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Bleeding Mexico: An Analysis of Cartels Evolution and Drug-Related Bloodshed

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Bleeding Mexico: An Analysis of Cartels Evolution and Drug-Related Bloodshed

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Report

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Master of Arts

and

Master of Public Affairs

The University of Texas at Austin

August 2012

Dedication

To my husband Will, who has always been the main driver and supporter of my research.

Acknowledgements

I am eternally grateful for all the help and support I have received from scholars at the University of Texas and several top Mexican universities, as well as eminent security experts and my fellow journalists in Mexico and the United States who continue to cover the brutal drug war. Your insights and guidance, especially during my research trips to dangerous, drug-producing corners of Mexico, were invaluable. I would especially like to thank Communications Researcher Anajilda Mondaca of *Universidad de Occidente* in Sinaloa, Social Psychologist Tomás Guevara of *Universidad Autónoma de Sinaloa*, and Sociologist Luis Astorga of *Universidad Nacional Autónoma de México*. I would also like to thank journalists Ignacio Alvarado, Alfredo Corchado, Jorge Carrasco, Manuel Carrillo, Kieran Murray and Chris Hawley. Still more thanks goes out to Intelligence Analyst Alberto Islas, and Rubén Aguilar, former spokesman for Mexican President Vicente Fox. For your readings of various drafts of this work and excellent feedback throughout this long and complicated journey, thank you to my advisors at the University of Texas, Professors Henry Dietz and Chandler Stolp. For getting me started, a special acknowledgement goes to Colombian Professor Francisco Thoumi, member of the International Narcotics Control Board (INCB). Finally, for all the logistical – not to mention emotional – support, I would like to thank my husband and wonderful *chilanga* friends Adriana Villegas and Gabriela Basurto. Also always there for me is *Gallo*, who is a wonderful listener and loyal companion, as long as you don't wake him up too early.

Abstract

Bleeding Mexico: An Analysis of Cartels Evolution and Drug-Related Bloodshed

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The University of Texas at Austin, 2012

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Drug-related violence in Mexico has increased exponentially in the last five years, killing near 50,000 people. Even though the country has been a producer of marijuana and opium poppy for nearly a century, it was not until the beginning of the new millennium that drug violence skyrocketed. Up until now, academic studies and policy papers have focused primarily on the political changes Mexico underwent over the last decade and on ingrained corruption as the central factors in explaining the increased violence. But such a jump in homicides rates, as well as the sheer brutality of the violence involved, also reflects the evolution of the country's drug organizations – which went from being merely feared and ruthless drug producers and smugglers to far-reaching criminal empires that now dominate all aspects of the illicit drug underworld in the Americas. Many have become so powerful that they have formed their own armies of hit men and foot soldiers that operate like full-fledged paramilitary groups protecting their territories and smuggling routes to American soil. Further feeding the cycle of murders in Mexico is an increasing diversification of drug gangs' businesses, which now range from

drug production and smuggling to extortion, kidnapping and human trafficking. Through an historical, spatial and statistical analysis, this study sets out to deconstruct the current wave of Mexican drug violence, show how it is spreading and why, and how that reflects the evolution of Mexican drug organizations.

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Introduction

It was after midnight when the cartel hit man burst into a seedy nightclub in the western Mexican colonial city of Uruapan and menaced those grooving on the scuffed wooden dance floor with an automatic rifle. A ski-mask covered his face and he lugged a bulky bag stained a sickening shade of reddish-brown over his shoulder. "Those people killed are the ones who must die!" he shrieked, throwing open his bag and shaking out five human heads. Word of the stomach-churning scene in the fall of 2006 spread around the world in no time, but many media outlets simply added five more victims to their running counts of the thousands of Mexicans slain by drug violence so far that year. Accounts of the turf war between rival cocaine, opium, and marijuana drug smugglers were not new, especially in the picturesque state of Michoacán, which includes Uruapan – even if five severed heads flung on the floor of a nightclub did not happen every day. The episode was perhaps the most horrific example of the astounding level of violence generated by drug gangs throughout Mexico in the past seven years and counting. But while it's hard to match that occurrence for sheer gruesomeness, tens of thousands of less dramatic killings have ensured the death toll from warring cartels has only continued to rise since then.

Drug violence is not a new phenomenon in Mexico, but why has it emerged with so much fury in recent years, even as the country's smugglers have gotten more powerful, and wealthier? Mexican cartels succeeded in expanding their business and market share, and eventually transformed their country into the top source of illegal drugs for consumers in the United States over a time span of just two decades.[1] How did they pull

[1] "International Narcotics Control Strategy (INCS) Report 2009," Vol. I. Drug and Chemical Control, Mexico Chapter, accessed February 10, 2012, http://www.state.gov/p/inl/rls/nrcrpt/2009/vol1/116522.htm

it off? Answering these questions means, in part, analyzing Mexico's history and examining its place in the hegemonic shadow of its neighbor to the north throughout its entire existence as an independent nation. It also means looking at the origins of drug trafficking in Mexico, identifying those factors that came to characterize the illicit narcotics business as it developed in specific regions of the country, and taking a close look at the conditions that allowed it to evolve as it did. Furthermore, we must pay special attention to the historical relationship between drug organizations and Mexican society, and take into account how the country's social, economic and cultural makeup helped fuel the rise of drug trafficking.

Some authors have tended to explain the relative specialization of specific countries in producing certain products using models that emphasize the comparative and competitive advantages they have.[2] Measured only by comparative advantages, Mexico has an important leg up considering its geographic location alone, just south to the United States. It was President Porfirio Díaz, who ruled the country twice, between 1877 and 1880, and then again – this time as dictator – from 1884 through 1911, who stated the obvious when he famously quipped, "Poor Mexico, so far from God and so close to the United States."

It is tempting to argue that because both nations share one of the longest borders in the world, Mexico is a natural source for illegal drugs being smuggled to the United States, a country that always ranks among top global narcotics consumers.[3] Especially since Mexico has been a longtime producer of drugs, including marijuana and heroin, and

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[2] Francisco Thoumi, *Illegal Drugs, Economy, and Society in the Andes*, (Washington D.C.: Woodrow Wilson Center Press, 2003), 55.

[3] According to the World Drug Report 2009, compiled by the United Nations Office on Drugs and Crime, the United States is the largest cocaine market and one of he biggest for marijuana, while Europe and Asia are the largest markets for opiates.

has powerful and ruthless gangs that have decades of experience growing, smuggling and selling those and other lucrative, illicit products in the U.S. market. But why then, has Mexico not been the top U.S. supplier of illegal drugs since the early 1900s? If close proximity to the United States and means of production, technical experience and logistical infrastructure were all it took, why did Mexico and its cartels not become Latin America's dominant source for drugs long ago? To be sure, the United States has made a consistent and concerted effort to keep that from happening. Washington has made Mexico a key target of a diplomatic offensive against illegal drugs since the early 1900s, and from then on has constantly pressed its neighbor to implement interdiction and eradication programs. Those efforts have been further reinforced in recent years with the massive deployment of Mexican soldiers. But why have these crackdowns and cross-border alliances between the Mexican and U.S. authorities not been effective in stopping or even slowing down smuggling activity in Mexico? Worse still, why has drug violence, which for decades was largely limited to a few, isolated pockets of the country – the Mexican side of its border with the United States, and remote, farming villages in rural production areas – now become both incredibly widespread and apparently out of control?

Part of the answer is that even if theories of comparative and competitive advantages might work for legal business, the illegal nature of drug trafficking and production makes evaluating these advantages extremely difficult. Generally, the prime, fertile territory for growing illicit crops used in narcotics does not come from traditional factors of production, such as capital, labor, technology or innovation. Instead, the competitive advantage, in many cases, grows out of the prevailing type of institutions and

market structure in the country.[4] In Mexico's case, it is precisely the power structure that lies at the country's core which actually boosted the thriving development of illegal drug activity there: the alliance between political authority and the embracing of an economic model that sparked heterogeneous development while also reinforcing centuries of marginalization of indigenous peoples.[5]

These conditions created alarming amounts of corruption and inequality as well as fertile breeding grounds for a new and powerful drug culture.[6] The Institutional Revolutionary Party, known by its Spanish acronym PRI and which took power in 1929 and did not relinquish it for 71 years, institutionalized certain ways of doing things and created authority patterns and corruption structures that not only allowed but fostered the emergence, expansion, and consolidation of drug power and organizations in Mexico. The PRI built an all-powerful bureaucracy and instituted a federal system that facilitated the coexistence of several police forces overlapping in their tasks, thus ensuring that no one was held accountable for fighting crime, especially when it was committed by those involved in a burgeoning narcotics trade.[7]

Moreover, widespread corruption and the lack of a strong federal police presence, which could have helped fill the power void but instead fell short in the war on drugs, prompted authorities to look to an institution long considered reliable, the military. In the end, however, soldiers proved to be as vulnerable to corruption as all other institutions of power.

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[4] Thoumi, *Illegal Drugs*, 55-78.

[5] Luis Astorga, *El Siglo de las Drogas: el Narcotrafico, del Porfiriato al Nuevo Milenio* (Mexico: Random House Mondadori, 2005).

[6] Thoumi, *Illegal Drugs*.

