

# Poppies, Opium and Heroin

*Production in Colombia and Mexico*





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Flower, bulbs and gum (Photo: Guillermo Ospina)

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## Introduction

Poppy cultivation in Mexico and Colombia is part of a local economy geared almost exclusively toward the illegal market abroad: it is driven by demand for heroin, primarily in the United States. North America, including Canada, is currently experiencing a major humanitarian crisis related to this use and the opioids circulating on this market.

To understand the dynamics of this market and to evaluate whether political responses to the phenomenon are appropriate and effective, we present this report on opium poppy cultivation in Mexico and Colombia, which, together with Guatemala, are the poppy-producing countries of Latin America. While it was not possible to include Guatemala in this study, we attempt to provide some relevant information about this Central American country.

Because the U.S. government tends to look to producing countries to explain the causes of the emergency situation in its country, it is important to consider the problem from broader and more inclusive perspectives.

This report is based on fieldwork by two researchers in Mexico and Colombia, relevant data and literature, and analyses of the U.S. market for heroin, primarily by the U.S. Drug Enforcement Agency (DEA). Due to lack of information, it does not include detailed discussion of or data from Canada, although a similar situation is understood to exist there.

## The History of Opium and its Uses

Used for centuries in different cultures, opium, the most highly prized product of the poppy plant (*Papaver somniferum*), is the most effective natural substance for alleviating pain. Its two principal derivatives, morphine and codeine, have been used since

Crop on a hillside (photo: unknown)



the beginning of the 19th century to control pain from various acute and chronic illnesses, and are indispensable in many medical and surgical procedures currently carried out around the world.

Since the beginning of the 20th century, opium and its derivatives have been at the centre of the international drug control system, which seeks to guarantee universal access to essential medicines and to prevent their abuse. In this context, opium and its derivatives have a dual character: they constitute an essential medicine *par excellence*, but they also represent a risk due to their potential for abuse.

While there is currently sufficient production of patented (legal) – and in most cases affordable – medicines derived from opium to satisfy demand, the distribution and consumption of such medications is concentrated in wealthy, developed countries.

These medicines are sorely lacking in many countries, especially the least developed.

The causes of this unequal distribution are several. However, not few are rooted in systems of national control that disincentivize good medical practice, fuel unfounded fears about the use of these medicines or are too restrictive for medical practice itself. Thus, every day, millions of people around the world suffer from pain unnecessarily.<sup>1</sup>

In **Mexico** a new regulation<sup>2</sup> and an accord by the Federal Health Council<sup>3</sup> on palliative care, published in late 2014, established new practical guidelines for prescribing pain medications. It is calculated that at least half of the 600,000 people who die annually in Mexico do so without palliative care services,<sup>4</sup> which generally include the dispensing of different opium derivatives. Meanwhile, in **Colombia**, despite the existence of a Law on Palliative Care (Law 1733 of 2014),

this has not been regulated. The Palliative Care Association of Colombia (in Spanish, *Asociación de Ciudadanos Paliativos de Colombia* or ASOCUPAC) estimates that between 100,000 and 120,000 terminal patients die each year amid difficulties in accessing opioids for pain relief.<sup>5</sup>

This situation is due to multiple factors. The first is the overregulation that has existed around medical practice for prescribing these substances, something that has been recognized even by the International Narcotics Control Board (INCB) and the World Health Organization (WHO). The system has been so

## Legal Opium

The legal cultivation of poppies to manufacture medicine – primarily morphine, codeine and thebaine – has its basis in the UN Single Convention on Narcotic Drugs of 1961 and is supervised and controlled by the International Narcotics Control Board (INCB), which calculates the quantity needed for medicinal pharmaceutical applications based on obligatory annual estimates from parties to the treaty. These estimates are translated into real quantities the following year.

To export up to five tons of opium, countries must only notify the INCB. However, if they wish to export a larger quantity, they must inform the UN Economic and Social Council (ECOSOC), the body that ‘shall either approve the notification or may recommend to the party that it not engage in the production of opium for export’ (Article 24–2b). The treaties impose limitations on production for international trade, but do not prevent a country from ‘producing opium sufficient for its own requirements’ or ‘exporting opium seized in the illicit traffic’ for legal purposes[1]. Cultivation licenses are issued to producing companies, some private and some state-owned. Production monitoring is very strict and is the responsibility of the State. The main producers are Turkey, Australia (Tasmania) and Spain. Other countries that grow poppies legally for international trade are France, Great Britain, India and Hungary. Several others produce opium legally for domestic use. India is the only country licensed to produce legal opium in which in which opium latex is gathered manually by farmers. India is also the only country that produces and exports opium latex; all other countries harvest the plant whole, using machines, and extract the alkaloids from poppy straw.

Total global production of morphine in 2016 was 463 metric tons. Thebaine production for that year was 147 MT. The difference between the amount of plants planted and harvested is considerable: in 2016, only 77% of the estimated amount required to meet global legal demand was in fact planted, and only 48% was harvested.

Australia	France	Turkey	Spain	Hungary	India	Others
180 MT	91 MT	63 MT	56 MT	9 MT	3 MT	61 MT

Figures for the production of morphine-rich poppy straw for 2016, in metric tons.

Source: [http://www.incb.org/documents/Narcotic-Drugs/Technical-Publications/2017/9\\_Part\\_3\\_Supply-and-Demand\\_S.pdf](http://www.incb.org/documents/Narcotic-Drugs/Technical-Publications/2017/9_Part_3_Supply-and-Demand_S.pdf)

[1] Single Convention of 1961, paragraph 24-5.

strict that only very few medical specialisms are authorized to prescribe opioids.<sup>6</sup> A second factor is that, given the difficulties in prescribing them, many doctors are not up-to-date on the management of these medications, and hence seek other, less problematic options. Thirdly, given that the prescribing of opiates is very limited and the bureaucratic procedures and specifications to maintain the availability of these substances have been very strict, pharmacies often lack sufficient quantity to meet demand. At first glance, this situation constitutes a paradox: opium production in Colombia and Mexico supplies a substantial illegal export market, but does not satisfy local demand.

## Heroin and the System of Prohibition

Heroin is the common name for diacetylmorphine, a derivative of morphine discovered in 1874 in London by the chemist C.R. Aldea Wright and produced and sold beginning in 1897 by the German pharmaceutical company Bayer, who promoted it as a safer and less addictive substitute for morphine.

Given growing concern over opium consumption in China,<sup>7</sup> twelve countries met in Shanghai in 1909 to form the International Opium Commission and begin discussing the possibility of imposing international controls on the opium trade. The delegates resolved to end the practice of smoking opium, limiting its use to medical purposes and controlling new derivatives. This was the precursor to the first International Opium Convention, signed in The Hague in 1912. This and subsequent treaties negotiated under the League of Nations (a precursor to the UN, 1919-1946) were more normative than prohibitive in nature, and their objective was to moderate the excesses of a free trade regime that lacked regulation.



Utensils used for harvesting (photo: Guillermo Ospina)

Heroin was prohibited in the United States in 1920 and classified under Schedule IV of the UN Single Convention on Narcotic Drugs in 1961. The purpose of the Single Convention was to replace earlier international treaties, which were developed unsystematically based on the International Opium Convention, incorporating new provisions and creating a unified, universal system of auditing. This system is intolerant and prohibitionist with regard to the production and sale of narcotics, with the exception of production and sale for medical and scientific ends.

The Single Convention expanded existing control measures to address the cultivation of plants from which narcotics were derived, and their traditional uses. These regulations imposed a burden on traditional producer countries in Asia, Latin America and Africa, where the cultivation and traditional use of coca leaf, cannabis, and poppies for opium was concentrated at the time. The Single Convention established the objective of ending traditional (or 'quasi-medical') consumption of opium within a period of 15 years.<sup>8</sup> Given that the Convention entered into force in December of 1964, that period ended in 1979.

Since its initial creation and up to the present day, heroin has been used with differing intensities and characteristics of consumption

## Illegal Opium

Country	Hectares	Opium production (in MT or metric tons)
Southwestern Asia: Afghanistan	328,000*	9,000 MT* (4,470 MT in 2015)
Southeastern Asia: Myanmar, Lao	61,120	745 MT
Latin America: Mexico, Colombia and Guatemala	42,500	500 MT
<b>Total</b>	<b>431,650</b>	<b>10,245 MT</b>

\*Afghanistan Opium Survey 2017, cultivation and production, UNODC. .

The other figures come from global estimates of cultivation and production in 2015. Source: World Drug Report 2016, UNODC.

in different societies. Consumption patterns depend largely on the characteristics of the product. Depending on the procedure used to obtain it, heroin assumes characteristics that make it more suitable for injection, sniffing, ingestion, or smoking. The common denominator, however, is the ease with which heroin generates dependency in relatively short periods of consumption.

Poppy crops in Colombia and Mexico provide raw materials for the production of heroin that supplies illegal drug markets abroad, primarily in North America. Particularly in the United States and Canada, significant growth has been observed in the consumption of heroin and other opiates in the last decade, to the extent that this has become a major public health concern. The increase in overdose deaths has been described as an epidemic, with deaths quadrupling in the last decade and reaching 10,000 reported in 2014.<sup>9</sup>

In Colombia and Mexico, which both have a very small, but increasing, rate of heroin consumption, poppy cultivation poses a

dilemma for public policy: on the one hand, the production of opium gum is confronted through the criminalization of producers and forced eradication of crops, which has not had a substantial effect on the root of the problem. On the other hand, there is a constant lack of economic alternatives for rural communities that produce opium gum as a source of cash income to complement a subsistence farming economy. The State's presence in these communities is exclusively repressive.

### A Brief History of Opium in Colombia and Mexico<sup>10</sup>

Poppy cultivation and opium production in Colombia and Mexico have followed different trajectories but, in both cases, they are motivated by external factors and are part of persistent, short-duration cyclical economies. The third producer in Latin America is Guatemala. For a brief description of the situation in that country, see the box at the end of this chapter.



The history of opium in Mexico dates back to the second half of the 19th century, when poppy cultivation was encouraged primarily by two interrelated external factors: first, growing demand for morphine in the United States due to the Civil War, and second, immigration of Chinese workers who arrived as laborers on railroads in the northeastern part of the country and introduced the first cultivation techniques in Sinaloa, Durango and Chihuahua.<sup>11</sup>

Multiple testimonies exist of opium consumption in these communities, primarily through smoking, but large-scale national production was always linked to the North American market, especially in eras of large-scale armed conflict such as the World Wars. Records of domestic consumption in Mexico began to appear in the first half of the 20th century and were often used to justify discrimination against the populations that engaged in it: Chinese and lower-class Mexicans who had fallen into ‘the clutches of addiction’.

