

Environmental Consequences of Drug Production: Hidden responsibility of consumers

By Walter Kegö and Aissata Maiga

Abstract: One of the hidden yet significant aspects of the production of drugs is undoubtedly the huge environmental destruction that it causes. Drug production and trafficking are linked to large-scale and rapid deforestation, soil, air and water pollution, and the destruction of biodiversity worldwide – the consequences of which are largely underrated. While the destruction spans a global level, the information at our disposal is scarce. International agencies such as EUROPOL, INTERPOL, and UNODC are only just beginning to look into the problem in cooperation with some national governments and with the support of environmental organizations. Yet, research as well as political attention has so far been insufficient to fully grasp and counter what is a worrying trend.

The impact of drug trafficking and production on civil society in terms of health and criminality has been addressed by political bodies and law enforcement with varying success. A global threat that has not been previously considered, and which is not assessed properly, is the environmental damage caused by drug production and trafficking. This article will try to expose some of the current and short-term consequences; while the long-term consequences, mainly mutagenic effects, are yet to be fully understood.

Drug trafficking causes air, water, and soil pollution through, among other things, deforestation, extensive use of pesticides and fertilizers, chemical waste, and increased energy use. In Colombia and Afghanistan, forests are destroyed to plant coca and opium fields. In the US, traffickers burn down national parks to grow marijuana. Large amounts of chemicals resulting from Amphetamine Type Stimulants (ATS), namely methamphetamine, ecstasy and synthetic drugs are released into nature. Individuals, and especially law enforcement officers, who are confronted with chemicals on a daily basis might suffer from carcinogenic, mutagenic and teratogenic effects (effects on the fetus). This article summarizes information received from international agencies such as INTERPOL, EUROPOL and the UNODC, environmental organizations (WWF Sweden) as well as open sources. Exposing and estimating the costs and the magnitude of environmental destruction linked to drugs are critical to promote research, awareness and political engagement.

For the sake of consistency, and as noted by environmental organizations, it should be noted that so-called “legal” non-sustainable land use practices and pollution, such as the pharmaceutical industry or transportation, are the main source of environmental damage worldwide. Yet, hidden and illegal pollution is growing consistently. To date, there are no precise figures to allow a clear comparison and analysis between both types of environmental destruction. Louise Carlsson, biologist at WWF Sweden, stresses that “legal” exploitation conceals the fact that many of the so-called official permits are obtained through corruption practices.¹

Nevertheless, it is clear that the extent of “illegal” damage such as that caused by drugs is underrated. Members of criminal organizations are seldom prosecuted for environmental crimes, due to high cost proceedings and the low priority assigned to such; whereas trafficking in human beings, drug, criminal organizations and especially terrorism charges yield greater sentences.² Also, there is a lack of research in this area which hinders effective prosecution. As a result, environmental crime flourishes and remains a high profit/low risk area.

One line of cocaine destroys one square meter of rain forest

The most obvious environmental effect of coca and opium poppy cultivation is the clearance of rain forests. The WWF estimates that an area corresponding to one fourth of the total area of Sweden is disappearing each year. Furthermore, the WWF estimates that 50% of this destruction is linked to illegal exploitation. Although it is very difficult to find reliable information on the magnitude of deforestation specifically linked to illicit drug crops, some of the studies provided by the UNODC

¹ Radioforecast: <http://sverigesradio.se/sida/avsnitt/288024?programid=2024>

² http://www.gla.ac.uk/media/media_200448_en.pdf

suggest that in Peru 2.5 million hectares of Amazonian forest have been destroyed in order to grow illicit coca crops³; while EUROPOL states that 25% of all deforestation in Peru is associated with the planting of coca bushes. In the Andean region of Peru, Bolivia and Colombia, it is estimated that more than one million hectares of native forest have been eliminated over the past 20 years. This is roughly the area covered by a country like El Salvador or Slovenia.

One hectare of coca field produces only 7.4 kg of cocaine per year; and one field suffices only for three or four cycles. When the fertility of the soil has decreased to a level where the crop production is low, drug traffickers increase the field area by deforestation to further supply the high global demand for drugs. The report on the “Drug Problem in the Americas” estimated that for each hectare of coca leaves, four hectares of forest are cut down, almost always through slash-and-burn practices⁴. The latter is the most common method of preparing soil for cultivation. It is further the major source of air pollution in areas of rainforest, the burning of which results in high emissions of greenhouse gases (methane, carbon dioxide, carbon monoxide, and nitrogen oxides). According to the Intergovernmental panel on climate change, the global anthropogenic emissions of greenhouse gases resulting from deforestations were calculated to be 17.3% in 2004⁵; which amounts to 8 Giga tons (Gt). For comparison purposes, it corresponds to more than 998 millions homes' electricity use for one year; and the total releases of industry were approximately equal to 9 Gt.