[7] At the municipal level alone, Mexico has 2,022 police forces, according to data presented to the country's Congress by the Public Security Minister in late September 2009. That already large tally does not include federal and state police forces, or other police corps assigned to institutions such as the judiciary or banking system.

While Mexico remained one of the many sources of drugs for the United States, the business kept growing quietly at a slow pace. But when the political and economic environment suddenly changed, so did drug production and smuggling across the country. The equilibrium was broken. The arrival of the National Action Party (or PAN, its Spanish acronym) in power in 2000, coupled with the unintended consequences of the U.S. crackdown on the Caribbean routes for cocaine smuggling (which reoriented the transit of drugs to American soil via Central America and Mexico) provoked a fundamental break in the internal organization and market structure of the drug business. The fact that PAN President Felipe Calderón declared an all-out war on drugs in December 2006 was simply a catalyst that sped up the already fast-evolving environment of the Mexican drug industry and its key players.

My study analyzes this tumultuous period by using historical, spatial and statistical methods to more closely examine the situation. The goal is to shed light on the development of the drug business and the growing violence associated with it across the country, which in recent years has become increasingly chaotic. I discuss the relationship between drug cultivation and drug trafficking patterns, their links to the political and socioeconomic characteristics of the municipalities where these activities most occur, and how they are correlated to the increase number of killings since 2006.

Chapter 1 is a historical analysis of the evolution of Mexican drug organizations and drug cultivation patterns since their first mention in the country's press and police files in the late 19th century. I analyze conditions such as political change, corruption, type of governance and economic and drug policy – from Mexico and also from the United States. Chapter 2 focuses on the factors related to the cultivation of marijuana and opium poppy in specific regions of Mexico. I include environmental variables such as climate, precipitation, elevation, and slope in a spatial statistical analysis, which also

considers human factors that have an impact on the growth of these illegal crops. In this latter category, it is possible to analyze drug production areas' proximity to highways that make drug transportation easier, and the use of sophisticated irrigation systems to extend the areas of growth. Chapter 3 offers a descriptive statistical analysis of the relationship between killings and the municipalities that have become drug hubs, or points of cultivation, storage or distribution for at least three different drugs at the same time since 2007. My main purpose is to shed light on how smuggling routes change, and how violence erupts in the new territories that become areas of production and/or transport. Chapter 4 is a case study examining the worst example of brutal violence and killings in the country: Ciudad Juárez, right next to El Paso, Texas, which is now the epicenter of mass homicides and which journalists commonly refer to as "Murder City." I focus on socioeconomic and political conditions, as well as economic policy, governance styles and political factors to find answers to the spread of violence in the city. Finally, the conclusions make clear that the traditional patterns of drug production, as well as the organizations that run the underground business, have evolved to take advantage of a myriad of circumstances ranging from new technologies and geographic location, to Mexico's type of governance and often-shifting U.S. anti-drug policy. One thing that remains clear is drug production and smuggling in Mexico depend less on the confluence of adept physical and economic conditions, and instead rely more on the will and clout of the drug organizations.

Chapter 1: A Tale of Two Countries

The rise of marijuana and opium cultivation and smuggling in Mexico is not simply the story of one country's entrenched corruption problems and exploitation of a geographical advantage to crack into a coveted market. The dominant position Mexican drug organizations have achieved today also reflects the deep impact U.S. security and anti-drug policies have had on Mexico's ability to fight its own battles against drug gangs on its own. Indeed, the rise of Mexico's illicit drug business – from once pale in comparison to the cartels of Colombia to now constituting the most powerful criminal syndicates in the world – is an intertwined story. It is a tale of two countries that, together, generated the perfect storm for Mexican drug traffickers: a market where insatiable demand and unlimited supply are separated only by a porous border.

IT STARTED IN SINALOA

Sinaloa, a hot and dry state in northwestern Mexico, features golden beaches as well as the chilly mountains of the Sierra Madre Occidental. Home to such famous resorts as Mazatlán, the region has become ground zero for the illegal drug business. By the end of the 19th century, it was a rural state where it was possible to find *adormidera blanca*, or opium poppy, and *cañamo indio*, cannabis, or marijuana.[8] While marijuana grew in the wild and was native to Sinaloa, opium poppy was introduced by arriving Chinese immigrants. Both were classified as a fiber crop, as forms of oilseed not for medicinal use. Neither had been linked to any cultural or ritual use by Mexico's indigenous peoples, unlike such drugs as hallucinogenic mushrooms or the spineless cactus Peyote. Both also grew well in the area, so much so that some authors described

[8] Sergio Ortega and Edgardo López Manon (eds.), *Sinaloa, Textos de su Historia* (Mexico: Instituto de Investigaciones José María Luis Mora, Vol. 2, 1987), 143.

marijuana being produced and exported to the United States as early as the late 1800s. Opium began developing later, in the first decades of the 20th century, and increased in popularity as more Chinese laborers arrived in Sinaloa and neighboring Sonora state to work in mines and railroad construction.[9]

As in the United States, prohibitions of narcotics at the municipal and state level started early in Mexico. In 1875, the city of San Francisco banned the smoking of opium in popular opium dens – the first such prohibition of its kind in the Americas. Just three years later, the governor of Mexico City, Luis Curiel, enacted a rule applying to pharmacy owners, drug stores and chemical factories that restricted the sale of morphine and opium to those only with medical prescriptions for it.[10]

Although opium was cataloged among the different species of plants found in northwestern Mexico, the Mexican Pharmaceutical Society's magazine noted that it had been originally imported from the United States, Europe and Asia. The magazine cited as a key reason for reaching that conclusion: "the difficulties in obtaining pure opium and that of constant quality." However, the society also described "some attempts to plant imported poppy seeds" in Mexico and the way that "small specimens," as a result of this process, had "been preserved."[11] Although it is not native to Mexico, the crop took to the country well. External trade figures compiled by the Porfirio Díaz government show that between 1888 and 1911, Mexican imports grew from nearly 800 kilograms of opium "in all its variations and extracts" in 1888-89 to 12.9 tons for fiscal year 1910-11. The statistics also show that from 1901 to 1911, the price of those imports was rising consistently, as was opium's importance to the import market as a whole, rising from

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[9] María Celia Toro, *Mexico's War on Drugs* (Boulder, CO: Lynne Rienner Publishers, 1995), 7.
[10] Astorga, *El Siglo de las Drogas*, 19.
[11] Ibid, 22.

initially zero percent in 1900-01 to 0.3 percent in 1910-11.[12] Beginning in the 19th century and during the first two decades of the 20th, opium was consumed in Mexico as a medicine, contained in laudanum and morphine. There also were, however, numerous reports in the Mexican press of opium dens in the Pacific Coast community of Mazatlán, as well as Sinaloa's capital of Culiacán. Press of the era also detailed suicides or death by overdose of morphine. Meanwhile, by the early 1900s, heroin was offered by drug laboratories as a component for cough syrup, while a diluted extract of peyote was recommended as a heart tonic. By the early 1920s, coca tonics were advertised in Mexican newspapers as remedies to fight anemia, rickets and paralysis and even marketed as rejuvenating.[13]

But the first sustained wave of prohibitions against the use and trade of narcotics in the United States eventually succeeded in changing Mexico's outlook, turning it into more of a drug exporting nation than one focused on consumption. Drug smuggling suddenly became a lucrative Mexican activity after Washington enacted the 1909 Opium Exclusion Act, outlawing the importation of opium for smoking. The U.S. Harrison Narcotic Law Act of 1914 then restricted the sale of opium and cocaine to prescription use only while establishing a register of everyone involved in importing, producing and manufacturing them. A further effort to control drugs in America came in 1922, when the Narcotic Drug Import and Export Act banned the import of raw opium and coca leaves. New U.S. controls, "effectively created a profitable market for narcotics in the United States" and along with the prohibition of alcohol in the 1920s, "provided an incentive for

[12] Comercio Exterior de México 1877-1911, *Estadisticas Económicas del Porfiriato* (Mexico: El Colegio de México, 1960), 214.
[13] Astorga, *El Siglo de las Drogas*, 25.

Mexicans (and others) to ship drugs into the United States and take advantage of the high prices," as Michael S. Werner (2001) states in his "Concise Encyclopedia of Mexico."

THE IMPACT OF THE PROHIBITION ERA

In the early 20th century, Mexico did not have a federal law controlling narcotics, so drug production and smuggling took off across the country. As Werner notes, Mexican exports of opium and heroin for U.S. consumption flourished in the 1910s and 1920s.

> Something similar happened with Mexican exports of marijuana, as more and more states in the United States regulated its use, production and sale. The cannabis plant, which had been produced legally in Mexico and exported since the late nineteenth century, if not earlier, mostly for industrial and medicinal purposes, quickly reached the U.S. market in larger quantities … Thus, a significant contraband along the U.S.-Mexican border emerged after 1910, basically prompted by prohibition in the United States.[14]

Mexican exports of opium and marijuana to the United States understandably soared, but Werner also notes that the country's imports increased as well, "since its territory offered an attractive transit point for opium smugglers on their way to the United States."