Thus, the available historiography presents a racist or ‘police blotter’ perspective generally linking drug use to the country’s criminal underworld, and it also shows the first links between political power and the business of opium and its derivatives.<sup>12</sup> While poppy production has remained constant in Mexico, the consumption of opium and sub-products has not been quantitatively significant in Mexican society, with the exception of the area along the northern border, where there is a continual flow of heroin and consumption occurs primarily among marginalized populations in the region. Unfortunately, as the numbers are too low for precise statistical records (less than 25,000 users), it is not possible to obtain reliable data on the Mexican market for heroin.

Several factors likely contributed to the expansion of poppy cultivation from the traditional zones in the Northern Triangle

(comprising Durango, Sinaloa and Chihuahua) to other states in the south, primarily Guerrero, since the beginning of the 1970s. On the international level, the dismantling of the ‘French Connection’ began in 1971 due to North American pressure on Turkey to abolish all of its illegal poppy cultivation and transition to the legal production of ‘medicinal opium’.<sup>13</sup> This interrupted the flow of opium from Turkish collectives, which was previously converted into heroin by Corsican mafias and trafficked through Marseille to the United States, primarily the East Coast and Chicago.

At the same time, internal factors such as U.S. pressure on Mexico to suppress production in the northeastern states through Operation Condor<sup>14</sup> in 1975, led heroin traffickers from Sinaloa to seek to diversify production to Guerrero, and concomitantly to the states of Oaxaca, Michoacán, Mexico and Chiapas.

Traffickers began to teach farming communities in these states techniques for



Bulbs oozing gum (photo: Guillermo Ospina)

cultivating poppies and extracting opium gum, which they rapidly bought and processed to convert into heroin, taking advantage of the consolidation of transit routes to markets in the north. As of the 1970s, it is also possible to identify the involvement in poppy cultivation of guerrillas and the armed forces, which used it to finance the 'dirty war' in these regions, primarily in the State of Guerrero.<sup>15</sup>

This may partially explain why poppy crops were not the object of intensive public policies of forced eradication during the 20th century or the first part of the 21st century. However, drug control statistics have treated the destruction of poppy crops as a key task, and in some ways a measure of anti-drug efforts by State forces, whether by local or federal police or the armed forces.

However, it was not until 2016 that Mexico first presented, in association with the UN Office on Drugs and Crime (UNODC), an

estimate of poppy crops based on satellite imagery, aerial photographs and historical records of crop destruction. The report cited cultivation of approximately 25,000 hectares nationwide. As will be seen later, this estimate is important for understanding Mexico's current production capacity.

Mexico has never had a consolidated program of crop substitution or economic development alternatives in poppy-producing communities. These communities continue to be the most marginalized in rural society, geographically and institutionally distanced from the formal State, and they continue to survive thanks to the illegal market for opium gum. In general they live under the oppressive yoke of State police and military forces, or under the aegis of the cartels that control the country's heroin market.

Unlike in Mexico and other traditional poppy producing countries, the history of poppies in



Gathering seeds (photo: Jorge Panchoaga)

**Colombia** is relatively recent. Some suggest that the adoption of poppy cultivation here is due primarily to the circumstances of the national economy and the coffee crisis of the late 1980s and early 1990s. The crisis liberated agricultural labour for a new business introduced by preexisting drug trafficking networks in indigenous territories and areas controlled primarily by the Revolutionary Armed Forces of Colombia (FARC).<sup>16</sup> Another factor affecting the emergence of the poppy and heroin business in Colombia was reduced production in Asia and increased U.S. demand in the early 1990s. Poppy production has been characterized as part of the speculative or boom ‘short-cycle economies’ well-known in what is now Colombia since colonial times.<sup>17</sup>

However, in addition to these external factors, another factor that enabled the rapid adoption and expansion of poppy crops is the existence of vast, sparsely inhabited mountainous regions covered by forests, as well as optimal climatic conditions for cultivation, which spurred a process of colonization in remote areas of the cordillera. The first official reports of opium cultivation by the National Police date back to 1983, when poppy crops were ‘discovered’ in the municipality of San Antonio in the Department of Tolima. It is very possible that crops already existed in other areas of the country at that point. In 1986, the first heroin seizures occurred (2.2 kilos), and laboratories were found in Bogotá and Barranquilla.<sup>18</sup>

It was in the 1990s, however, that Colombia’s poppy boom developed fully. In 1991, the Administrative Department of Security (*Departamento Administrativo de Seguridad* or DAS) reported the existence of 2,500 hectares of poppies nationwide. At the end of that year, the Colombian government announced the destruction of 1,406 hectares, the seizure of 17 kilos of morphine and 30 kilos of opium, and the dismantling of five morphine base laboratories in the city of Neiva, the capital of

the Department of Huila, where most of the opium gum produced in the Colombian Massif region was collected and processed.

In January of 1992, the National Narcotics Council (*Consejo Nacional de Estupefacientes* or CNE) authorized the fumigation of 2,900 hectares of poppies with the herbicide glyphosate. In March of that year, the then Director of the National Police, Rosso José Serrano Cadena, stated that national poppy production was as high as 10,000 hectares. A month later, the figure reported in the media was 20,000 hectares distributed among 17 departments and 113 towns.<sup>19</sup>

With these epidemic figures, Colombia appeared on the map of heroin-producing countries with Latin America’s largest surface area under poppy cultivation. In a very short time, Colombia came to represent 9% of total global poppy production, more than Mexico and Guatemala combined. In 1999, the country was considered a small producer compared to the traditional poppy-growing countries in Asia, but it still held the top spot in the Americas, with nearly 7,500 hectares, representing 2.8% of the world’s total cultivation for that year.

In the year 2000, figures from the Colombian Anti-Drug Police (*Policía Antinarcóticos colombiana* or DIRAN) -- which are used without verification by the UNODC for its annual drug reports -- reported 6,500 hectares of poppies. Since then, reports show a constant decline in crops to a low of 298 in 2013, followed by a rebound to 387 hectares under cultivation in 2014 and to 595 hectares in 2015. In 2016, a new decline is reported, to just 462 hectares. Farmers have provided higher estimates of current production that are difficult to verify.

The methodology used to estimate the size of poppy crops in Colombia is not clear. It is not based on satellite images, as with the monitoring of coca crops, perhaps due

## Poppies in Guatemala

Guatemala is currently the only Central American country with poppy crops. They are located in the western part of the country in several municipalities of the Department of San Marcos, which borders Mexico. According to the annual reports of the U.S. Bureau of International Narcotics and Law Enforcement Affairs (INL), the country is the third-largest poppy producer in the Western hemisphere, behind Mexico and Colombia.

Poppy crops are illegal under national legislation, which, as in other countries in the region, is prohibitionist in nature, although public policy has been limited to forced manual eradication. Curiously, arrests of farmers have been quite rare over the years. Arrests have taken place in the context of illegal drug trafficking, more so than production, the arena in which -- under constant pressure from the U.S. Government -- the Guatemalan State's efforts have historically been focused.

According to a report by the National Commission for the Reform of Drug Policy[1], poppy cultivation in Guatemala dates back to the mid-1970s in the context of the internal armed conflict, which ended with the 1996 Peace Accord. In the same report the Commission identified a basic problem that seriously hinders decision-making about and adoption of policies beyond the forced manual eradication practiced for decades by Guatemala's Interior Ministry with clearly negative results, which is that no reliable data exists on the magnitude of poppy production, a situation that persists today. However, the U.S. Embassy in Guatemala and the State Department's anti-drug division have developed detailed maps. In effect, while the Interior Ministry regularly reports on the existence of thousands of hectares of poppy crops, the INL estimates that the numbers are instead in the hundreds: 220 in 2011, 310 in 2012, 640 in 2014, and 260 in 2015. It notes a sharp increase in its 2016 report, however, to 4,500 hectares (although citing Guatemalan government sources). Today, the opium gum trade in Guatemala's poppy-growing municipalities (particularly in Ixchiguán and Tajumulco) is run by Mexican cartels -- the Sinaloa cartel and Jalisco Nueva Generación -- that also attend to the enormous needs of peasant families in this region, maintaining de facto control over the population. The opium is trafficked to Mexico, and processed heroin is then sent to the United States.

In May of 2017, conflict over the management of the illegal poppy trade led to the declaration of a weeks-long state of siege in Ixchiguán and Tajumulco. [2] This is significant, as it was the first time that the Guatemalan State used this measure to demonstrate the magnitude of the problem. However, although the conflict subsided and the state of siege ended, and even though the Commission Against Addiction and Illegal Drug Trafficking (*Comisión Contra las Adicciones y el Tráfico Ilícito de Drogas* or CCATID) adopted a public policy approach of integral and sustainable alternative development, the problem of illegal poppy cultivation persists. Presumably, the next administration will have to face this issue with greater clarity and decisiveness.

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[1] <http://www.ohchr.org/Documents/HRBodies/HRCouncil/DrugProblem/Guatemala.pdf>

[2] <https://www.plazapublica.com.gt/content/la-amapola-es-un-billete-maldito>

to atmospheric conditions in the poppy cultivation zones (which are located in mountains covered with clouds the majority of the year), the size of the crops or rotation times, among other factors.

According to the 2009 monitoring report on illicit crops, figures on poppies in Colombia are the result of ‘reconnaissance flyovers’ that are ‘carried out two or three times a year in small planes’ from which ‘the observer on board registers the GPS coordinates of the identifiable poppy plots and makes a visual estimate of the area of each one’. The figures are thus very questionable, and it is likely that there is a great deal of underreporting, obscuring the current situation of poppies and their derivatives in Colombia. Given the current advances in remote sensing, it is difficult to attribute the lack of reliable information to technology.

Although the volume of poppy crops and their derivatives appear minor when compared to the spectacular figures for coca and cocaine, poppies have persisted since their arrival in Colombia’s mountainous regions despite of efforts to eradicate and substitute.

In the last 30 years, poppy crops have emerged in regional booms only to disappear rapidly, while in other cases they have been established permanently, for instance in towns in the departments of Nariño, Cauca, Huila and Tolima in the southwestern part of the country (see Annex).<sup>20</sup> There, poppy cultivation and opium gum production have been adopted into the family farming economy as a source of cash income that contributes in different ways, providing livelihoods and local development for farmers and their communities.

In sum, although the history of poppies in Colombia is much more recent than in Mexico, the former has an Illicit Crops Monitoring System that, in the last two decades, has issued an annual official census

of crops, cultivated area and areas eradicated or substituted. Mexico, despite its longer history of cultivation, did not release the first official results of crop monitoring efforts until 2016.

## Cultivation and Production

### From Planting to Gum

In Colombia, as in Mexico, poppy thrives at elevations between 1,700 and 3,000 meters above sea level. It is a crop that requires humidity and cool climates, and, once established, it tolerates adverse climatic conditions such as droughts or nighttime freezes relatively well.