This also results in high soil carbon losses. Soil is the main terrestrial carbon sink; that is to say that the amount of carbon contained in the soil is greater than in the living biomass and the atmosphere together. Carbon soil is composed of organic material from flora and fauna in various stages of decomposition. Losses of carbon from soil result from decay and conversion into carbon dioxide, which returns to the atmosphere in the form of CO². Activities such as deforestation increase rapidly the rate of decomposition of the organic forms of carbon, which results in CO² fluxes. The quantity of CO² released depends on the initial amount of carbon in the soil—which is difficult to estimate. In rainforests or good soils, organic carbon can be over 10%.⁶ Thus, deforestation results in a carbon loss of approximately 250 tons per hectare, or 666 tons of CO² per hectare. This corresponds to electricity use for 83 homes for one year, according to the United States Environment Protection Agency.⁷

Forests are also cleared to build landing strips for the purposes of transporting production. In Northern Guatemala, for instance, traffickers have built dozens of landing strips, including one nicknamed the “international airport” which had three runways and more than a dozen abandoned aircrafts.⁸ The result was the loss of 40,000 hectares of forest; in terms of soil carbon loss, it would equate to 26 million tons of CO₂. This corresponds to 55 million barrels of oil used, electricity use for 3,245 million homes, or roughly 5 million passenger vehicle emissions per year.

Forest exploitation for sassafras oil (a component of ATS ecstasy) in South East Asia pushes extremely rare trees towards extinction; sassafras oil is extracted from the roots of the Mreah Prew Phnom tree. While this oil is used to make cosmetics, it is also a major precursor to produce ecstasy. In 2013, the Cambodian environment ministry collaborated with an environmental organization, Fauna and Flora International (FFI), in a successful investigation which resulted in the destruction of two illegal distilleries in Cambodia. The Cambodian environment ministry welcomed FFI help, as the rate of the illegal production of the "ecstasy oil", could have caused the extinction of the Mreah Prew Phnom tree in Cambodia within just five years. The number of illegal factories is unknown; it was estimated to be 75 at the peak of traffic in the oil back in 2006⁹. The oil

³ Colombia Coca cultivation survey 2011 https://www.unodc.org/documents/crop-monitoring/Colombia/Colombia_Coca_cultivation_survey_2011.pdf

⁴ http://www.oas.org/documents/eng/press/Introduction_and_Analytical_Report.pdf

⁵ http://www.ipcc.ch/publications_and_data/ar4/syr/en/figure-spm-3.html

⁶ <http://www.fao.org/docrep/009/a0100e/a0100e00.HTM>

⁷ <http://www.epa.gov/>

⁸ <http://www.countthecosts.org/sites/default/the-full-OAS-introduction-and-analytical-report.pdf>

⁹ <http://www.theguardian.com/environment/2009/feb/25/ecstasy-cambodia>

is produced by shredding and boiling the roots for 12 hours. Surrounding trees are also cut down to fuel fires. Furthermore, rivers are also polluted by the effluent resulting from the oil production.

U.S. State Department studies indicate that 10 million liters of sulfuric acid, 16 million liters of ethyl ether, 8 million liters of acetone, and between 40-770 million liters of kerosene are poured annually directly into the soil by cocaine processors working in the Andean region, mainly in Colombia. The consequences of this pollution are felt in the small rivers where aquatic life and biodiversity are devastated. The Caqueta river basin, which is the primary growing area in southern Colombia, is particularly affected.¹⁰

Synthetics: the big dumping

The production of Amphetamine Type Stimulants (ATS) such as ecstasy, amphetamine, methamphetamine and semi-synthetics (cocaine and heroin) drugs require high amounts of chemicals and precursors (reagent in the process of drug manufacturing). The amount of chemical waste depends on the production method, the knowledge of the producer and the equipment used. The Leuckart reaction has remained the most popular method for synthesizing illicit amphetamine in the U.S, the U.K, and the Netherlands. This method requires the use of highly dangerous and carcinogenic products, and results in 6-40 liters of chemical waste per manufactured kilogram.