Stories about the discovery of large opium poppy fields in Sinaloa and pioneer traffickers captured by police started appearing frequently in local newspapers, while opium dens began spreading from Sinaloa and Sonora to many other areas, including the industrial hub of Guadalajara and Mexico City. Because it shared a 2,000-mile border with the United States and already sported thriving marijuana and poppy production industries, Mexico enjoyed a comparative advantage against other countries looking to tap into the illegal U.S. narcotics market. The country came to be seen as the logical route to reach the American market, and the smugglers weren't the only ones taking notice. The White House targeted Mexico early as it worked to promote international drug

[14] Michael S.Werner, *Concise Encyclopedia of Mexico* (Chicago: Fitzroy Dearborn Publishers, 2001), 173.

smuggling restrictions following the Harrison Act, viewing its southern neighbor both as strategically important, but also a convenient, would-be ally in its fledgling fight against drugs.

Just two years later, Mexican President Venustiano Carranza prohibited opium importation. Most of the groups smuggling opium into the United States used two primary routes, either through Mexicali or through Tijuana, both cities in the Pacific Coast state of Baja California. Opium not grown in Mexico generally arrived by ship from Asia, landing at such ports as Acapulco, Mazatlán and Ensenada. From there, it was transported overland to Baja California. While they applied to all of Mexico, the new laws appeared to specifically target a single man, coronel Esteban Cantú, who headed military forces in Baja California and who, according to U.S. Customs officials, controlled the drug trade in the region. U.S. authorities accused Cantú of conspiring with American citizens to move copious amounts of opium into the United States.[15] Indeed, Cantú had built a kind of personal fiefdom between 1914 and 1920, levying and collecting his own taxes and refusing to allow the use of Mexican pesos, accepting only American dollars in his state. He also declared Baja California a buffer zone during the U.S. occupation of Veracruz in 1914 and again during General John Pershing's expedition to Chihuahua to capture Mexican rebel Pancho Villa, a manhunt that came after Villa's attack on the U.S. border outpost of Columbus, New Mexico, in March 1916. To further ensure Cantú and other smugglers were put out of business, Carranza went a step farther, banning all facets of the opium trade specifically in Baja California in 1917.

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[15] Luis Astorga, *Mexico, Colombia and illegal drugs: variations on the same topic*. Paper presented at the VIII Annual History Professorship Ernesto Restrepo Tirado in Bogotá, Colombia, dedicated to the "Colombian Drug Trafficking Historical Analysis," 2003.

In addition to fears about Cantú, other factors likely helped prompt Carranza to take decisive steps against opium smuggling, including not infrequent raids by U.S. authorities – who thought nothing of crossing into Mexican territory in pursuit of drug offenders in cases where other Americans were involved.[16] At a time when the Mexican Revolution was raging, and with memories of the U.S.-Mexican war still relatively fresh, a move to solidify Mexican sovereignty – especially along the nation's sprawling border with the powerful United States – seemed prudent.

By 1920, Mexico's government banned the cultivation and sale of marijuana, and three years later, President Álvaro Obregón issued a decree barring the importation of opium, cocaine and heroin and imposing harsher punishment for those found to be growing or manufacturing them, even though coca, the chief ingredient in cocaine, was not grown in Mexico and was still not a major problem around the world. Those measures helped Mexico achieve de facto adoption of the 1912 Hague Convention restricting opium and cocaine, although the country did not officially subscribe to that measure until 1925.[17] In 1926, Mexico's Health Code added opium to the ban on marijuana cultivation and trade, and the following year, President Plutarco Elias Calles signed another decree barring the export of both drugs. The series of laws and measures attempting to regulate drugs makes it clear Mexico was facing a growing problem of both narcotics production and smuggling, as well as feeling the heat of additional pressure to improve its anti-narcotics effort being applied by its neighbor to the north, where Mexican immigrants had started being identified as marijuana smugglers.[18] Still, the

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[16] Toro, *Mexico's War on Drugs*, 9.
[17] William O. Walker, *Drug Control in the Americas* (New Mexico: University of New Mexico Press, 1981), 49.
[18] Curtis Marez, *Drug Wars: The Political Economy of Narcotics*. (University of Minnesota Press, 2004), 107.

events of the 1920s helped form a pattern of production and trafficking of illegal drugs in Mexico that has continued to this day.

THE IMPACT OF WORLD WAR II

Despite the new laws, production and export of opium and marijuana flourished in Mexico, though the country was nowhere close to becoming the top United States supplier of opium in the 1920s and 1930s. Mexican producers claimed barely 15 percent of the American market in those decades, with syndicates in Italy, France, and throughout Asia and the Middle East vying for control of the rest of the market.[19] Still, some medium-sized Mexican traffickers gained enough notoriety to be named in the press, including Enrique Fernández Puerta, who built a small empire in the border city of Ciudad Juárez based on the smuggling of alcohol to the United States during prohibition. Such was Puerta's fame that he became known as the "Al Capone of Juárez," and his power and influence grew after local authorities proved willing to shelter his activities and associates. Puerta had close ties to the governor of Chihuahua state, which includes Juárez, and used a portion of his considerable profits to donate to charities and build schools. Other names of drug leaders listed in newspapers of the era were former anti-narcotics police chief Arturo Vaca. The press also reported on sizeable drug seizures, but made it exceedingly clear that police were far from honest. Newspaper accounts as early as 1937 describe authorities making off with some of the drug shipments they successfully captured.[20] Drug production and trafficking was by then thriving in much of the Mexican northwest, especially the states of Sinaloa, Durango, Chihuahua and Baja

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[19] Miguel Ruiz Cabañas, "Mexico's Changing Illicit Drug Supply Role," in Gonzalez and Tienda (eds.) *The Drug Connection in US-Mexican Relations* (San Diego, CA: University of California at San Diego, 1989), 53.

[20] *El Universal Grafico*, a series of articles on drug trafficking between November 1937 and January 1938. Astorga, *El Siglo de las Drogas*, 40-43.

California, with the latter pair acting as the bridges that connected producers with consumers in the United States.

World War II changed everything, however. Fighting disrupted traditional heroin routes from Asia and through Europe, and countries at war needed unprecedented amounts of narcotics such as morphine to treat wounded soldiers. Mexico wasted little time filling the drug void, this time with Washington's rather ironic blessing.[21] As Celia Toro asserts, "the United States did not hesitate to ask Mexican authorities to allow for legal production of marijuana and opium poppy plants in 1940. Indian hemp (marijuana) was required to manufacture ropes, and morphine was needed for medical purposes." By 1943, opium had become Sinaloa's largest cash crop,[22] and poppy fields appeared in other states in the Sierra Madre Mountains, including Michoacán. Marijuana crops emerged in southern states like Puebla, Morelos, Guerrero, San Luis Potosí, Tlaxcala and even Mexico City. Press reports from that era also detailed vast marijuana fields in the northern states of Nuevo León, Coahuila and Tamaulipas, all on the border with the United States, and in areas such as Veracruz, on the Gulf of Mexico, which would later become a major route from cocaine traveling from Colombia to the United States.

Before the war caused policy shifts, Mexican authorities had begun operations to eradicate drug crops as early as the 1930s.[23] These campaigns were led by the Public Health Department, which had its own police force. It was not until 1947 that the office of the attorney general took over supervision of those efforts. Despite eradication

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[21] Toro, *Mexico's War on Drugs*, 11.

[22] Richard Craig, "U.S. Narcotics Policy Toward Mexico: Consequences for the Bilateral Relationship," in Gonzalez and Tienda (eds.) *The Drug Connection in US-Mexican Relations* (San Diego, CA: University of California at San Diego, 1989), 72.

[23] There is a difference in the cultivation process of marijuana and heroin that might affect eradication campaigns. While the former is a plant that can complete its growth cycle in five months, the latter is annual.

measures, Mexican newspapers began reporting on increasingly close relationships between drug traffickers and authorities at the national and local levels, including governors and police chiefs. In one case in 1944, Sinaloa Governor Rodolfo Loaiza was killed and Mexican newspapers and magazines linked the slaying to a dispute between him and a band dedicated to opium production in the municipality of Badiraguato. That town would later become known as "The Cradle of Mexican Drug Cartels," because many of the top current kingpins were born there.[24]

Since World War II, Mexico has remained a major source of marijuana for the U.S. market. But it took longer – until the start of the 1970s – to become a major supplier of heroin because U.S.-based trafficking organizations reassumed control of the illicit drug coming from Italy in the years following the war.[25] An end to the fighting also saw Mexico launch a major, U.S.-backed campaign to combat drug trafficking that succeeded in keeping heroin production in the country at bay, at least temporarily.[26] Still, authorities could not hold back the industry forever. By 1947, U.S. Deputy Customs Secretary John W. Buckley publicly asserted that Mexican traffickers used planes to smuggle opium into the United States. Then, Harry Anslinger, the first commissioner of the Treasury Department's Federal Bureau of Narcotics, who would eventually hold the office for 32 years until 1962, declared Mexico the main opium supplier for the United States, adding that many government officials were involved in drug production and smuggling.

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[24] Luis Astorga, *Drogas Sin Fronteras* (Mexico: Editorial Grijalbo, 2003b), 115-116.

[25] Heroin was initially diverted to the U.S. market from Italian pharmaceutical manufacturers. But from the early 1950s on, Italian sources were supplanted by products from the Marseille's heroin labs (the French Connection), produced with opium and morphine bases from Turkey and Lebanon and run by members of the French Corsican underworld. Those producers supplied the drug to the American-Sicilian mafia. In David T. Courtwright, "*Dark Paradise: A History of Opiate Addiction in America* (President and Fellows of Harvard College, 2001), 148.