Because it is an illegal crop, poppy is generally found in areas that are difficult to access. The arrival and adoption of poppy in farming communities is linked to pre-existing networks of exchange created by drug trafficking, and, in some cases, also to territorial control by illegal armed groups.

Poppy-growing has been adopted as part of the local peasant economy in traditionally agricultural areas in which the culture of the local population is closely linked to the land. Cultivation techniques for short-duration crops, shifting cultivation, and crop association and rotation are used primarily for subsistence, and any surplus is brought to market. This relationship with the land is reflected in the landscape, system of landholding and agro biodiversity.

For farmers, poppy is a crop originating “outside” their communities. It is not consumed locally because it is stigmatized. Nonetheless, poppy seeds were introduced and their cultivation was adopted because a market existed. In other words, where it persisted the crop was successful because, although it is not consumed by producers, and despite the uncertainty linked to eradication

and price fluctuations, there has always been someone willing to buy the gum, which justifies the risks of cultivation.

### Crop Association and Rotation

Crop association occurs when farmers sow various types of plants on the same plot of land, optimizing the space under cultivation and seeking to obtain several crops simultaneously. In Colombia's poppy-growing regions different types of associations can be seen, such as potatoes-peas (*Solanum tuberosa* and *Pisum sativum*), potato-manioc (*Ullucus tuberosus*), corn (*Zea mays*)-beans (a variety of legumes of the *Fabaceae* family), corn-beans-peas-poppy, poppy-beans and poppy-quinoa (*Chenopodium quinoa*). The primary objective is to provide food for subsistence and obtain some surplus or products for sale, as with opium gum. In the case of Mexico, poppy

crops are mixed with others such as papaya (*Carica papaya*), lentils, corn, pumpkins or various legumes.

In both countries, crop rotation consists of changing the type of plants grown on a plot of land after a harvest. Crops have different durations and meet the needs of farmers according to their agricultural calendar. Crop rotation and what is sown at a given time depends on farmers' decisions and is conditioned by a series of variables such as market demand, their financial ability to take on the crop and a broad knowledge of land use and agro diversity that determines what to plant when.

Although poppy is generally planted in homogeneous fields in order to intensify production where it is most specialized, it can also be sown in gardens alongside peas, corn, beans and quinoa, among others. In the fields,



Gathering latex (photo: Jorge Hernández Tinajero)

poppy crops can be seen in different states of growth (staggered cultivation), which indicates a type of planning in which crop rotation makes it possible to sustain constant production: when one planting is reaching its final phase of production, another will begin to be planted.

## Cultivation and Harvesting Techniques

Poppy seeds are obtained directly from the crops. The bulbs are gathered when the harvesting of latex is complete, and the plants are then dried. The colour of the seeds depends on the colour of the flowers. Farmers recognize that white flowering plants have a greater latex yield and appear to have begun selecting these seeds, which is evident in the colour of the crops.

Various cultivation techniques exist. Generally, broadcast seeding is used, dispersing seeds randomly 'where the land is level', but planting can also be done by scattering seeds into furrows that are dug previously, for example, after a potato harvest. Finally, the cultivation technique depends on the conditions of the land, to which farmers adapt their practices. Nurseries can also be used to germinate seeds in bags that are later transplanted. When broadcast seeding or scattering is used, the weakest plants must be pulled, leaving space for the strongest ones to grow. According to what was observed in the field, on 'level ground', there can be five or six plants per square meter. On sloping ground, the number of plants per square meter can vary depending on the cultivation technique. Before, some say, 'a good plant could have up to a hundred bulbs. Now, a good plant can have between 10 and 20 bulbs to cut'. Not all the bulbs mature, and thus not all can be harvested before the plant dries out and its productive cycle ends.

Poppy crops take about three months to

mature. Harvesting begins when the petals fall off, at which point the bulbs are scored and latex is collected. The harvest lasts approximately a month. The frequency of scoring (twice a day, once daily or every other day) and the amount of time dedicated to collecting the latex depends largely on the form of work and capacity of the farmer, as well as the other complementary activities they carry out to make a living, for example working as a farmhand or as a day labourer on another type of crop. Each bulb can be scored and harvested up to three times (between 9 and 12 scores or cuts in total). Drops of dried opium are visible on bulbs that have been harvested in previous days. Farmers harvest the fresh latex early in the morning before the sun gets too hot. On rainy days, harvesting is difficult because '*la mancha*' (literally, 'the stain' or the latex) runs with the drops of rain and the work is wasted.

## Who Participates

Harvesting poppies is often family work. It requires at least two people: one goes ahead scoring (cutting) and another follows, collecting the latex (gathering). Groups of two to four people, both men and women, can be seen working in a field with some cutting and others gathering. Poppy crops are not always harvested by the person who plants them. A crop may be sold by its 'owner' to another person when harvest time comes, allowing the seller to recover their investment and obtain earnings while the buyer assumes the cost of the harvest and its yield. This is done possibly because the owners of the land or crop are not willing to assume the cost (effort) of the harvest or simply because they are not involved as farmers in that phase of production.

Farmers may also form a type of association known as 'half-labour', a form of production in which two people establish a cooperation

agreement that consists of the owner of the land (or a tenant) and a grower associating to plant one or more crops. In such an arrangement, the owner (or tenant) provides the land, seeds and fertilizer, while the grower provides the manual labour and knowledge regarding how to care for the crop. At the end, they split the profits of the harvest. Such associations occur in different arenas and are very important in the peasant economy.

## Yields

For farmers, crop yield is measured based on the quantity of 'product' (opium) obtained from the harvest and the earnings generated from its sale after production costs. Farmers consider poppy a profitable crop that produces earnings, even with the significant variability in the price of opium. Latex provides cash income in very little time and with little investment.

The amount of opium collected from poppies depends on the number and quality of plants, as well as the management and knowledge of the crop. The climate also affects the yield, as humidity and temperature influence the development of the plants and possibly the quality of the opium derived from them. Growers rely on rain; irrigation practices were not seen in the area observed, with the exception of the plant nurseries, where this technique is indeed practiced.

According to farmers, plants with white flowers yield more latex. In the fields, there is a visible tendency toward the selection of seeds from white flowering plants, although plants with flowers of all colours continue to be grown: red, purple, violet, pink and white.

Another aspect farmers consider with respect to yield is the percentage of alkaloid and the quantity of latex that is required to 'voltiar' (transform) the gum into 'M' (morphine) and

'H' (heroin). No information exists regarding the differences in alkaloid content between plants with different coloured flowers. However, farmers recognize that crops grown at lower altitudes in warmer climates yield more and have a greater alkaloid content than those on higher and colder land. The advantage of higher-altitude land is that it offers greater distance and possibilities to hide the crop, and does not compete with other crops such as coffee.

Poppy is a transitory crop with a productive cycle of four months, which represents three potential harvests per year. The system of crop rotation used in the fields limits the size of poppy crops and prevents monocropping. Farmers have adopted poppy in their model of crop association and rotation under very specific climatic conditions. The amount of any agricultural product planted, harvested (produced) and sold depends on the opportunities available in local markets and communication networks used to facilitate trade and exchange.

According to Colombia's Ministry of the Interior and Justice (2003), it is estimated that one hectare of poppies produces an average harvest of 11 kilos of latex and 0.5 kilos of heroin, figures similar to those seen in Mexico. Based on three potential harvests per year, that is 22 kilos of latex and 1.5 kilos of heroin per hectare. Potential production in Colombia for 2003 was thus 4,153 hectares and approximately 4.1 tons of heroin.

## Estimated Size of Crops in Colombia and Mexico

Estimates of the area dedicated to poppy cultivation in Colombia since 2000 are based on data generated by the Illicit Crops Monitoring and Information System (SIMCI) from satellite images, aerial surveys and field data from the Counternarcotics Office of the National Police.



## From Gum to Heroin

Opium gum is transformed into heroin through two basic steps: raw opium is turned into morphine, from which heroin (diamorphine) is then synthesized. This process is usually carried out through different methods and precursors: first, morphine is acetylated with acetic anhydride or acetyl chloride, and then the raw product of that acetylation is purified by adding activated carbon. Finally, it is filtered and recrystallized using ethanol.

The different processes used to achieve this synthesis result in different types of heroin, the most well-known ones on the market being Black Tar, Brown Sugar or China White, each of which has its own variants. The amount of heroin produced from gum is determined both by the quality of the raw opium and the process used to obtain it.

The market value of opium depends on both the amount of morphine and codeine it contains (which can vary depending on the region in which it was grown) and its degree of humidity: the more moisture, the greater the weight and volume, but the lower the concentration and price. Meanwhile, lower humidity means a higher price and market value.

The amount of heroin derived from opium gum can also vary according to when the former is used: for example, the Ministry of Colombia cites a latex-to-heroin ratio of 22 to 1. This is feasible given that latex is recently harvested opium gum, which implies higher humidity in the product and a lower concentration of morphine. Other sources, however, note an approximate ratio of 12 to 1, which would suggest a process beginning with a drier gum.

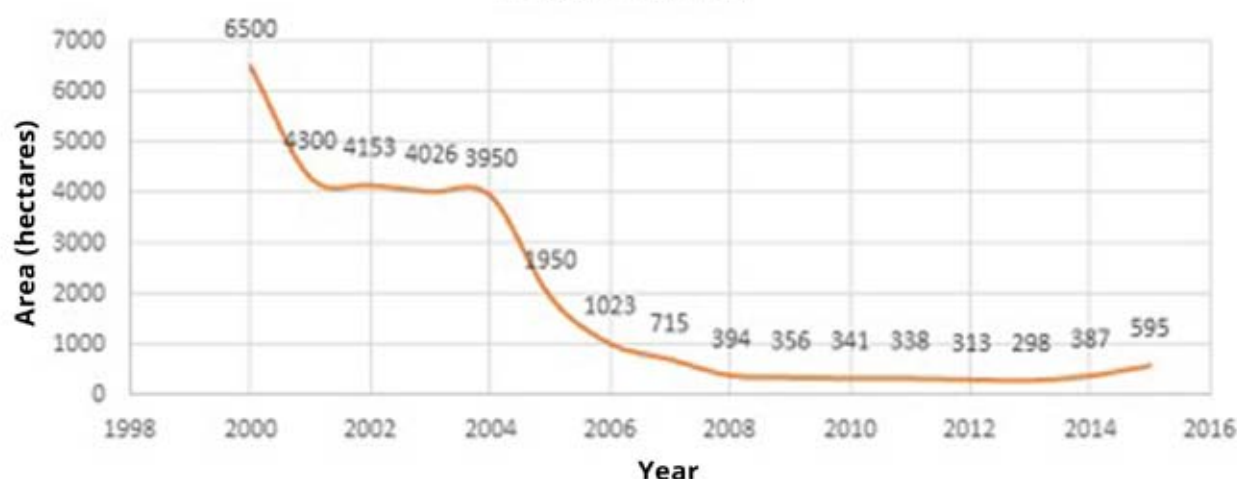
These figures are used in the annual reports of the UNODC and the Colombian Drug Observatory (*Observatorio de Drogas Colombia* or ODC), as well as the Ministry of Defense and drug control agencies. Unlike with coca, spatial data on poppies is not easy to trace, mainly due to the small size of the cultivated plots -- one hectare, in most cases -- and their colour, which make them almost impossible to recognize in practice when they are grown together with other types of plants.