According to UNODC figures from 2013, 51 tons of methamphetamine (one type of ATS) was seized worldwide in 2010, and this number rose to 88 tons in 2011. This means that in 2011, around 440,000 to 2.11 million kilograms of toxic waste was produced during the production of methamphetamine. According to the same source, the illicit manufacture of methamphetamine has been detected in more than 60 countries. Major producing countries include the United States, Canada, Mexico, Europe, and, increasingly, Central America.¹¹

The situation in the Netherlands is a good illustration at the European level. In 2006, the Dutch police seized 4 tons of ATS (about 10% of the total amount of ATS in the country) from which they estimated that 430 to 960,000 liters of chemicals had been released into the nature. In 2013, several operations have shown a dramatic increase in this trend. In August and October 2013, the Dutch police and EUROPOL dismantled the largest facilities ever discovered in Europe, which covered 1000 square meters and contained high volume custom-made equipment. The police seized more than 40 tons of chemicals in the two raids. In 2013, the police discovered 130 dumping sites in the Netherlands; this figure is almost three times higher than in 2012, when 50 dumping sites were found. (*image 1*)

The chemicals are disposed of in the woods, rivers and the seas, and are sometimes buried into the soil where they keep burning for days. Trees in the surrounding area are contaminated by the poisonous fumes and must be cut down. (*image 2, 3 and 4*)

Criminal organizations are using creative methods to get rid of the chemical waste, such as equipping trucks containing pipes which discharge chemicals on the road while driving. In fact, new methods are invented quicker than information on it spreads in law enforcement circles. (*image 5*)

The restoration of areas polluted by ATS chemical rejections is extremely expensive; several m3 of soil must be removed and thoroughly processed. The cost is up to 80,000 euros for a small area (*image 6*)

¹⁰ <http://druglibrary.org/schaffer/cocaine/cocaenv.htm>

¹¹ UNODC. (2013) World Drug Report 2013.



Image 1: Dumping site in the Netherlands (EUROPOL)



Image 2: Chemical reaction on a dumping site (EUROPOL)



Image 3: polluted area



Image 4: Cutting trees in a polluted area



Image 5: New "innovative" ways of disposal"



Image 6: Waste cleaning (EUROPOL)

Pesticides and fertilizers: a major market

According to Roel Willekens, National Programme Manager for Environmental Crime in the Netherlands,¹² the legal and illegal use of pesticides takes a huge toll on the environment. There are currently 2600 factories in China producing around 14 million tons of chemicals for agriculture each year. 50% of the world food production depends on those fertilizers and pesticides. To obtain authorization to export these products to Europe, manufacturers must go through a complex procedure, which takes years and costs up to 200,000 Euros. To avoid those costs, and to meet

¹² Eg. Interview with the author, November 2013

the pressing demand for drugs, traffickers turn to illegal fertilizers and pesticides. The law enforcement authorities have almost no grip on the important of legal products, and lack information to fight efficiently illegal fertilizers and pesticides.

Another unforeseen problem of legal pesticides linked to drug trafficking is the “War on Drugs”, that is to say the aerial spraying of the herbicide glyphosate on crops. Governments and environmental organizations have started to fight this technique, which was proven ineffective and extremely harmful. The International Relations and Security Network in Zurich states that the concentration of glyphosphate used for fumigation in Colombia is 26 times higher than recommended¹³. The concentration of glyphosate that is used for fumigation in Colombia is 26 times higher than recommended. Aerial herbicides are non-selective chemicals and affect all plants—and the surrounding population. According to the Center for International Policy Plan Colombia¹⁴, between 2000 and 2003, the fumigation program involved the spraying of 380,000 hectares of coca, which is equivalent to more than 8% of Colombia’s arable land. One of the particularities of the coca plantation business is that it is very mobile. Intensive spraying led to the proliferation of areas where coca leaves were under cultivation (growing has been observed in 22 provinces, instead of 12 three years previously). According to U.S. government studies, the land devoted to coca cultivation in Colombia has increased by 23 percent since the U.S.-backed fumigation began in 1999. This has also led to population displacement and rocketing health complaints. Dutch journalist Marjon van Royen revealed that 80 percent of the children of the Aponte Indian indigenous community¹⁵ fell sick with skin rashes, fever, diarrhea and eye infections.