[26] Werner, *Concise Encyclopedia*, 174.

> The cultivation of opium poppy in Mexico, although prohibited by Mexican law, appears to be tolerated by state and local authorities in producing areas (…) It is reported that between twenty and thirty secret landing strips for airplanes have been constructed in Mexico to handle the transportation of narcotics from Mexico to the United States.[27]

Stories appeared in Mexico City newspapers stating that two governors were also involved in trafficking illegal drugs. During a visit by the Mexican attorney general to the northwestern part of the country, reporters traveling with him wrote lengthy articles about the links between political power and drug cultivation in the area. One such account describes Culiacán as "the headquarters of opium smugglers" and the state's governor, Pablo Macías Valenzuela, as one of the ringleaders of a gang of drug dealers.[28]

Mexican president Miguel Alemán (1946-52) launched a push against drug trafficking within the framework of an ethical and social protection program that sought to "defend" public health, the economy and the "nation's international prestige." In 1948, he began "The Great Campaign," which sought to eradicate drug crops in the whole country and, for the first time, enlisted soldiers to help. Since then, the Mexican military has been involved permanently in anti-drug programs. But efforts to enforce drug laws helped pave the way for the emergence of more consolidated and professional networks around opium and marijuana production. By the late 1950s, the term "drug dealer" appeared for the first time in the Mexican press, and by the end of the following decade and the beginning of the 1970s, the names Pedro Avilés and Ernesto Fonseca Carrillo were well known. Both are accepted today as early pioneers, and the latter is considered the "Godfather" of the Mexican drug cartels as we now understand them. Fonseca Carrillo was first identified as the head of the Guadalajara Cartel, where he worked

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[27] Anslinger presentation at a meeting of the UN Commission on Narcotic Drugs, July 30, 1947. General Records from the U.S. Department of State. In William O. Walker, *Drugs in the Western Hemisphere: An Odyssey of Cultures in Conflict* (Wilmington, DE: Scholarly Resources Inc., 1996), 113.

[28] Article by reporter Armando Rivas Torres for *Excelsior* newspaper. Astorga, *El Siglo de las Drogas*, 73.

alongside Miguel Ángel Félix Gallardo and Rafael Caro Quintero, his eventual successors. Fonseca Carrillo is also said to be the uncle of Amado Carrillo, who later became known as "Lord of the Skies," since he used entire fleets of planes to fly cocaine from South America straight into Miami and other points in the United States by the 1980s.[29]

THE RISE OF MEXICO'S CARTELS

By the early 1970s, Mexico was already widely believed to be the biggest supplier of marijuana and heroin to the United States, following the sustained growth of cultivation and production of both drugs there in the previous decade.[30] But the country was also becoming a key transport point for another major drug, cocaine, which flowed to U.S. streets from South America, even though demand for it was still relatively small. Changes in the U.S drug market helped Mexican traffickers evolve, however, and chief among them was the fact that drug consumption trends were rising among young adults. In 1962, only 4 percent of Americans between the ages of 18 and 25 had tried marijuana. Just five years later, that figure more than tripled to 13 percent, and by 1979, 68 percent had tried it.[31] U.S. heroin use rose as well, while, in Mexico, reliable information about narcotics abuse was scarce, limited only to sporadic reports in newspapers and other

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[29] Personal interviews with Mexico's former deputy attorney general for drug crimes, José Luis Santiago Vasconcelos, between 2002 and 2006, when I was a reporter working first with the Spanish News Agency EFE, and then for the British news agency Reuters.

[30] According to Mathea Falco, U.S. assistant secretary of state for international narcotics matters in 1975, Mexico at the time was supplying around 87 percent of the heroin and nearly 95 percent of the marihuana available on the U.S. market. Also, estimates from the U.S. National Narcotics Intelligence Consumers Committee (NNICC) indicated that between 70 and 80 percent of total U.S. imports of heroin in 1975 were of Mexican origin. NNICC estimates also indicate that 95 percent of U.S. marihuana imports from the 1930s to the early 1960s came from Mexico. Figures quoted in Peter Reuter and David Ronfeldt, *Quest for Integrity: The Mexican-U.S. Drug Issue in the 1980's* (Santa Monica, CA: A Rand Note, 1992).

[31] Ann Blanken, "Changing Patterns of Drug Abuse in the United States," in Gonzalez and Tienda (eds.) *The Drug Connection in U.S.-Mexican Relations* (San Diego, CA: University of California at San Diego, 1989), 23.

anecdotal sources. That changed with the government's commission of the first National Survey on Addictions, but that did not come until 1988, and, even then, its results did not find drug use among young Mexicans increasing at rates as high as those in the United States.

By 1975, Mexico was facing a serious problem of illegal agricultural production, with opium and marijuana plantations spreading throughout the country almost at will, and occupying areas far away from the U.S. border. Poppy fields reached into such southern states as Oaxaca and Chiapas, which actually borders Guatemala, while major marijuana cultivations spread all the way to the Yucatán Peninsula on the Caribbean coast, according to official eradication data from the era. The attorney general's office, known by its Spanish initials PGR, reported that authorities wiped out 25,000 hectares of opium poppy plantations between 1970 and 1976, compared to only about 4,370 between 1963 and 1970.[32] And that was only the beginning. By the middle of the decade, a hectare of poppy generated 5 to 6 kilograms of opium gum that could be transformed into one kilogram of heroin. Technological advances and genetic modification eventually allowed poppy crops to sport more bulbs per plant, pushing production of opium gum up to 16 kilograms per plant after 2005, according to data produced by the National Defense Ministry of Mexico. Marijuana, on the other hand, went from about 2,400 hectares razed by the Mexican Army in the 1960s and 500 tones sized, to 13,300 hectares eradicated and 3,800 tones confiscated just in the period between 1970 and 1976.[33]

Washington's concerns about the growing prevalence of Mexican drug production and smuggling efforts first materialized during "Operation Intercept," a search and seizure anti-drug initiative that virtually closed the U.S. border with Mexico for 20 days

[32] Astorga, *El Siglo de las Drogas*, 119.
[33] Ibid., 120-121.

in 1969. A White Paper on drug abuse released six years later recommended joint law enforcement activities with Mexican police for greater effectiveness.[34] Mexico refused the offer, but chose to launch its own extensive aerial herbicidal spraying campaign. A few months later, in January 1977, the country started a major U.S.–backed antinarcotics offensive that would be a turning point in Mexico's history against drugs. It was known as "Operation Condor" and billed at the time of its unveiling as "the biggest onslaught against drug trafficking that has been launched in Mexico, with the participation of 10,000 troops." The operation was headed by Army General José Hernández Toledo, a military veteran best-known for his participation in the Tlatelolco student massacre of 1968 in Mexico City, and Carlos Aguilar Garza, an official in the attorney general's office who, in 1984, was arrested with 6 kilograms of heroin and cocaine in the northern state of Tamaulipas.[35]

The campaign sent the military to eradicate drug plantations, reinforce police interdiction efforts against narcotics smuggling, and disrupt trafficking organizations in the northwestern states of Sinaloa, Durango and Chihuahua, dubbed the "Golden Triangle" of narcotics production. The soldiers' headquarters was located in Badiraguato, at the confluence of the three states. The program's results in the eradication of marijuana and poppy fields were surprisingly positive, so much so that crime rates that had been rising in all three states began to fall slightly as a relative calm took hold among rival smuggling gangs. From 1975 to 1977, soldiers destroyed an average of more than 7,000 hectares of marijuana and about 13,500 of opium poppy plantations a year.[36] Though

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[34] "White Paper on Drug Abuse", A Report to the President from the Domestic Council Drug Abuse Task Force (Washington, D.C. : GPO, 1975), 50. Cited in Toro, *Mexico's War on Drugs*, 17.

[35] Paul Gootenberg, *Cocaine: Global Histories* (New York; Routledge, 1999), 187. Gootenberg also says that in 1989, Aguilar Garza was nabbed in Texas as an alleged "drug kingpin" and handed over to Mexico's federal judiciary. He was assassinated in 1993.

[36] Toro, *Mexico's War on Drugs*, 18-21.

successful, Operation Condor redefined key facets of the U.S.-Mexico relationship, serving to subjugate the latter to the former in terms of Washington's war on drugs. As researchers Jorge Domínguez and Rafael Fernández de Castro assert, "Mexico began to accept helicopters, specialized aircraft, spare parts, pilot training, and other forms of U.S. technical assistance in large quantities, which, as we have seen, was utterly unprecedented." Accepting so much aid, the Mexican government "agreed to formalize the presence of U.S police agents in Mexico." Then, in 1983, Domínguez and Fernández de Castro note that, "under U.S. pressure, President Miguel de la Madrid greatly increased Mexican military participation in the battle against drug activity."[37] He also declared drug trafficking a threat to "national security" in 1988, soon after the United States began unilaterally issuing annual certifications of cooperation and achievement to countries around the globe as a condition for aid and assistance, essentially endorsing or decrying their efforts to control drug violence within their borders.[38] Although Mexico was sometimes threatened with being decertified, that never actually happened, despite its growing drug business.