As previously mentioned, the figures show a significant decline in the cultivated area between the years 2000 and 2001 from 6,500 hectares to 4,500 hectares. The data on crops shows production stabilizing at around 4,000 hectares for some years and then beginning a

steady decline in 2004, reaching 394 hectares in 2008. As of that year, the total stabilizes at around 300 hectares until 2015, when a rebound is reported to 595 hectares.

Poppy crops are located mainly in the southwestern area of the country, in the Colombian Massif region (departments of Cauca, Huila, Nariño and Tolima), with occasional areas in the Serranía del Perijá region on the border with Venezuela. According to Table 1, four departments reported poppy cultivation between 2001 and 2014: Nariño, Cauca, Tolima and Huila. In the period covered by the report, cultivation in these departments represented 88% of the total area under poppy cultivation in Colombia, according to official figures.

**Graph 1: Area of Poppy Cultivation in Colombia, 2000-2015**  
(Source: UNODC)



Despite the fact that poppy practically disappeared from reports and news about drugs and illicit crops in Colombia -- perhaps because the figures for poppy seem insignificant compared to those for coca -- it must be said that poppy crops have not disappeared. On the contrary, they have persisted in specific localities in the south of the country since being adopted as part of the family farming economy. Rather than disappearing, what the figures indicate is that

the area under poppy cultivation increased by almost 100% between 2013 and 2015 (from 298 to 595 hectares).

Until 2016, there was no well-founded data with verifiable methodology on the size of opium poppy cultivation in Mexico. In June 2016, however, the UNODC and the Mexican government institutions SEMAR, SEDENA and PGR/AIC-CENAPI issued their first official joint report, entitled 'Mexico: Monitoring of

**Table 1: Area of Poppy Cultivation (in Hectares) Reported in Colombia by Department, 2001-2015 (ODC 2016)**

Year	Nariño	Cauca	Tolima	Huila	Cesar	Guajira	Caquetá	Boyacá	Caldas	Putu-mayo	National Total
2000											6,500
2001	1,699	1,150	687	692	34			11			4,273
2002	1,230	1,155	682	624	454				8		4,153
2003	540	600	1,359	636	651	240					4,026
2004	460.39	450	1,090	1,135	675	35	105				3,950.39
2005	475	538	265	320	152	68	132				1,950
2006	316	448	90	114	3		52				1,023
2007	204	280	170	45	7	2	7				715
2008	24	126	170	45	19	3	7				394
2009	238	100	3	11	2.5						354.5
2010	233.5	92	3.3	12							340.8
2011	229.4	101.9	1.5	4,8							337.6
2012	205	102	1.9	4							312.9
2013	72,7	219.7	1.9	4							298.3
2014	158.6	208.4	4.9	9.5	4.9					0.4	386.7
2015											595

**Table 2: Area of Poppy Cultivation and Eradication in Colombia**

Year	Cultivated area (ha)	Area eradicated through aerial spraying (ha)	Area eradicated manually (ha)
1998			228.36
1999			174
2000	6,500	9,254.4	74.61
2001	4,263	2,267.6	318.66
2002	4,153	3,371.3	213.08
2003	4,026	3,994.19	271.48
2004	3,950	3,060.76	1224.92
2005	1,950	1,623.82	932.11
2006	1,023	231.44	1697.46
2007	715		375.2
2008	394		381.42
2009	355.8		546.15
2010	341		711.77
2011	340.8		294.22
2012	313		320.03
2013	298		513.62
2014	387		813.08
2015	595		613.41
2016			163.26
<b>TOTAL</b>	<b>28,908</b>	<b>23,803.51</b>	<b>9,866.84</b>

Source: Created by the authors

Poppy Crops, 2014-2015'. Based on analysis of aerial and satellite photography of poppy crops, the report estimates a minimum cultivated area in Mexico of 21,500 hectares, an average value of 24,800 hectares and a maximum of 28,100 hectares.

### **Poppies in the Family Farming Economy: Colombia**

Inhabitants of Colombia's poppy-growing regions commonly recall that before the arrival of poppies, the communities were poor, with very marginal subsistence economies in which work was undertaken mainly to obtain food. Some 25 years ago, during the poppy 'bonanza', many farmers had never seen so much cash. Poppy growing was relatively easy work, and buyers paid directly in the field.

This boom arrived quickly, and the towns and communities began to change.

In a first phase, lasting until the early 1990s, poppy growers spent the 'easy' money from opium on alcohol, guns and other goods available in the markets that arrived with the bonanza. This abundance of money and increase in buying power gave rise to different types of alliances between landowners, growers, harvesters and opium buyers, et cetera, and an increase in rivalries between farmers, which in some cases led to violence in the poppy-growing regions. It also became an engine for economic development in the towns. Children stopped going to school to work in the fields and earn their own money, following the example of the adults. This was also the era in which guerrilla groups became stronger, gaining control over the production

## Destruction of poppy crops for the year 2010



Source: UNODC/México, Monitoreo de Cultivos de Amapola 2014-2015, June 2016.

zones and levying a security tax on opium gum farmers and 'M' and 'H' laboratories, although it should be noted that research on the role of the guerrillas in this period has not been exhaustive.

A second phase from the late 1990s to the early 2000s was characterized by State repression of illicit crops. This period saw the arrival of the military, police, helicopters, fumigation airplanes and forced eradications. Farmers began to feel the consequences of the fumigations: their crops were sprayed from the air with glyphosate, which killed not only poppies, but also potatoes, corn, beans and the whole range of crops grown alongside them in their fields. Some have bad memories of the consequences wrought by poppy, considering it something 'that does not bring good things', a 'cursed' plant. Many abandoned the crop, fearing the consequences of eradication, or the threat of jail and dispossession. But

others persisted. On balance, in this era, the booming poppy market caused many deaths and problems, but also brought benefits and progress for those who used the money to improve their homes, buy land or invest in businesses.

The third phase, lasting to the present day, could be described as the stabilization of poppy-growing areas and the adoption of the poppy within the variety of plants grown by farmers. Poppy is considered a complementary source of income with which other agricultural products can hardly compete. Poppy plays several observable roles in the family farming economy:

- It is an alternative source of quick income (cycles of four months between planting and harvesting).
- It is a crop that requires little investment compared with others (labour, inputs).
- The whole family (men and women) can participate in cultivation and harvesting.
- It generates employment and wages.
- There is little financial risk for the grower (although the price of the latex is not constant, there is always a market, and it can be stored easily).

Poppy is a source of income that is difficult to compare with other agricultural products that have longer production cycles. Potato, manioc, peas, beans and corn are grown basically for family and local consumption, with some surplus being traded. Quinoa and achira, in addition to providing food, are also products that have a larger market and represent cash income for farmers, but the average time between planting and harvesting is one year. Cattle and milk are another sector that is very small in the region, even though pasture dominates the landscape, which could indicate a form of accumulation of land. Poppy-growing and the sale of latex play an important role in the development of the

communities that engage in it. In many cases, families invest the earnings of their work with poppies in home improvements, motorcycles, businesses, services and leisure.

Depending on variations in price, a poppy grower can earn between 150,000 and 500,000 Colombian pesos (approximately \$50 to \$180) for a kilo of opium gum. According to the figures commonly cited in the specialized literature on this topic, it takes 22 kilos of gum (valued at \$1,100 to \$3,960) to produce a kilo of heroin. An article on heroin trafficking in the Department of Cauca in the newspaper *El País* states that a kilo of heroin in Colombia can cost between 10 and 16 million pesos (\$3,570 to \$5,700), and that, in the United States, the price can reach \$70,000. With a street value of 10,000 to 30,000 pesos (\$3.50 to \$10) per gram,<sup>21</sup> heroin is not the most popular drug in Colombia, although an estimated 15,000 people in the country inject drugs, primarily heroin. 'Internal consumption in Colombia demonstrates that heroin has been developing established patterns of use in cities such as Medellín, Pereira, Armenia, Cali, Bogotá, Cúcuta and Santander de Quilichao.'<sup>22</sup>

Crop substitution programs -- parallel to forced eradication programs -- have sought to motivate poppy growers to abandon the crop in exchange for 'assistance' with which to finance the start-up of a legal productive project. With the signing of the peace accords between the Colombian Government and the FARC in Havana in 2016, the National Comprehensive Program for the Voluntary Substitution of Illicit Crops (*Programa Nacional Integral de Sustitución Voluntaria de Cultivos Ilícitos* or PNIS) was introduced to combat the historic rise in coca crops in the country, which now cover around 200,000 hectares according to official figures. News of the new program also reached the poppy-growing communities, in some cases through municipal and departmental governments, and in other cases through the Coordinator of

Coca, Poppy and Marijuana (*Coordinadora de Cultivadores de Coca, Amapola y Marihuana* or COCAM). Currently, the National Liberation Army (*Ejército de Liberación Nacional* or ELN) is considered 'the big capo' of heroin in Colombia, controlling the business in the departments of Cauca and Nariño, the country's main poppy producers.<sup>23</sup>

According to on-the-ground observations, the announcement of PNIS and the promise of financial assistance for growers had an immediate effect: both the area used for cultivation and the number of people sowing poppy grew rapidly. If being a poppy grower was the condition for receiving assistance, 'now everyone wants to be in poppies'. Paradoxically, the announcement of the crop substitution program ended up incentivizing cultivation of the crop it sought to replace and generated new challenges for farming communities and their agricultural economy including, among others, land speculation, demographic changes, an increase in the quantity of opium available and conditions of uncertainty. As long as there is a market for poppy, someone will always be willing to grow it.

## Production in Mexico

According to historical records and the most recent estimates,<sup>24</sup> the production relationship of opium gum to heroin is approximately 6% or 17 to 1. Therefore it can be calculated that 255 tons of opium gum are needed to produce 15 tons of pure heroin. Taking into account cultivation estimates from this report and the size of demand for heroin in the United States, there is an apparent correspondence between demand and the approximate heroin production of Mexico, according to the UNODC.<sup>25</sup>

However, all figures regarding cultivated area and the conversion of opium gum into heroin can only be approximations subject to various factors. Despite the fact that the plant has a



relatively short cultivation cycle that would theoretically permit three crops per year on the same land, what is observed on the ground is that poppy-growing communities rotate poppy with other crops, so it may be more appropriate to calculate an average of two crops per year on the same land. Therefore, while there are fields suitable for cultivation during the whole year, they are used in an alternating manner, not continuously.