Image 7: aerial spraying over Colombia (UNODC)

According to a survey conducted by the US Office of National Drug Control Policy (ONDCP), 157,200 hectares of cultivation areas were detected in 2006, 13,200 hectares more than in 2005, despite the most intensive fumigation campaign in the history of Colombia.¹⁶

Organic waste

Last but not least, the chemicals are not eliminated once inside consumers’ bodies. Sewers carry human emissions and bacteria which usually empty into rivers and seas which become contaminated. Human waste can also stay in the ground, slowly poisoning the soils. A study published in the Journal of Environmental Monitoring showed how an open-air festival in Sweden (Uppsala) attracting about 10,000 visitors per year, resulted in a high chemical input from pharmaceutical products into the water of the River Fyris in Uppsala. This study did not researched

¹³ <http://www.isn.ethz.ch/Digital-Library/Articles/Detail/?Inq=en&id=123972> and www.isn.ethz.ch/content/.../04%20Impact%20on%20environment.pdf

¹⁴ <http://www.cipcol.org/>

¹⁵ http://www.marjonvanroyen.nl/index.php?option=com_flexicontent&view=items&cid=147:about-marjon-van-royen&id=525:driven-mad-by-it&Itemid=85

¹⁶ <http://www.tni.org/briefing/colombia-coca-cultivation-survey-results>

the illegal drug traces; but nevertheless stresses the need for more accurate risk assessments and the need for monitoring programs.¹⁷

Cannabis

Europol figures show that 1200 tons of cannabis plants are produced in Europe, to which must be added 1300 tons of cannabis resin imported from Morocco. This transportation requires ships, trucks, and aircraft, as well as human beings (up to 1.5 kg per “mule”). The rejection of carbon dioxide is difficult to estimate, but as per the online calculators, the release can amount to 0.95 kg CO₂ per Ton-Km for an air cargo, 0.185 kg CO₂ per Ton-km for a truck. The emissions of a standard truck with a load 26T load will be equivalent to 1.6 homes' electricity use for one year.¹⁸

Each year, 50 million Euros worth of electricity is stolen for cannabis production in the Netherlands. In the US, 3% of energy in California is calculated to go to cannabis production. According to U.S. researchers, one joint is equal to a 100 watt-lamp burning for 17 hours.¹⁹ The energy necessary for the production of one kilogram of cannabis translates as 3000 kilograms carbon dioxide being released into the atmosphere, which is roughly equivalent to the emissions of one household over a 6-month period, or the total carbon footprint from all annual consumption of goods and services for an average person from Latvia or Cuba.²⁰

Policy recommendations

More research is necessary to estimate the scale and impact of emissions more accurately. To date, it has been impossible to give a precise estimation of chemical waste worldwide. Further, the consequences of the blending of several types of chemicals and their release into nature must be subject to more analysis.

The Dutch police is one of the more active authorities in fighting environmental crime linked to drug production. European countries, for which the issue is particularly pressing due to their high synthetic drug production, such as the UK, Germany, Poland, and Lithuania, must cooperate urgently.

The public must be informed through the right channels, and in so doing, general awareness raised about the link between drug abuse and its environmental consequences. The information must be spread and provided to different age groups, especially young people and young adults who are the main target of drug traffickers. Universities programs in sustainability must comprehend and study the criminal impact of drug production and trafficking.

Politicians must show greater engagement and strengthen the laws against this type of criminality. Environmental crime is often treated as a “second-class” crime, while it is not isolated from global drug trafficking, and other types of criminality.

The environmental organizations who have the networks and means to study the issue must analyze the consequences of drug trafficking on soil, air, and water pollution as well as biodiversity.

Awareness must be raised amongst law enforcement officers, to increase their security, to minimize the impact on their health of handling chemicals, improve their investigation methods, share information about the ways of disposal used by criminals, improve the effectiveness of investigations and engage more efficiently in combating environmental crime. Priority has not been placed on fighting the environmental consequences of drug production – more attention has been placed on other aspects so far.

¹⁷ <http://pubs.rsc.org/en/content/articlelanding/2012/em/c1em10551e#ldivAbstract>

¹⁸ <http://www.carbonfund.org/how-we-calculate>

¹⁹ http://evan-mills.com/energy-associates/Indoor_files/Indoor-cannabis-energy-use.pdf

²⁰ http://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions_per_capita