Operation Condor had other unintended consequences, including the displacement of crops and traffickers to other regions in Mexico, the large-scale exodus of peasants who had lived in the mountains and other isolated areas to cities, human rights violations, and the use of harmful chemicals (namely, Paraquat)[39] which were sprayed on drug

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[37] Jorge Domínguez and Rafael Fernández de Castro, *The United States and Mexico: Between Partnership and Conflict* (New York: Routledge, 2001), 42.

[38] The certification process first became U.S. law with the 1986 Anti-Drug Abuse Act and was subsequently modified in 1988, both under the Ronald Reagan administration.

[39] For a complete explanation about the use of the chemical Paraquat for eradication campaigns of marijuana, see the following study: Turner, Cheng, Torres, and Elsohly, "Detection and Analysis of Paraquat in Confiscated Marijuana Samples," *The Journal of the American Medical Association (JAMA)*, October 20, 1978, 240(17).

plantations to destroy them.[40] Also, it promoted the "cartelization" of drug organizations operating in Mexico, as Toro states. Operation Condor pushed less daring and smaller traffickers out of business, ensuring that only the largest and best-organized survived and moved in to fill the void, becoming even more powerful and influential in the process. Also, those groups that survived were forced to reorganize their businesses due to the crackdown and began, for their continued survival, to rely on the purchase of weapons and other forms of protection and the increasing use of violence.[41] Meanwhile, the anti-narcotic collaboration honeymoon between the United States and Mexico would come to an abrupt end after Drug Enforcement Administration agent Enrique Camarena was captured and killed by Mexican traffickers in Guadalajara in 1985.

THE CAMARENA CASE

Operation Condor forced Mexican drug syndicates to reorganize, moving into transportation of cocaine to the U.S, a previously untapped area of operations for them. The move was necessary because anti-drug efforts succeeded in making previously strong segments of the illicit narcotics market suddenly less profitable. Mexican exports of heroin to the United States reached their peak value in 1977-1978,[42] when they accounted for about $4 billion dollars annually, when adjusted for year 2000-level inflation.[43] The heroin business began to shrink after that, when Operation Condor and other Mexican interdiction initiatives severely limited the availability of the product. The crackdown on production and smuggling also affected marijuana, which until the 1970s

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[40] Astorga, *El Siglo de las Drogas*, 113-120.
[41] Toro, *Mexico's War on Drugs*, 17.
[42] Carlos Resa Nestares, *El Valor de las Exportaciones Mexicanas de Drogas Ilegales 1961-2000* (Colección Documentos, Universidad Autónoma de Madrid, 2003), 53-62.
[43] Because of the lack of information in this area, Resa Nestares devises his own data based on seizures in the United States and narcotics prices given by researchers such as Astorga and King for certain years. He then adjusts financial data to the rate of inflation in 2000.

was the leading illegal drug exported by Mexico. That industry suffered a violent contraction in shipments to the United States – its only market – in the late 1970s and early 1980s, decreasing from a value of about $1 billion in 1972 and 1973 to less than $300 million in 1981.

In addition to production concerns, another key factor in that decline, as Resa Nestares notes, was a strong rejection by U.S. consumers of Mexican marijuana after word spread throughout America that Mexican authorities were using toxic sprays to eradicate marijuana crops in many parts of their country. As marijuana sales sagged, Mexican cartels embraced cocaine more and more, triggering a profound revamping of the structures of most smuggling gangs. The value of Mexican exports of cocaine to the United States amounted to $4 billion in 1984, but by 1991, it had climbed to double that, as measured in dollars adjusted for inflation at 2000 levels.[44] Even though marijuana exports levels recovered fully by 1984, the value of Mexican marijuana began to slide after 1991 and has never fully recovered, as increasing competition for market share in the U.S. has continued to hold prices in check.

It was in late 1984 that authorities discovered a huge marijuana processing center hidden on the grounds of El Búfalo ranch in the remote desert of Chihuahua. The area was being used to store thousands of tons of marijuana while Operation Condor was being conducted, with those who controlled the area apparently hoping to wait-out authorities and only smuggle their product to the United States once the crackdown had ended. That discovery was so costly that analysts believe it prompted a conscientious decision on the part of Mexican drug organizations to hit back. In February 1985,

[44] Resa Nestares, *El Valor de las Exportaciones Mexicanas*, 38-39.

undercover DEA operative Enrique Camarena and a Mexican pilot were kidnapped. Both were murdered, and their tortured remains were soon recovered.

To this day, Camarena is the only DEA agent killed while working in Mexico. Up until his death, targeting a U.S. government official had been a line Mexican smugglers were unwilling to cross. The U.S. responded with operation "Stop and Seize," virtually closing its border with Mexico again, as a way of pressing Mexico City to get to the bottom of what happened to Camarena. U.S. officials believed Mexican police authorities were involved in the agent's kidnapping as he worked to prove that the western city of Guadalajara, Mexico's second-largest, was become a key center for international drug trafficking. When Mexican investigations into the slayings stalled, DEA Director Francis Mullen declared to reporters that guards from the Mexican Federal Directorate of Security had let the main suspect in Camarena's kidnapping escape. "This concerns us, and we wonder why he was allowed to go," Mullen said.[45]

Rafael Caro Quintero was the alleged head of the powerful Guadalajara Cartel and had a romantic relationship with the niece of the governor of Jalisco state, of which Guadalajara is the capital. He eventually was captured in Costa Rica and returned to Mexico to face charges for Camarena's murder, as well as accusations he was a top leader of one of Mexico's largest and richest drug production and smuggling organizations. After his capture, Mexican authorities released for the first time a list containing the names of the country's top drug kingpins, and acknowledged that some law enforcement officials had links to the illegal organizations, while at the same time maintaining that the relationship between the cartels and corrupt officials was relatively

[45] Mullen, quoted in story "U.S. Charges Mexico Let Suspect Flee-DEA Chief Also Says Federal Police Aided Kidnapping Fugitive," The *Los Angeles Times,* February 25, 1985.

isolated and had not spread to all legal and law enforcement institutions.[46] Despite those assurances, in 1985, Mexico shut down the Federal Directorate of Security (DFS), a national police force that had been charged with preserving the country's internal stability when it was created in 1947. That was the same group the DEA director claimed let the man behind Camarena's kidnapping escape, and also had faced the bulk of accusations of widespread corruption and charges its agents offered protection to drug gangs in exchange for sizeable bribes. The names on the official list of heads of the drug trafficking organizations included Miguel Ángel Feelix Gallardo, Rafael Caro Quintero, Juan José Esparragoza Moreno, and Jorge Fabela Escobosa.

Ernesto Fonseca Carrillo, alias "Don Neto," was known as a founding member and longtime patriarch of the Guadalajara Cartel. He was arrested a short time after the list was released. More fortunate was Miguel Ángel Félix Gallardo, who was on the administrative board of a local bank, had close ties to a former Sinaloa governor and was frequently mentioned in the social pages of newspapers in Culiacán. He remained free until 1989, despite more than a dozen arrests warrants issued against him dating back to 1971.[47]

THE EMERGENCE OF COCAINE AND THE RESTRUCTURING OF THE CARTELS

The capture of the Guadalajara Cartel's main leaders forced the group to reorganize, with low-ranking associates moving up to higher positions. The new kingpins divided the group's territory into smaller fiefs and routes to the U.S. market, and for a while formed an alliance under a makeshift umbrella organization that became known as "The Federation." Among its members were the Arellano Félix family, which controlled

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[46] "En Estados Unidos se promueven presiones económicas y la Procuraduría niega que México sea trampolín de droga," Proceso, February 23, 1985.
[47] Astorga, *El Siglo de las Drogas*, 145.

the city of Tijuana, and lucrative routes into neighboring San Diego and much of Southern California; the Amado Carrillo Fuentes group, based in Ciudad Juárez, across the border from El Paso, Texas; and the Amézcua Contreras organization, identified as the largest illegal importer of ephedrine – a key component of synthetic drugs, including methamphetamine – into Mexico and on to U.S. territory from the tiny Pacific Coast state of Colima. A DEA Report in 1996 characterized those organizations as "major Mexican trafficking groups" and concluded that they "operated within a fluid, flexible, and elastic system."[48]

The DEA report explained that alliances among the groups at that time hold, but also "shift, or shake-ups in the hierarchy occur with the divergence of interests and eruptions of internecine violence. But while the precise roles of specific groups and individual organization members often blur, there is an overarching structure within which drug trafficking operates: The Federation." The other big organization, one which shunned the coalition, was the Cartel of El Golfo, based in Matamoros, Tamaulipas, also on the border with the United States. This group developed in the 1980s under the leadership of Juan Garcîa Ábrego, who was captured in 1996 and later extradited to the United States. By the end of the millennium, a young ambitious hit man named Osiel Cárdenas Guillén had risen through the ranks to become the group's leader.