Another consideration regarding total production has to do with the quality of the gum obtained and the state it is in when it is converted, first into morphine and later into heroin. If the gum is fresher (recently harvested), it has a high water content, and thus its morphine yield is lower, as is its market price.

Finally, it is also necessary to consider the technique or conversion process, which affects

the quality and quantity of the final product.

Taking these factors into account, we use the lower quantity of 11 kilos per hectare per harvest as an average to calculate the projected yield of crops. According to this, to obtain 255 tons of gum, it would be necessary to harvest 23,182 hectares poppies. This would mean that between 8,000 and 24,000 hectares land would have to be committed to poppy, given the possibility of up to three annual cycles. These parameters appear consistent, then, with the conclusions of the study, which suggest a minimum of 21,500 cultivated hectares of poppy and a maximum of 28,100.

However, the same report indicates that, for the same period (2014–2015) the institutions charged with eradicating poppy crops in the country destroyed a total of 24,729 hectares, while the average estimate for total area under poppy cultivation was 24,800 hectares.

That is, Mexican authorities claim to have destroyed 99.68% of all poppy crops nationwide. According to this data, only 71 hectares of all crops detected in that period would remain.

It seems much more likely, then, that the destruction of plants does not significantly affect production due to the practice of crop rotation. In fact, if the total estimated cultivated area is multiplied by three to take rotation into account, it appears that, in one year, a total of 74,700 hectares of poppy crops could be cultivated, and if the 24,729 hectares destroyed are subtracted from the total, some 49,671 hectares would still be produced. This would be enough to satisfy the annual North American demand for heroin.

As explained previously, Mexico has been a poppy producer since the second half of the 19th century. The first states to produce poppies -- Sinaloa, Chihuahua, and Durango -- were gradually joined by others. The historical record indicates that poppy cultivation in Guerrero, for example, began only in the mid- to late 1960s. On the other hand, however, historical documents describe poppy crops being used for food, flowers and medicines in Xochimilco since the late 19th century.

Mexican poppy production has developed alongside demand in the North American

market, at least where poppies are destined for consumption in the form of opium or its derivatives. In Mexico, consumption has been marginal, and although it does exist -- primarily along the northern border -- it is insignificant in comparison to U.S. demand.

Thus, poppy production in Mexico (and Colombia and Guatemala) has grown in recent years as the largest market for heroin -- the United States -- has begun to demand more, a trend that has been widely documented but for which data is inconsistent, as will be explained below.<sup>26</sup>

The foregoing analysis relies on this basic assumption and aims to describe as reasonably as possible the size of U.S. demand for heroin and figures on poppy production in Mexico to satisfy that demand. It also seeks to put in perspective data which is often presented in an isolated or biased manner, and for which it is often impossible to verify the source or methodology used. The purpose of the analysis, in any case, is broad and general.

## The Price of Gum

Various reports estimate that the price per kilo of opium gum paid to producers varies between 11,000 and 22,000 pesos (600 to

### Heroin Consumption in Mexico

No exact data exists on the number of heroin users in Mexico, but according to the ENA 2011, it has remained stable since the 2000s at less than 1% of the population aged 13 years or older. With such a low statistical prevalence, it is not possible to determine even an approximate figure for the number of heroin users in Mexico. Despite this, consumption along the northern border has remained stable for years, and while the incidence of HIV is relatively low, data from 2007 revealed that 96% of IV heroin users had Hepatitis C. On the other hand, for the first time in a long time, in 2016, a group of 14 IV heroin users was detected in Mexico City, all of them from Guerrero.

**Table 3: Prices in Colombia 2001–2006**

Year	Price of raw heroin (USD/kg)	Price of raw opium latex (USD/kg)	Latex yield per cultivated hectare (kg/ha)
2001	No data	No data	No data
2002	No data	194	Between 13 and 17
2003	5,660	156	No data
2004	7,635	164	Between 13 and 17
2005	9,050	230	Between 13 and 17
2006	9,992	251	Between 13 and 17
2007	10,780	286	No data
2008	10,780	318	No data
2009	9,993	358	Nariño 24.6; Serranía de Perijá 18.4; Cauca 12.3; Huila 13.1
2010	10,786	503	Nariño 24,6; Serranía de Perijá 18,4; Cauca 12,3; Huila 13,1
2011	10,348	466	Nariño 16,8; Serranía de Perijá 18,4; Cauca 20,8; Huila 15,3; Tolima 13,1
2012	11,660	634	Nariño 16,8; Serranía de Perijá 18,4; Cauca 20,8; Huila 15,3; Tolima 13,1
2013	9,295	1,112	Nariño 16,8; Serranía de Perijá 18,4; Cauca 20,8; Huila 15,3; Tolima 13,1
2014	7,512	700	Nariño 16,8; Serranía de Perijá 18,4; Cauca 20,8; Huila 15,3; Tolima 13,1
2015	6,432	700	Nariño 16,8; Serranía de Perijá 18,4; Cauca 20,8; Huila 15,3; Tolima 13,1
2016	6,432	700	Nariño 16,8; Serranía de Perijá 18,4; Cauca 20,8; Huila 15,3; Tolima 13,1

Source: Created by the authors

1,200 US\$), depending on the region. To put in perspective the economic advantages opium brings to Mexican producers its profit margin must be compared to that of other, legal agricultural products.

According to information collected directly from poppy growers in southern Colombia in 2016, on average, a poppy crop occupies one square meter and produces approximately 20 bulbs optimal for harvesting. Each bulb

can produce half a gram of latex in total. This means that a crop (one square meter) produces 10 grams of latex.

Using this estimate provided by farmers, it can be said that one hectare (10,000 square meters) produces an average of 100 kilos of latex (a yield of 100 kg/ha). This figure is far above the maximum of 24.6 kg/ha reported by the UNODC for the Department of Nariño in Colombia in 2009 and 2010. Regarding price,



in 2016 growers stated that a gram could cost up to 800 Colombian pesos (\$0.29). Using this maximum value as a reference, the price of a kilo would be some \$289, a value again very different from the \$700 per kilo reported by the UNODC.

The price of opium gum in Mexico depends on the region, demand, time of year, quality and the local buyer, and hence it is very difficult to establish with precision a single average price. According to the testimonies of growers in Guerrero, the price of gum is set by the criminal organization that controls each territory. At the same time, different testimonies reflect variations in price according to the amount of water each plant contains, which depends both on the cultivation technique (for example, letting the bulbs ooze overnight increases the water content because of dew in the morning) and on the time of year in which they are planted. Recent reports from the mountains of Guerrero cite prices ranging from 6,000 pesos per kilo of gum during the rainy season up to 20,000 pesos per kilo in the dry season (\$300 to \$1,000).<sup>27</sup>

In Mexico in 2010, however, the UNODC established an average price per kilo of \$2,027,<sup>28</sup> while the available reports obtained on the ground between 2014 and 2017 range from about \$1,000 to \$1,700 per kilo of gum (in theory, it is cheaper in the south than in the Northern Triangle). These figures could make sense given that a source stated in 2015 that a decade and a half ago, in 2000, a kilo was worth twice what it is now<sup>29</sup> (some \$2,100 to \$2,250 per kilo, adjusted to the exchange rate at the time).

Additionally, it has been possible to verify that, in 2016, prices remained stable -- in Mexican pesos -- despite rapid devaluation of the currency during that whole year, totalling nearly 40%.<sup>30</sup> According to these data, in the period from 2010 to 2015, years of relative economic stability, a kilo of opium gum

sold for between 13,000 and 17,000 pesos in Guerrero (\$1,000 to \$1,250) and up to 22,000 pesos in the region of Sinaloa, Chihuahua and Durango (\$1,500 to \$1,600). If this were the case, then, it could be said that as the supply of opium gum grew in Mexico, prices have adjusted downward to the detriment of the producer, but without affecting the volume available in the market.

In any case, it is worth pointing out that, for the producer, even when prices are not always what is expected, the product is relatively durable and easy to store, while a sale is guaranteed at some point and signifies cash income.

## Mexican and Colombian heroin on the US market

Martin Jelsma<sup>31</sup>

The US heroin market has gone through many changes in the past century, with several epidemics and shifting sources of supply. Turkey and Southeast Asia were major players in the past, but since the mid-1990s, Latin American heroin has dominated the illicit market, roughly divided between white powder heroin produced in Colombia primarily consumed east of the Mississippi River, and black tar or brown powder coming from Mexico in the west. Now the US Drug Enforcement Administration (DEA) claims that Mexican traffickers have largely pushed Colombian heroin out of the eastern market. For 2015, the DEA Heroin Signature Program (HSP) analysis of wholesale seizures attributed 93 per cent to Mexican origin, and according to the DEA Heroin Domestic Monitoring Program (HDMP) of retail street purchases, Colombian heroin had virtually disappeared in eastern cities.<sup>32</sup> This dramatic shift would correspond with US estimates that Mexican heroin production tripled between 2013 and 2016 from 26 to 81 metric tons, with cultivation reaching a record of 32,000 hectares in 2016; while poppy cultivation in Colombia for 2015 was estimated at around 1,000 hectares with a potential production of only 3 metric tons of heroin.<sup>33</sup> The reliability of these data, however, is contentious, especially regarding Colombian production estimates and the methodology used to identify geographical source of white heroin since Mexican organisations started using similar refining techniques as those used in Colombian labs.

