg Ecstasy Equiv)	0	0	931	0	0	0	1,179	11,445	0	4,087	207	0	0	66,058	1,594	784	86,284
Farmgate Price at Origin (US$/Kg Ecstasy Equiv)	0	0	6,961	0	0	0	39,421	24,483	0	21,803	23,010	0	0	7,887	23,001	47,014	11,839
Producer Income (US$mill)	**0**	**0**	**6**	**0**	**0**	**0**	**46**	**280**	**0**	**89**	**5**	**0**	**0**	**521**	**37**	**37**	**1,022**
Supply:																	
Total Intended for Consumption (Kg Ecstasy Equiv)	0	0	1,135	22	612	568	4,075	36,327	0	5,920	456	0	762	28,601	1,867	5,940	86,284
Total Seized/Lost at Destination (Kg Ecstasy Equiv)	0	0	59	0	17	2	206	32	0	367	100	0	1	1,623	28	748	3,182
Total Available for Consumption (Kg Ecstasy Equiv)	0	0	1,076	22	595	565	3,869	36,295	0	5,552	356	0	761	26,977	1,840	5,192	83,102
Wholesale price at Destination US$ /gm	93	93	75	49	233	155	164	103	93	93	77	93	85	57	97	143	93
Wholesaler Income (US$mill)	**0**	**0**	**81**	**1**	**138**	**88**	**633**	**3,723**	**0**	**518**	**27**	**0**	**65**	**1,530**	**179**	**741**	**7,724**
Demand:																	
Estimated User Population (Thousands)	0	0	108	2	59	57	387	3,561	0	555	36	0	139	2,698	184	519	8,304
Estimated Actual Consumption per year (Kg Ecstasy Equiv)	0	0	1,076	22	595	565	3,869	32,665	0	5,552	356	0	685	26,977	1,840	5,192	79,396
Implied Consumption per user (gms Ecstasy Equiv)	0	0	10	10	10	10	10	9	0	10	10	0	5	10	10	10	10
Average Retail Price US$ /gm	204	204	87	60	280	157	244	260	204	330	125	204	193	91	139	298	204
Retailer Income (US$mill)	**0**	**0**	**94**	**1**	**166**	**89**	**944**	**8,503**	**0**	**1,835**	**45**	**0**	**132**	**2,458**	**257**	**1,549**	**16,072**

next largest ecstasy producing region is North America (12 mt), followed by East and South-East Asia (4 mt). The model results also suggest that Europe is the only region with important ecstasy exports. More than half of the ecstasy produced in West and Central Europe is destined for export to other regions. With ecstasy prices almost three times the level seen in West and Central Europe, North America seems to be a particularly lucrative market, but European ecstasy exports go to most other regions as well.

Deducting seizures and losses, about 80 mt remain available for consumption. Using existing prevalence estimates and applying an average rate of 10 grams per person per year (equivalent to some 100 pills a year, or two pills per weekend), the largest ecstasy market appears to be North America (33 mt), followed by West and Central Europe (27 mt). Multiplying these amounts with reported prices, the North American ecstasy market appears to be substantially larger (US$8.5 bn) than the European market (less than US$3 bn). However, this may change, as there are strong indications that the North American ecstasy market is shrinking. As outlined in the beginning of this chapter, data used for the market calculations were those published in last year's World Drug Report (2.7 million ecstasy users for North America). The numbers published in this year's World Drug Report are already 15% less (2.3 million ecstasy users in North America), and – using school surveys as an early indicator for subsequent trends in the general population - one can still expect further declines to take place. While the bulk of the ecstasy market is in North America and Europe, 30% of the global ecstasy market is in other parts of the world, notably in Asia (12%), Oceania (10%) and South America (7%).

2.4 Conclusions

This review of UNODC's global drug market valuation has highlighted some of the complexities involved in making such estimations. The technical details of the model have not been discussed in this review. Clearly there are still areas where estimates can be improved. As new information emerges, it will be incorporated into the model. The overall figure of US$322 bn should be seen as representing reasonable order of magnitude. As stated previously, some market estimates can be made with more precision than others. The estimates for the opiates market (US$65 bn) and the cocaine market (US$70 bn), for example, are quite strong – because there is rigorous data at least on the production side.

The estimates for the ATS (US$44 bn) and the cannabis resin (US$28bn) markets are also reasonably well grounded; but the cannabis herb market estimate (US$113 bn), remains rather weak due to the paucity of underlying data.

Ideally, results from the top-down and the bottom-up approaches should match, simply because there is no drug consumption without production and there will be, most probably, no drug production without a demand for drugs. This does not preclude the possibility that stocks can be built-up or depleted, thus distorting this relationship in the short-term.

One key parameter for analysing the market from both sides is still largely missing: the average consumption per user. Only some vague and often contradictory information is currently available, often from case studies which may or may not be representative of a locality, a country or a region. This put a severe constraint on this exercise. More systematic research on quantities consumed could greatly improve the rigour of the results.

In presenting this work in progress, UNODC shares its understanding of the illicit drug markets, as well as lack of it in some areas, in order to improve the common level of understanding, stimulate discussion and prompt new research to overcome existing gaps in information.