The Federation would last until the early 2000s, but in the mid-1990s was already beginning to crack. The most notorious problem arose with the slaying of the Archbishop of Guadalajara, Juan Jesús Posadas, during a shootout in the parking lot of the city's airport in 1993. Posadas was allegedly mistakenly identified as a rival drug lord and was caught in the crossfire between gangs. The bands that opened fire on one another that

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[48] "Methamphetamine Situation in the United States Report", Drug Enforcement Administration (DEA), Washington, D.C., March 1996, accessed March 2, 2012, http://www.fas.org/irp/agency/doj/dea/product/meth/toc.htm

afternoon should have been cooperating as mandated by the alliance. Instead, members of the Tijuana Cartel, headed by the Arellano Félix brothers, and operatives loyal to a gang controlled by Joaquín "El Chapo" (Shorty) Guzmán Loera tried to kill one another. Over the next decade, loyalties would crumble further, with every group working in its own interest while occasionally forging alliances in order to defeat a common rival or gain new territories and routes to smuggle drugs to the United States.

Early in the 1990s, the Guadalajara Cartel had been identified by the DEA as one of the first Mexican drug trafficking groups to work with the Colombian cocaine mafias.[49] At some undetermined point, Mexicans started smuggling Colombian cocaine to the United States themselves, no longer relying on networks established by the Colombians and even charging them a fee for transportation.[50] Although at first the amounts moved unilaterally by the Mexicans were minimal, after more aggressive and effective interdiction measures proved successful in the Caribbean, cocaine traffickers modified their tactics and operations. Primary cocaine routes began to pass through Central America and Mexico, and ships replaced planes as the most common form of transport.[51] But the main impetus for the rise of the Mexican gangs in the cocaine market was the fall of the big cartels in Colombia. The killing of Pablo Escobar, the head of the Medellín Cartel on December 2, 1993, was followed by the capture and extradition of the Rodríguez Orejuela brothers, who had controlled the rival Cali Cartel. As Colombian organizations became increasingly fragmented, Mexican traffickers began to gain more

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[49] Drug Enforcement Administration (DEA), 1996 *Methamphetamine Situation in the United States Report*, Washington, D.C:, March, 1996, accessed March 2, 2012, http://www.fas.org/irp/agency/doj/dea/product/meth/toc.htm

[50] Thoumi, *Illegal Drugs,* 100.

[51] Peter Reuter, "Quantity Illusions and Paradoxes of Drug Interdiction: Federal Intervention into Vice Policy," *Law and Contemporary Problems*, 1988, 51 (1), 233-252.

power, smuggling cocaine produced in South America into the United States without relying on Colombian groups for protection, know-how and support.

THE NEW MILLENNIUM

The beginning of the new century in Mexico saw the stunning electoral defeat of the Institutional Revolutionary Party (PRI) for the first time since its founding 71 years earlier. The system that Peruvian writer Mario Vargas Llosa once famously dubbed "the perfect dictatorship" because the PRI enjoyed absolute control under the guise of purportedly free and fair presidential elections every six years,[52] was suddenly finished. In its place, Mexico shifted to an imperfect democracy, headed by an against-all-odds rancher from the northern state of Guanajuato, Vicente Fox of the conservative National Action Party, or PAN. Fox had worked as a manager at Coca-Cola de México before becoming the presidential candidate that toppled the PRI party machine in July 2000. Many things were different from then on. Not only did Fox vastly improve the image of Mexico's presidency simply by winning the election as a member of a party other than the PRI, he also shifted the perception of his new office from overly formal to that of a cowboy who always wore boots and a wide leather belt with a large metal buckle. He also vastly remade the structure of power within his administration, dismantling at least part of a PRI bureaucratic system that had become so unwieldy since coming into being in 1929.

Sociologist Luis Astorga, a leading researcher on Mexico's drug trade, asserts that throughout the country, illegal drug production and trafficking had long since become accustomed to offering kickbacks for protection from authorities, who used state

[52] "Vargas Llosa: México es la dictadura perfecta," El País, September 1, 1990, accessed June 12, 2012, http://elpais.com/diario/1990/09/01/cultura/652140001_850215.html

resources to protect drug gangs in exchange for personal bribes.[53] Despite some successful crackdowns, including Operation Condor, smuggling syndicates understood that as long as they kept making protection payments, authorities would generally leave them alone. The Fox government changed that however, first involuntarily, by simply replacing the previous PRI bureaucracy – which had had deep contacts within drug organizations. Fox chose new, conservative officials from the PAN, many of whom had no knowledge of how the previous government's power structure had functioned.

Also, the new president sought to clean up the ranks of anti-drug authorities and erase longstanding ties between all levels of government and drug cartels. Doing so was not so easy, however. Drug gangs responded with increased levels of violence and, anxious to restore order, the Fox government began to rely more heavily on soldiers through a large military initiative called "Operation Safe Mexico," which ultimately only served to make the violence worse. Decades of relative calm built on corruption disintegrated, and the result was a blood bath that made the government even more nervous. Mexican authorities said rising violence proved they were winning the war against drug smugglers, claiming that the major cartels were being forced to endure violent internal shakeups and outside challenges just to continue operating.[54] But, as Astorga explains,[55] authorities began "employing the current, desperate measures we have seen, such as the increased use of the armed forces, in an attempt to recover the relative control and containment of the drug trafficking business that had previously operated for decades."

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[53] Astorga interview with the author of this paper in Mexico City, May, 2010.

[54] Personal interview with Mexico's former deputy attorney general for drug crimes, Jose Luis Santiago Vasconcelos, between 2002 and 2006, when I was a reporter working first with the Spanish News Agency EFE, and then for the British news agency Reuters.

[55] Astorga, *El Siglo de las Drogas*, 162.

For a while, the strategy worked. The Fox administration captured Benjamín Arellano Félix, the smart-as-a-whip operations chief of the powerful and blood-thirsty gang bearing his family's name in Tijuana. Around the same time in 2002, the group's fearsome enforcer, Ramón Arellano Félix, was shot and killed, crippling the family business. Authorities also collared Osiel Cárdenas, the head of the Gulf Cartel, the following year. While Fox declared those blows against drug smuggling historic victories, a void at the top unleashed a war for territory that centered on Nuevo Laredo, part of the area under the control of the Gulf Cartel and the main entry point for drugs into Texas. The border city, which had always been a coveted prize, became even more fiercely sought-after by rival drug gangs. Drug-related killings became so frequent there in the summer of 2005 that the army had to permanently occupy the city, a move that did not succeed in tampering down the murder rate, but at least kept the surrounding region from sliding into chaos.

DRUG KINGPIN CEOS

Globalization has transformed Mexico's business world and has also had a major impact on drug trafficking. What began as a family business has long since outgrown its distinction as a collection of mom-and-pop operations. Drug groups today are cranking out heroin and marijuana, and moving record levels of cocaine, but they also are diversifying into products such as synthetic drugs, with a level of sophistication and professionalism never before seen.

Mexico still produces heroin and marijuana but only in the latter does the country remain an important global producer. In the case of heroin, Afghanistan alone accounted for 92 percent of global production in 2007, cranking out 6,100 of the 6,610 metric tons available globally, according to United Nations Office on Drugs and Crime. Mexico is a

small heroin player now, but its production continues to constitute a "major source" for the U.S. market.[56] The same has been true for marijuana, whose production has spread to many parts of the globe. Mexico, however, is the world's leading producer. In 2006, Mexico produced 7,400 out of the 41,400 metric tons on the world market,[57] and most of its production continues flowing north to its neighbor. "The majority of marijuana produced in Mexico enters the U.S. market," said the International Narcotics Control Strategy Report 2008, produced by the U.S. State Department.

And though Mexico does not produce cocaine, U.S. authorities estimate that 90 percent of all cocaine consumed in the United States is now smuggled there via Mexico.[58] As recently as 2007, the Mexican attorney general's office barely even acknowledged that the country's drug gangs had links to cocaine cartels in other parts of the world, but Colombian traffickers were far more vocal about those ties. Luis Hernando Gómez, a top leader of the Colombia cartel Norte del Valle, said in an interview with the newspaper El Tiempo that Mexicans were controlling cocaine traffic in all of Latin America.

> Today, they impose the conditions. They are practically managing the business. They are very smart: if you send them 1,000 kilos, 400 are for them and they charge 20 percent for smuggling it to Guadalajara or Mexico City, and the investment is charged totally on us.[59]

Mexican drug organizations also expanded their links to coca producers in Peru since the 1990s.[60] In 1995, 3.2 tons of cocaine destined for Mexico was seized in the coastal city of

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[56] "International Narcotics Control Strategy (INCS) Report 2009," Vol. I. Drug and Chemical Control. Mexico Chapter, accessed February 10, 2012, http://www.state.gov/p/inl/rls/nrcrpt/2009/vol1/116522.htm

[57] "World Drug Report 2008", United Nations Office on Drugs and Crime, accessed February 10, 2012, http://www.unodc.org/documents/wdr/WDR_2008/WDR_2008_eng_web.pdf

[58] "International Narcotics Control Strategy Report 2008," Vol. I. Drug and Chemical Control. Mexico Chapter, 176.