### Shifting supply sources

There have been a number of episodes of sharp increases in opioid use in the US, the first such epidemic shortly after the Civil War (1861-1865) when many wounded soldiers

Oozing poppy bulbs (photo Guillermo Ospina)

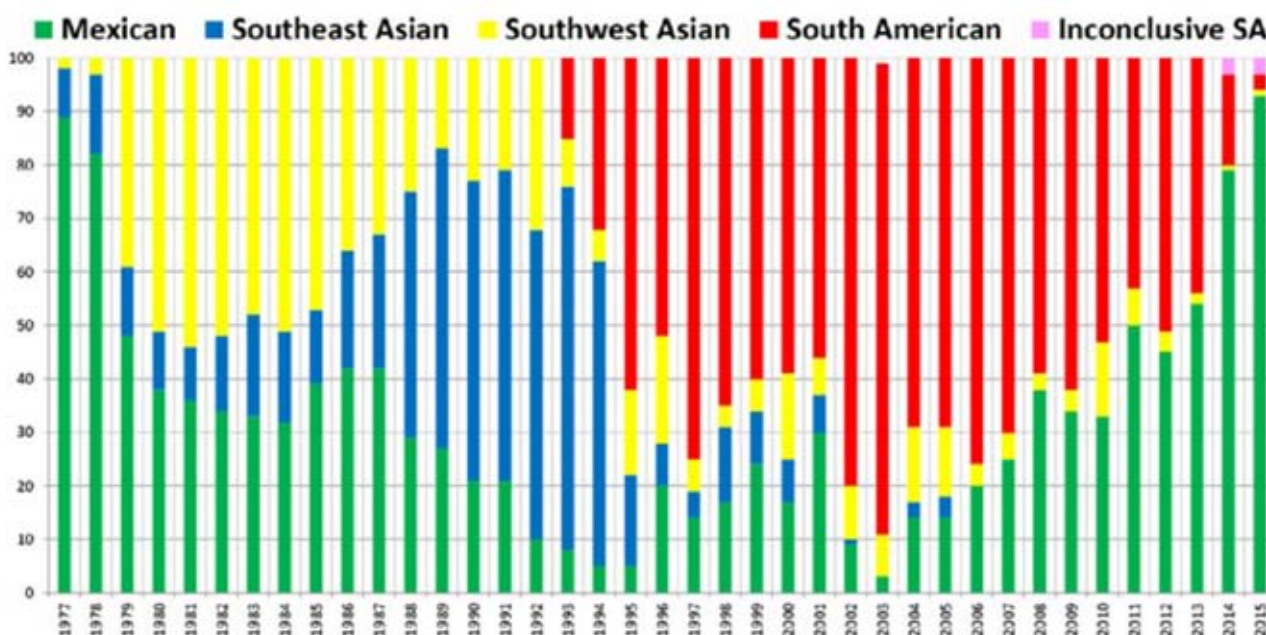


had become dependent on morphine, many opiate-based medicines were freely available, and the “soldier’s disease” spread across society. Immediately after World War II some cities, like Chicago and New York, experienced a heroin epidemic among black communities and the jazz and Beat subcultures, which peaked in 1949 and then started to level off.<sup>34</sup> The next heroin epidemic occurred in the late sixties, reaching “crisis proportions” in only a few years, leading President Nixon in 1971 to declare the “war on drugs”. A special Cabinet Committee on International Narcotics Control chaired by Henry Kissinger was given the task of “curtailing and eventually eliminating the flow of illegal narcotics and dangerous drugs into the United States from abroad”.<sup>35</sup> And in 1973 Nixon established the Drug Enforcement Administration (DEA) to unite all law enforcement agencies for an “all-out, global war on the drug menace” and to “fight it with all of the resources at our command”.<sup>36</sup>

Nixon’s campaign is an illustration of how the US has either misjudged, ignored or misrepresented—perhaps intentionally—the trends of shifting sources of heroin. Historically American politicians have sought

to externalize the causes of drug problems focusing on “the other” rather than dealing with them as a domestic issue. At the time, Turkey was the predominant source for the US market and became the first target of supply reduction efforts. Increasingly aggressive US pressure and threats of sanctions led the Turkish military-backed government to fully ban poppy cultivation at the end of 1971.<sup>37</sup> The opium prohibition had dramatic consequences for many farmers and created, according to Turkish authorities, “a potentially dangerous social resentment ... among the people affected by the ban.”<sup>38</sup> Hence in 1974 the recently elected government under Prime Minister Bülent Ecevit partially repealed the ban and poppy cultivation for medicinal purposes was re-initiated on a large scale under a licensing system. The harvesting of opium, however, remained prohibited; farmers were only allowed to sell the poppy straw to a state monopoly for extraction of the alkaloids, successfully thwarting leakage to the illicit market.<sup>39</sup> Diversion of Turkish morphine base to the illicit market had already been decreasing significantly before the 1971 ban, due to the introduction of stricter state

**Graph 2. Source of Origin for the United States Wholesale-Level Heroin Seizures, 1977 - 2015.**



Source: DEA

controls as required by the 1961 UN Single Convention on Narcotic Drugs.<sup>40</sup> Dismantling in the early seventies of the Marseille trafficking ring, known as the French Connection, further disrupted the Turkey-France-North America heroin supply route. Against this background, a major shift in the supply sources for the US heroin market took place in the early seventies.

Intelligence gathered for Nixon's Cabinet Committee tried to monitor those market shifts to define new priority target countries. According to a 1972 situation analysis, Southeast Asia constituted a significant, but not primary problem:<sup>41</sup>

The remote Golden Triangle area of northern Thailand, western Laos and eastern Burma, constitutes the world's major producing area for illicit opium (an estimated 700 tons). The vast majority of that opium is consumed in Southeast Asia by the hill tribesmen who cultivate it, and by ethnic Chinese living in urban centers of Asia, particularly Hong Kong. A very small percentage of this opium is transformed into heroin and much of this, too, is consumed by users in Southeast Asia. Some of the heroin which formerly supplied our troops in Vietnam is now being directed towards addicts in this country, but our best estimates are that only a small share -- probably less than 10 percent -- of the heroin flowing to our shores now originates in Southeast Asia.

A memorandum prepared for the Committee a year later stated that “[t]he opium ban in Turkey is effective to the best of our knowledge. Nonetheless, stockpiles of illicit Turkish opium are still the base for close to half of all U.S. heroin. ... An extreme shortage of morphine base is reported in Marseille. ... As pressure on traditional Near East routes increases, Pakistan becomes an increasingly likely target for major traffickers. ... Afghanistan is a major producer of illicit opium. Much evidence of international trafficking is available, but ties to U.S. heroin markets are not yet established.”<sup>42</sup> For the Committee, Mexico became “the top priority country” in 1973 since “DEA reports that 38 percent of FY 73 heroin seized in the United States was of Mexican origin, up from eight percent in FY 72.” According to the DEA,

“Mexico emerged as a prominent source of heroin to the United States in 1974, when growers stepped up production to fill the void left by the suppression of heroin supplies from Turkey”.<sup>43</sup> Based on “analysis of selected seizures” in 1975, the DEA even claimed that Mexico had become the source of 89 percent of the heroin in the US, though the reliability of those estimates was already questioned at the time and was probably overstated.<sup>44</sup>

According to the staff coordinator of the Cabinet Committee, Walter Minnick, in a 1975 Senate hearing, “the figure that was popularly bantered around in those days was that 80 percent of American heroin

originated in Turkey. It was never a hard figure.”<sup>45</sup> Senator Bayh felt the Senate had been deceived. “I had been led to believe that the Turkish poppy ban was a major part of our effort to defeat heroin addiction. I am sure the Senate would never have resorted—almost violently as they did—to cut off all aid to Turkey if they did not stop growing the poppies, if we had not been lead to believe that this was an indispensable ingredient to cut heroin traffic and addiction.” Walter Minnick acknowledged, “It was, perhaps oversold in the press as being a panacea, and for that we probably share some responsibility and blame. ... There is no question that the Turkish ban is not a solution. It was never conceived as being a solution. It was disruption, a short-term disruption. ... We figured that they

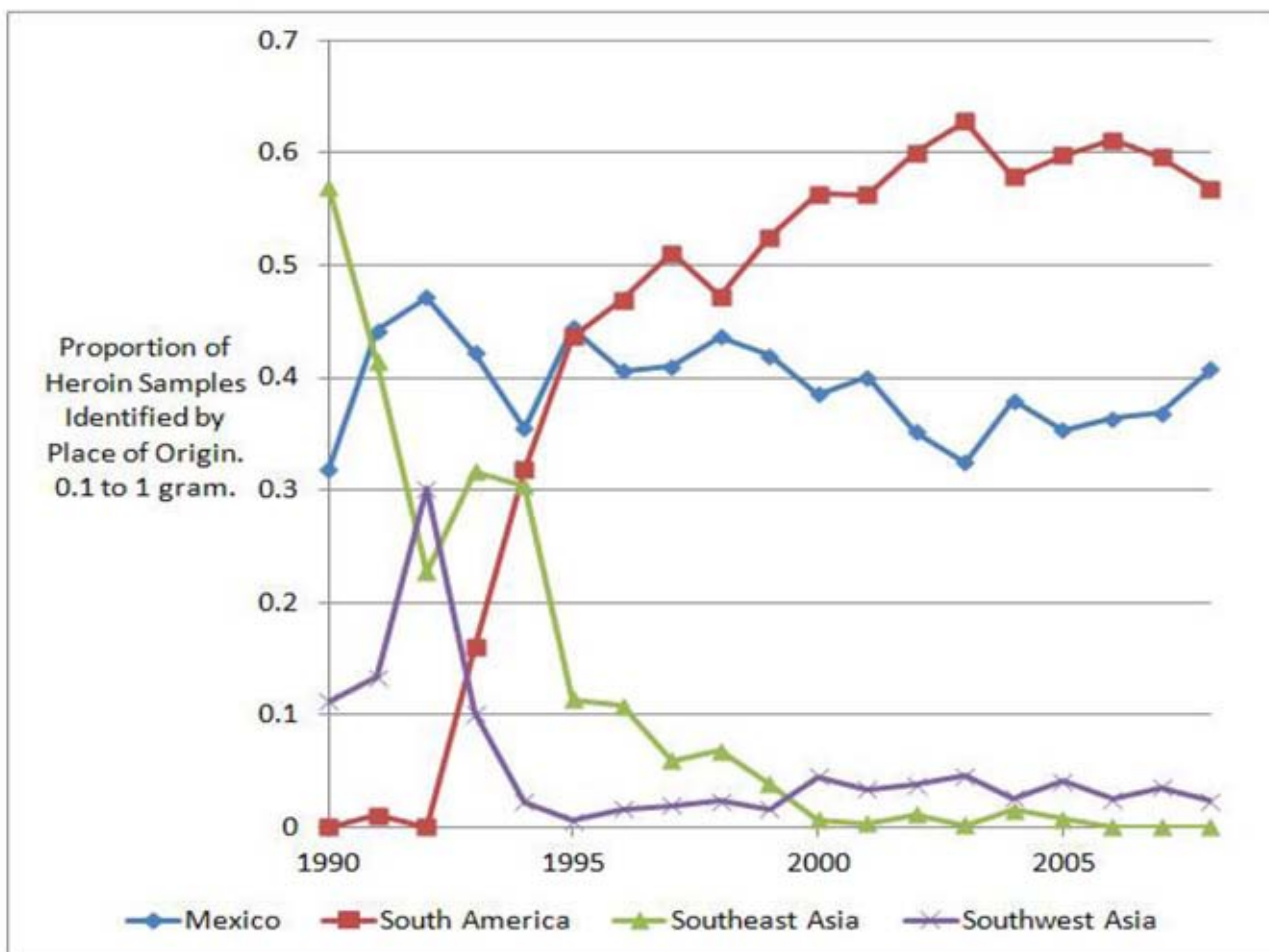
would probably be heading toward Southeast Asia.”<sup>46</sup>

In fact, over the following two decades, Mexican, Southwest and Southeast Asian sources all competed over market shares. Subsequently, from the mid-1990s onwards the Asian-sourced market share in the eastern US for white heroin hydrochloride (“Number 4” or “China white”) was gradually taken over by cheaper and purer Colombian white heroin. Analysis of the 1990-2008 data from the STRIDE database, combining all available information from police seizures and arrests and DEA signature and monitor programmes, concluded that “[b]y the 2000s, Colombian-sourced heroin had become a monopoly on the east coast and Mexican-sourced heroin a monopoly on the west coast with competition between the two in the middle”.<sup>47</sup>

## The current opioid epidemic

Aggressive marketing of pharmaceutical painkillers including deliberate misrepresentation, claiming low risk of addiction, to increase sales, particularly of OxyContin introduced by Purdue Pharma in 1996,<sup>48</sup> “made large quantities of oxycodone hydrochloride readily available for inhalation and intravenous injection”.<sup>49</sup> This was a major contributing factor triggering the latest opioid epidemic reaching alarming proportions, the end of which is not yet in sight.<sup>50</sup> According to the National Institute on Drug Abuse, in total more than 64,000 Americans died from drug overdoses in 2016 (an average of 175 per day); more than 20,000 were related to the fentanyl-type synthetic opioids, more than 15,000 related to heroin and more than 14,000 related to other

**Graph 3. Change in heroin supplier regions from 1990 - 2008.**



Data Source: STRIDE Database

pharmaceutical opioids.<sup>51</sup> By 2010, an abuse-deterrent reformulation of OxyContin was introduced and control efforts had become modestly successful in reducing the diversion of prescribed opioids to the black market. Heroin overdose deaths, however, by 2015 had increased “at an alarming rate having almost tripled since 2010” when black market prices of prescription opioids increased: “For some time now, law enforcement agencies across the country have been specifically reporting an increase in heroin use by those who began using prescription opioids non-medically”.<sup>52</sup> “Those already dependent on prescription opioids were faced with a dilemma: find more money to buy harder to find and more expensive prescription opioids, or find a cheaper alternative. For many, the solution was a transition to heroin”.<sup>53</sup> A survey at the end of 2013 among heroin-dependent patients in treatment centres showed that “nearly everyone (94%) indicated that they used heroin because prescription opioids were

far more expensive and harder to obtain”.<sup>54</sup> This recently sharply rising heroin demand, according to the DEA, has been almost exclusively supplied from Mexico, where especially the Sinaloa Cartel started around 2014 to use Colombian refinement techniques to produce white powder heroin, gradually pushing the Colombians out of the eastern US market.<sup>55</sup>

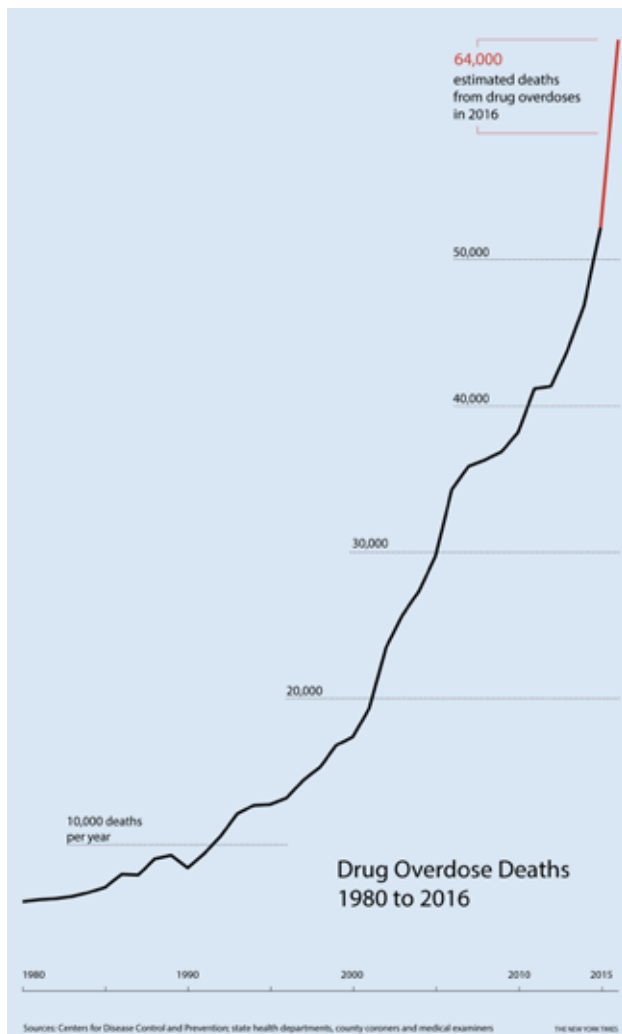
### The INCs and UNKs of the DEA figures

Heroin comes from different sources and in different types, reflecting differences in refinement techniques and use patterns and preferences: “Southeast Asian heroin is stereotypically white, powdered, highly water soluble and acidic; Southwest Asian heroin is typically a brown coarse powder with poor water solubility (until acidified from its basic form by the addition of an acid) and good heat



Opiates and opioids (photo: author unknown)

Graph 4. Drug Overdose Deaths 1980 to 2016



stability; Colombian heroin is off-white to light brown, powdered and acidic with good water solubility; Mexican heroin is dark brown to black, solid, vaporisable, of lower purity and despite its acidity, requires heat to go into aqueous solution.”<sup>56</sup>

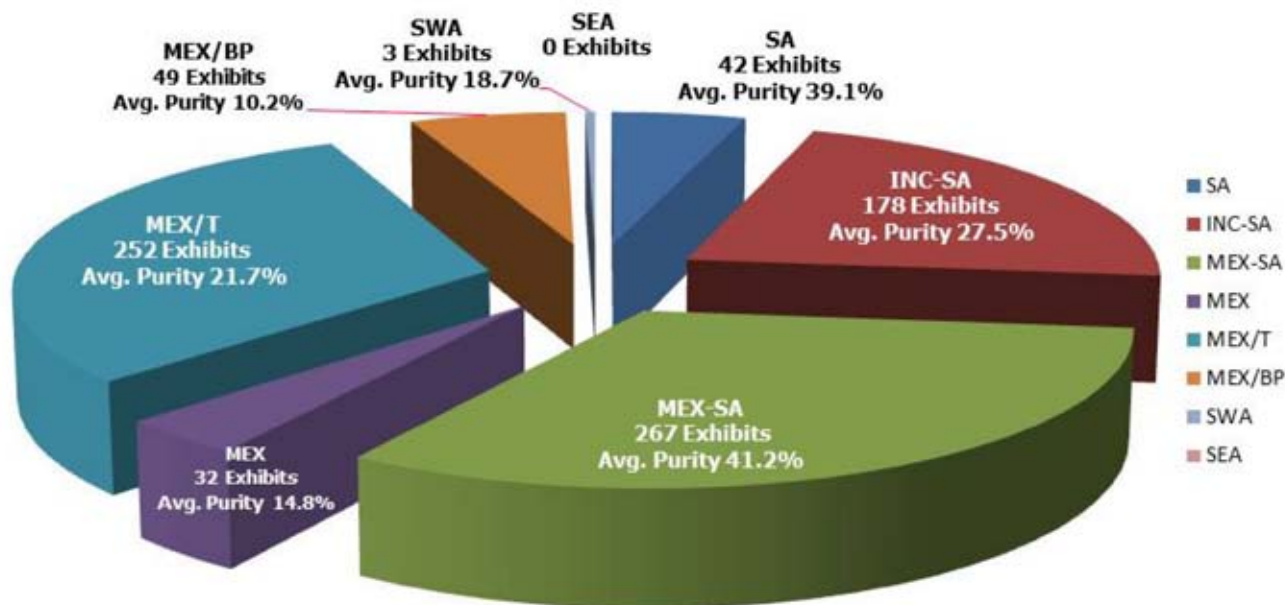
The DEA uses various signatures to identify heroin types and sources. Originally the main categories have been: *Southeast Asian* (SEA), *Southwest Asian* (SWA), *South American* (SA), *Mexican-Black Tar* (MEX/T) and *Mexican-Brown Powder* (MEX/BP). Four additional signatures, however, indicate that it is not always easy to identify source or type and that processing techniques have changed over time. A number of test samples simply could not be identified at all and end up in the database as *Unknown* (UNK), and a number of street purchases “do not include a sufficient

amount [of heroin] to allow for geographic signature classification” and therefore do not count as “qualified samples” and are excluded from the analysis.<sup>57</sup> Also, “refined or crudely manufactured heroin from Mexico that does not fit in one of the other Mexican signature categories” is classified as *Mexican* (MEX).<sup>58</sup> Further confusion was caused when Mexican traffickers started around 2014 using Colombian processing techniques to produce white heroin, which led the DEA to introduce two additional categories: *Mexican-South American* (MEX-SA), a “signature for Mexican white powder heroin, indicating Mexican-origin with South American processing methods”, and *Inconclusive Origin-South American* (INC-SA), “which is assigned to heroin where either Mexico or South America could be the origin, but is produced or refined using South American processing methods”.<sup>59</sup>

The newly introduced signatures raise questions about potential blurred lines between the MEX, MEX-SA, SA and INC-SA categories. The Mexican labs refining white heroin use processing techniques copied from Colombia, so if Colombian morphine base would be refined into heroin in Mexican labs, for example, or finished Colombian heroin is trafficked through Mexican channels, would those be classified as SA, MEX-SA or INC-SA? Does the *Inconclusive Origin* category really capture all the unknowns regarding source country determination or could there be more confusion between overlapping categories?

Also, figures based on the HDMP street purchases (see pie chart) are often confused with those from HSP ports of entry seizures, while the DEA acknowledges that “the source area proportions reported through the HSP should not be characterized as market share. Fluctuations from year to year in source area proportions may reflect shifting law enforcement priorities, changes in trafficking patterns, or exceptionally large seizures that could boost the HSP representation of a particular source area”.<sup>60</sup> The assertion

Graph 5. Heroin Exhibits: Origins and Purities



Source: DEA, 2015 Heroin Domestic Monitor Program

that “more than 90% of heroin on the US market nowadays comes from Mexico”, widely repeated in recent media reports and political debates, is based on HSP test results of seizures in 2015 which showed that 93 percent (by weight) was of Mexican origin and that Colombian and “inconclusive” heroin each accounted for only 3 percent, but—as the DEA clarified—those figures cannot be interpreted as market shares.<sup>61</sup> The HDMP program, designed to estimate market shares, showed for the same year 73 percent for Mexico (600 out of the total 823 street purchases),<sup>62</sup> illustrating the difference in results between the two data sets, and adding to the doubts regarding possible blurred signature categories that apply equally to both programmes.

### The production paradox

Additional questions arise when comparing over time the DEA market share figures for Mexico and Colombia with estimated production levels in the source countries.