[59] "'Rasguño' habló, en exclusiva, con *El Tiempo* el pasado 22 de marzo de 2007," El Tiempo, July 19, 2007, accessed March 2, 2012, http://www.eltiempo.com/archivo/documento/CMS-3645628

[60] Drug trafficker Oscar Benítez stated that the Juárez Cartel even paid bribes to then Peruvian presidential advisor Vladimiro Montesinos in order to export cocaine to Mexico without problems. The statements from

Piura. Then, in 2002, a huge Peruvian operation led officials to discover the true dimension of the presence of Mexican cartels in their country, when they captured another 1.7 tons of the narcotic. By 2006, the then head of Peru's National Anti-drug Directorate, Carlos Olivo, recognized that Mexican cartels, especially the Tijuana organization, were sending their representatives armed "with millions of dollars to invest jointly with the Colombians in cocaine production in Peru." The Colombians contributed added know-how and even had begun sending their own chemists to the jungle to install labs close to the coca fields.[61] By 2008, Peruvian President Alan García asked for help from Mexican police to fight Mexican cartels in his country.[62] "We identified the aggressive entry of Mexicans trying to rebuild in the Upper Huallaga Valley (in the northeast), undoing all progress the state had made in coca eradication," he said during a press conference during the APEC meeting in November 2008. From then on, media reports quoting DEA agents in South America have mentioned growing links and the expanding operations of Mexican drug organizations in other Latin American countries, and even in Europe.[63]

But if Mexico is so important in the drug trafficking supply chain to the United States, why haven't drug gangs in other countries attempted to challenge its dominance? The answer came from Mexico's deputy attorney general for anti-narcotics, who said in a personal interview in September 2003 that the country's cartels are too ruthless to let non-Mexican smugglers get even a toe-hold in their territory.

Benítez were used in the trial against businessman Fernando Zevallos, accused of being involved in drug trafficking in 2004.

[61] Olivo's comments appeared in a story by news agency IPS from Lima, Peru, on August 24, 2006.

[62] "Alan García pide apoyo de policía mexicana", Televisa, Nov. 27, 2008, accessed February 10, 2012, http://www2.esmas.com/noticierostelevisa/internacional/026794/alan-garcia-pide-apoyo-policia-mexicana

[63] Monica Medel, "Narcos Mexicanos, nuevos reyes de la droga en América," Reuters, July 17, 2007; "Mexican drug gang tentacles reach Europe, Africa," Reuters, December 23, 2008; "Guatemala president orders army to join drugs fight," BBC, January 15, 2012, accessed March 9, 2012, **http://www.bbc.co.uk/news/world-latin-america-16570292**

> Mexican drug kingpins are very violent and territorial. This prevents other organizations from settling in. Although Mexicans tolerate the presence of representatives from other groups, they allow them to move in only to do business, not to exploit territories.[64]

The Mexicans are shrewd businessmen and one of the most recent examples of their acumen came with the rise of the synthetic drug market in the United States. As drugs like methamphetamine became wildly popular in cities and towns across America, Mexican smuggling syndicates learned very quickly that it and other synthetics can be produced virtually anywhere at extremely low costs. Since 1990, authorities have detected production of amphetamine-type stimulants (ATS) such as methamphetamine and amphetamines (the kind of meth produced in Mexico) in 60 countries around the world and counting. The main market for Mexican ATS is, of course, the United States. Ephedrine, a supplement that can still be purchased over-the-counter in many parts of the world, is a key ingredient of synthetic drugs. In 2006, Mexico seized a record 20 tons of ephedrine and seized nearly 13 tons of pseudoephedrine the following year, according to data from the PGR, or federal attorney general's office.[65] Even though seizure levels for such chemicals declined for a while since then, in the past year, methamphetamine labs have mushroomed in central México, especially in the states of Sinaloa and Jalisco. Santiago Vasconcelos, Mexico's deputy attorney general, explained the rise of synthetic drugs in Mexico as follows to El Universal newspaper in Mexico City in June 2008, mere weeks before a plane carrying him and other top officials crashed under mysterious circumstances:

> These drug lords recognized the synthetic drug market as an alternative. You have no risk in the transport, you don't need large areas of cultivation, your costs in

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[64] Personal interview with Vasconcelos, published September 4, 2003, by EFE news agency.

[65] "Resultados de la Política Mexicana Contra la Delincuencia Organizada," Procuraduría General de la República (PGR), June 9, 2009, accessed January 28, 2012, http://www.pgr.gob.mx/prensa/2007/docs08/hoja_ruta_results_politicmex.pdf

> bribes decrease, you don't need to put at risk a large amount of infrastructure such as planes, ships, vehicles. In a little room of two by two meters, you can 'cook' synthetic drugs with an extraordinary profit.[66]

THE RECOMPOSITION OF DRUG ORGANIZATIONS

After the major arrests and resulting violence of the early 2000s, Mexican drug trafficking groups entered a new and major transitional phase. According to the Mexican federal attorney general's office, representatives from different groups briefly formed a sort of administration board under the umbrella of the Juárez Cartel – though external disputes eventually caused that alliance to collapse.[67] The organization that emerged as the most powerful and influential was the Sinaloa Cartel, headed by Joaquín "Shorty" Guzmán. Standing 1.70 meters (5-feet 7-inches) tall, Guzmán is today the most-wanted criminal in Mexico, He even made the Forbes Magazine top millionaires list, ranking No. 701 in 2009 with a fortune believed to exceed $1 billion.[68] Guzman was one of the pioneers of building tunnels under the U.S.-Mexico border, moving countless tons of cocaine, marijuana and heroin into the United States without detection and multiple shipments of weapons into Mexican territory on the way back. He was arrested in Guatemala in 1993 and imprisoned until 2001, when he and his associates bribed prison guards who allowed him to escape in a laundry truck. His whereabouts since then remain unknown, though the Mexican attorney general's office considers him a "drug guerrilla warrior" because authorities believe he spends at least some of time hiding in caves in the mountains. And yet, Guzmán has proven extremely effective at controlling and even boosting his drug business while avoiding capture.

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[66] "El cerebro financiero de 'El Chapo'," *El Universal*, June 2, 2008, accessed March 22, 2012, http://www.eluniversal.com.mx/nacion/159894.html

[67] Personal interview with the deputy attorney general published September 4, 2003, by EFE news agency.

[68] "The World's Billionaires: #701 Joaquin Guzman Loera," *Forbes*, March 11, 2009, accessed December 3, 2011 http://www.forbes.com/lists/2009/10/billionaires-2009-richest-people_Joaquin-Guzman-Loera_FS0Y.html

The Sinaloa Cartel operates with a complex power structure, where Guzman is the boss but coordinates closely with Ismael "El Mayo" Zambada and Ignacio "Nacho" Coronel, who are in charge of important territories and smuggling routes controlled by the organization. While their full duties are unknown, Mexican authorities have identified Coronel as the head of the Sinaloa Cartel's synthetic drug operations. Below Guzmán and his top deputies, there are what have become known as "jefes de plaza," or regional bosses who control certain areas, usually cities. Other top cartel leaders are in charge of finance, logistics, transportation and security.[69]

The area of security has been further developed by drug organizations after the PRI lost the presidential election in 2000. With the military increasingly turning to fighting drug trafficking, the decision about where to go to best protect cartel interests was easy: In a bold move, Osiel Cárdenas co-opted a division of the Mexican Army's best-trained special forces unit, the Grupo Aeromóvil de Fuerzas Especiales (GAFE). This new group of drug enforcers became the base of the violent gang known as the Zetas.[70] They soon became so powerful that General Ricardo Clemente Vega, then Mexican Defense Minister, said in 2003 that not only were members of the GAFE being bought by drug smugglers, but the problem was spreading to other reaches of the military: "Hiding it would be a lie. It's a cartel, a big cartel, which recruited all deserters. Unfortunately, this is happening everywhere. These are people without honor, without conviction, without passion or desire to defend Mexico."[71]

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[69] "Radiografía de las Organizaciones de Narcotraficantes," Secretaría de Seguridad Pública (SSP) de Mexico, April 19, 2007, document facilitated to Monica Medel by the PGR in 2007.

[70] Ricardo Ravelo, 2006, *Los Capos: Las Narco-Rutas de Mexico* (Mexico: Random House Mondadori, 2006) 253-259.

[71] Statement by General Ricardo Clemente Vega, then Mexican Defense Minister. It is taken from a story reported and written by the author of this paper for EFE news agency in Mexico City on March 14, 2003.

Some members of the special forces resigned, but others simply defected and became part of the Gulf Cartel, which also had civilians enrolled in its armed wing. In January 2008, Mexico's deputy minister of defense, Tomás Angeles Dahuajare, acknowledged to Congress that more than 100,000 soldiers had defected since 2000, some of them to join drug organizations.[72] That was when fighting among drug cartels in Mexico began becoming especially fierce and ruthless. For the first time in Mexican history, battles among rival gangs became so hostile that they left massive trails of killings and even dabbled in torture and mutilation, as the bodies of victims recovered by police later showed. The coup the grace, gang-speak for a gunshot to the temple, was no longer sufficient. Instead, gunmen – who had previously generally kept feuds contained, settling scores among themselves and not targeting society as a whole – began killing indiscriminately: policemen, local security officials, and journalists. In response, the Sinaloa Cartel formed its own militia, not using Mexican army officials but instead recruiting members of the Chachos, Los Negros, Gente Nueva, and Los Texas street gangs in Mexico,[73] while also banding together with the U.S.-based Texas Mexican Mafia (TMM) and Mara Salvatrucha (MS-13), which was born in Central America.[74] The situation was so dire that U.S. Ambassador to Mexico Tony Garza declared in August 2005 that America's southern neighbor had failed to quell drug violence and warned Mexican authorities that the longer the killings persisted, the more difficult it would be for Washington to consider Mexico a "reliable partner."[75]

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[72] "Han desertado 17 mil militares en sólo un año," *La Jornada*, January 23, 2008, accessed January 28, 2012 http://www.jornada.unam.mx/2008/01/23/index.php?section=politica&article=007n2pol

[73] "Recaptura de 'El Chapo', prioridad para México y EU," *Notimex*, January 19, 2009, accessed June 13, 2012, http://www.eluniversal.com.mx/notas/570217.html

[74] "Texas Gang Threat Assessment 2010," Texas Department of Public Safety, September 1, 2010.