The recent DEA picture seems to correspond with US estimates that Mexican heroin production tripled between 2013 and 2016, with cultivation reaching a record 32,000 hectares in 2016, while poppy cultivation in Colombia for 2015 was estimated at around 1,000 hectares. In previous years, however, there is an unexplained mismatch, casting doubts about the methods used to calculate these estimates. For example, both the HSP and HDMP data show that Colombian heroin was the primary source for the US market from 1995, holding a near monopoly in the eastern part of the country until 2015, when—according to the DEA—Mexican white took over. US cultivation estimates for Colombia, however, show stable figures of 6–7,500 hectares for the second half of the 1990s, but a sharp decline to levels around 1,000 hectares as early as 2009.<sup>63</sup> This sharp drop in Colombian production estimates is nowhere reflected in DEA test results of seizures or purchases until 2015. A 2014 study by the Rand Corporation also pointed out this paradox: “If Colombian production has collapsed and Mexican production has soared, how is it possible that both HSP and DMP continue to



show roughly the same share of purchased heroin coming from the two countries”.<sup>64</sup> There are different potential explanations for this inconsistency: either the DEA data collection of both the HSP and HDMP are statistically biased and unrepresentative; or the forensic signature testing techniques are inadequate; or the methodology used by the US to estimate cultivation based on analysis of satellite pictures grossly underestimates Colombian production. And if those figures didn't add up then, what does that say about the reliability of the picture presented by the DEA today?

UNODC and the Mexican government published in 2016 for the first time their own estimates, estimating poppy cultivation in the period July 2014 to June 2015 between 21,500-28,100 hectares,<sup>65</sup> confirming the high production levels in Mexico reported by the US. A similar verification of the low

estimates for Colombian opium cultivation does not exist. The very low figures mentioned in UNODC/Colombia cultivation monitoring reports (between 400-600 hectares for 2014-2016) are based on visual sightings by the Colombia Anti-Narcotics Police (DIRAN) during occasional over flights in some areas; UNODC does not monitor poppy cultivation in Colombia.<sup>66</sup> Poppy farmers, themselves, have mentioned that levels of cultivation could be much higher than the US and DIRAN figures. The reality is that there are no reliable estimates for Colombia.

Another unexplained issue is the separation between the US and Canadian heroin markets: “More than 90 percent of all heroin consumed in the US is of Mexican origin”, said William Brownfield, US Assistant Secretary for Drugs and Law Enforcement in 2017, while “in Canada more than 90 percent of the heroin consumed is of Afghan

Pharmaceutical opiate products (Photo: author unknown)



## Types of Heroin

Different processes are used for different products.

- There are basically three processes or techniques for converting opium into heroin. Each type of heroin has specific characteristics.
- These characteristics may be important indicators of:
  - Its origins
  - Its presence and value in the market
  - Predominant routes of administration

Type	Routes of administration	Source	Notes
<b>Black Tar</b>	Smoking / Injection	Mexico	The distinctive--and, until recently, only--type of heroin from Mexico. Recent indications suggest, however, that China White is also being produced in the State of Guerrero.
<b>China White</b>	Inhalation / Injection	Southeast Asia / Colombia / Mexico?	In the United States at least, the form of heroin that is most sought after and seen as the highest quality.
<b>Brown Sugar</b>	Inhalation / Injection	Afghanistan	Rare in North American markets.

origin”.<sup>67</sup> Given the long porous border, it raises the question why there is not more interaction between the US and Canadian heroin markets. Market logic would predict that the cheaper product in terms of purity-to-cost-ratio would move from one country to the other: hence either more Mexican and/or Colombia heroin should be moving into Canada or more Afghan heroin should be moving across the border into the US. What are the reasons that could explain this apparently almost absolute segmentation of the two neighbouring markets? US Special Inspector General for Afghanistan Reconstruction John Sopko raised that question, saying he believed that the Afghan heroin presence on the US market is higher

than the 1 percent still cited by the DEA and that some of it is coming into the US via Canada.<sup>68</sup>

In the past most Afghan-sourced heroin appeared on international markets in the form of brown heroin base, but since 2009 more and more white heroin hydrochloride from Afghanistan has been entering the European and Canadian markets. Given the sharp increase in demand in the US, market logic would predict the same pattern in the US as well. The DEA, however, claims “a 95 percent confidence level with four independent signature methods” and maintains that Afghan heroin “has a unique chemical signature that displays no similarities to

the chemical signatures of the heroin types produced in either South America or Mexico. Due to the distinct signature differences, it is not possible to misclassify SWA heroin as either South American or Mexican origin”.<sup>69</sup> In 2017 the DEA concluded: “Record levels of opium and heroin production in Afghanistan have not led to a corresponding rise in SWA heroin availability in the United States. Based on DEA reporting and seizure data, SWA heroin is not shipped to the United States in the bulk (wholesale) quantities needed to sufficiently challenge or supplant well-entrenched Mexican heroin distribution networks. ... Until SWA trafficking networks can ensure a consistent flow of high-purity, competitively priced heroin while simultaneously expanding their U.S. distribution networks, it is unlikely that SWA heroin will significantly increase its presence in the United States in the near term.”<sup>70</sup>

## Externalizing the threat

Over the decades the global illicit opiates market has developed into regionally segmented markets: (1) Burmese opium and heroin today is almost entirely consumed in the Southeast Asia-Pacific region, China, New Zealand and Australia; (2) Afghan production almost fully sources Southwest and Central Asia, Russia and the whole European continent; and (3) Latin America supplies the US. Valid questions remain unanswered about the DEA methodology and estimates, especially about the shifting balance between Mexican and Colombian heroin on the market, but the overall trends are clear. The market has shown its ability to adapt and the US over time has been supplied from different source countries, casting doubt about the effectiveness of supply-reduction efforts abroad.

The US has always tended to externalize the threat, blaming source countries— from Turkey to Mexico, Colombia and

Afghanistan—for its domestic opioid epidemics and drug-related problems. “An astonishing 90% of the heroin in America comes from south of the border where we will be building a wall, which will greatly help in this problem,” said Trump recently.<sup>71</sup> The latest act in the US counternarcotics theatre is a military bombing campaign against heroin labs in Afghanistan, declaring that “the gloves are off”.<sup>72</sup> As history shows, such interdiction operations do not solve the crisis of overdose deaths at home. Many lessons can be learned from elsewhere about stemming opioid epidemics and reducing numbers of overdose deaths through a comprehensive set of harm reduction measures.<sup>73</sup> Ultimately the US government and society at large will need to address the domestic causes behind the opioid crisis: social inequality and exclusion, criminalisation of drug users, and a pharmaceutical industry gone out of control, rather than blaming narcos and poppy farmers abroad.

## Conclusions and Recommendations

- Poppy cultivation in Mexico, and, to a lesser extent, Colombia and Guatemala, expanded during the last decade, following the trend in the illegal heroin market in the United States, although official data from drug control organisations are not very reliable, lack clarity with regard to the methodologies used (especially in the case of Colombia), and have often demonstrated contradictions and incoherencies.
- Poppy cultivation and opium extraction were adopted decades ago by farming communities in the mountains of Mexico and Colombia, and the practice persists despite its illegality and constant efforts at eradication. It is a complementary activity in the family farming economy, providing a source of income that is alternated with food production, manufacturing and local trade to sustain economies that are, in many cases, precarious.
- Government policies for the control of illicit drug crops in Mexico and Colombia have consisted exclusively of forced eradication, whether manual, by police and military forces, or through aerial spraying with chemicals. In both cases, these strategies are ineffective and counterproductive as they cause the displacement of cultivation to other, more remote areas and harm the affected communities.
- The U.S. government should recognize the underlying causes of its opiates/opioid crisis which involves an unprecedented number of heroin and fentanyl overdoses. These causes are internal and not the result of the growing flow of heroin from Latin America. In fact, the United States should assume a certain amount of responsibility for the fact that structural failures in public health and control of the pharmaceutical industry have stimulated illegal drug production in Latin America to satisfy growing

demand. In no way can farmers in Mexico, Colombia and Guatemala be blamed for the dramatic increase in opioid overdose deaths.

- Nor can farmers that grow poppies be criminalized for cultivating the plant for subsistence: few real options exist for substituting poppies with alternative crops due to the high price opium currently commands in the market, which is a result of increased demand. Meanwhile, the areas where crops exist are isolated, with little infrastructure and virtually no state presence or assistance. In the case of Colombia, the National Comprehensive Program for the Voluntary Substitution of Illicit Crops (PNIS) created in the context of the peace process never included poppy growers, and to date has focused exclusively on coca crops.
- The often-mentioned option of redirecting illicit opium production to legal, medicinal uses seems interesting. However, it poses a series of obstacles and dilemmas that are not easy to overcome in the short term. Most importantly, the high prices paid to producers in the current illicit market would be difficult to match with an economic, competitive programme for licit production of medicines. The conversion of illicit production into licit production would not only depreciate farmers' product, but would also be unviable in the international pharmaceutical industry. Meanwhile, demand for heroin for the illegal market, which would compete with production for licit purposes, would continue. Hence, it is difficult to argue that this would provide an economical solution to the scarcity of opiates for medicinal ends, or significantly reduce the illegal heroin market. Even so, the option deserves further study as a short-term alternative for certain communities that currently depend on illicit cultivation, given the absence of other viable options for alternative development and the inefficiency and deleterious consequences of forced eradication.

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Poppy cultivation in Mexico and Colombia is part of a local economy geared almost exclusively toward the illegal market abroad: demand for heroin, primarily in the United States. North America is currently experiencing a major humanitarian crisis with regard to the consumption of heroin and opioids circulating in that market. Policies for the control of illicit crops in Mexico and Colombia have consisted exclusively of forced eradication, causing the displacement of crops to more remote areas, the criminalization of growers and harm in the affected communities.

To understand the dynamics of this market and evaluate whether political responses to the phenomenon are appropriate and effective, we present this study on opium cultivation in Mexico and Colombia, which, together with Guatemala, are Latin America's three poppy-producing countries. The report also includes an analysis of the geographic sources of heroin in the U.S. market. As the U.S. government tends to look toward producer countries to explain the causes of the emergency situation in its own country, it is important to consider the problem from broader and more inclusive perspectives.



The Transnational Institute (TNI) is an international research and advocacy institute committed to building a just, democratic and sustainable world. Founded in 1974 as a network of 'activist scholars', TNI continues to be a unique nexus between social movements, engaged scholars and policy makers.

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TNI's Drugs & Democracy programme analyses drug policies and trends in the illicit drugs market. TNI examines the underlying causes of drug production and consumption and the impacts of current drug policies on conflict, development, and democracy. The programme facilitates dialogue and advocates evidence-based policies, guided by principles of harm reduction and human rights for users and producers.

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