[75] U.S. ambassador's comments to the Mexican press, cited in an EFE story, August 17, 2005.

KILLINGS AND BUSINESS

The new business management style has also created division between the organizations that have adopted it, and those smuggling gangs that preferred to adhere to the more-traditional, family-style of management. Among the latter syndicates was "Los Valencia," which had long controlled drug production and smuggling in the central state of Michoacán, and the Díaz Parada group, which produced and transported marijuana in the southern Pacific Coast state of Oaxaca.[76] Both organizations began to buckle in the face of unprecedented violence and enjoy little of the importance today that they did in decades past. Currently, Mexico's most-powerful drug gangs, including the Sinaloa Cartel, the Tijuana Cartel and the Gulf Cartel, all rely on tactics of business management and have thrived. A key reason for their success has been the pressure applied by Mexican authorities. Family-style gangs depended on a very centralized decision-making process that placed a great deal of authority in the hands of a strong boss – a system that allowed few new and younger leaders to emerge, and discouraged groups from expanding into territories beyond those that they traditionally controlled. When authorities, or rival drug gang members, killed or captured a group's kingpin, there was often no one capable of stepping up and replacing him. The business management style, meanwhile, is more likely to create a decentralized administrative system and decision-making boards where every member has a well-determined and established area of territory, and the full group only meets to make the biggest decisions. That style has not only shielded them from catastrophe when top leaders are killed or captured, but also allowed them to maintain

[76] Secretaría de Seguridad Pública, *Radiografía de las Organizaciones*.

consistent and stable control over large portions of territory apt for production and smuggling routes.[77]

THE ALL-OUT WAR ON DRUGS

In the middle of the already important organizational transformation of many of Mexico's most-powerful and most-violent drug organizations, the election of President Felipe Calderón, a fellow member of Fox's National Action Party, in July 2006, provided the impetus for still more profound change of Mexico's illicit drug business. Immediately after taking office that December, Calderón declared an all-war on drugs and sought major support from the United States. In 2007, Calderón and U.S. President George W. Bush signed the Mérida Initiative, a $1.7 billion, bilateral plan to provide Mexico and Central America with American equipment and training to combat drug-related crime. Even though it was not the first time Mexico was partnering with the United States to fight drug trafficking, the agreement did mark the first time that the assistance was not imposed in exchange for certification for good performance in combat drug production and smuggling, or amid rising political tensions between Washington and Mexico City. The assistance from the United States became even more fluid after the U.S. Congress assigned some $1.5 billion of the Mérida plan budget exclusively to Mexico.[78]

Calderón set out to weaken the organizational structures of Mexico's most-powerful cartels by directly attacking the heads of each gang. Like Fox, he relied heavily on the military, but unlike his predecessor, Calderón dispatched soldiers across much of the country instead of using them to quell violence in areas where it had spiked, thereby

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[77] Information on this topic comes from a series of interviews between 2002 and 2007 that the author of this paper conducted with Mexico's then deputy attorney general José Luis Santiago Vasconcelos, the top official in charge of fighting drug trafficking related crime.

[78] Clare Ribando Seelke, and Kristin M. Finklea, "U.S.-Mexican Security Cooperation: the Mérida Initiative and Beyond," Congressional Research Service (R41349, February 16, 2011).

hoping to take the fight directly to top kingpins. His strategy had a profound effect, but not the one the president or his administration was hoping for. The militarization of the conflict in an attempt to control violent outbreaks, especially in cities along the border with the United States. and in drug-producing areas, ended up fueling a crime rampage that has killed nearly 50,000 Mexicans since December 2006.[79] In fact, increased American cooperation in Calderón's offensive came shortly after U.S. Defense Department experts warned in November 2008 that Mexico was on the verge of "a rapid and sudden collapse" to become a "homeland security problem of proportions to the United States."[80]

> The government, its politicians, police, and judicial infrastructure are all under sustained assault and pressure by criminal gangs and drug cartels. How that internal conflict turns out over the next several years will have a major impact on the stability of the Mexican state.

In the beginning, the Mérida Initiative merely focused on disrupting organized criminal groups and institutionalizing the rule of law in Mexico, but in the Spring of 2010 Beyond Mérida – a follow up to the original program – also included community building, improving the criminal justice system, and strengthening non-army military training.[81] In his fifth state of the union address on September 1, 2011, Calderón asserted that 97,929 criminals linked to drug trafficking and 6,560 kidnappers had been arrested, while 902 crime gangs had been disbanded during his administration.[82] The numbers

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[79] "Mexico's Drug War: 50,000 Dead in 6 Years," The Atlantic, May 17, 2012, accessed June 15, 2012, http://fpc.state.gov/documents/organization/171385.pdf

[80] "The Joint Operating Environment 2008. Challenges and Implications for the Future Joint Force," U.S. Joint Forces Command, accessed on June 9, 2012, http://www.jfcom.mil/newslink/storyarchive/2008/JOE2008.pdf

[81] Vanda Felbab-Brown, "Stemming the Violence in Mexico, but Breaking the Cartels," *The CIP Report*, September 2010, accessed May 20, 2012, http://cip.gmu.edu/archive/CIPHS_TheCIPReport_September2010_BorderSecurity.pdf

[82] "Quinto Informe de Gobierno", Mexico's Presidency, Mexico, September 1, 2011, accessed June 20, 2012, http://quinto.informe.gob.mx/archivos/informe_de_gobierno/pdf/Quinto-informe-de-gobierno.pdf

were purported to support his military strategy against drug organizations and the expanded efforts of the Mérida Initiative, but also represented an appalling reminder of how crime and violence had skyrocketed during his administration. In this current environment of open cooperation with the United States, Mexico has extradited 464 criminals to face justice abroad in the last five years, almost 200 percent more than during the Fox administration. Most of the extradited were criminals accused of drug trafficking or drug-related crimes, and the immense majority was sent to the United States. Among them were Osiel Cárdenas, chief of the Gulf Cartel, and Benjamín Arellano Félix, head of the Tijuana cartel, extradited in January 2007 and April 2011, respectively. In an effort to beat back the extensive human network that allows drug activities to flourish, Calderón also launched "Operation Cleanup" in October 2008. The investigation led to the detention of many government officials, among them the deputy attorney general in charge of fighting drug trafficking, the head of Interpol Mexico, and top leaders in the government's intelligence apparatus, anti-narcotics office and the heads of police forces and security networks.[83]

The collaboration with the United States, however, had its drawbacks. According to secret U.S. diplomatic cables released by WikiLeaks, Washington praised Mexican marines' emerging role in the counter-narcotics war, while belittling the role of the Mexican Army, which U.S. officials often see as corrupt at best and openly incompetent at worst. "Our ties with the military have never been closer in terms of not only equipment transfers and training, but also the kinds of intelligence exchanges that are essential to making inroads against organized crime," said John Feeley, the deputy chief

[83] "Reitera el presidente Calderón el firme compromiso del gobierno federal para combatir a la delincuencia organizada," Mexican Presidency, November 27, 2008, Press Release, accessed May 20, 2012, http://www.presidencia.gob.mx/2008/11/reitera-el-presidente-calderon-el-firme-compromiso-del-gobierno-federal-para-combatir-a-la-delincuencia-organizada/

of mission for the U.S. Embassy in Mexico City, in a cable dated January 29, 2010, to describe the relationship with Navy marines.[84] Other secret cables published by WikiLeaks, meanwhile, leave no doubt about Washington's lack of confidence in the Mexican Army. One such cable reveals how U.S. Ambassador to Mexico Carlos Pascual said that information on the whereabouts of key Beltrán-Leyva drug organization leaders was first provided by the DEA to the Mexican Army, "whose refusal to move quickly reflected a risk aversion that cost the institution a major counter-narcotics victory."[85]

The Mexican government had also blamed the U.S. for the increasing violence, arguing that Washington's decision to let the Federal Assault Weapons Ban of 1994 expire sped the flow of smuggled guns flooding into Mexico. The prohibition had prevented for 10 years, until 2004, the sale to American civilians of certain, specific semi-automatic rifles. Right after the ban expired, however, Mexico saw cases in which drug organizations used heavy firepower balloon. Drug cartels commonly use semi-automatic handguns and rifles like AK-47s, which are illegal for civilians to purchase in Mexico. Instead, arms dealers buy guns in the United States and bring them south-of-the-border. Allowing the assault weapons ban to expire just made the entire process easier. [86] President Calderón raised this issue with President Barack Obama during his visit to Mexico in April 2009, saying: "from the moment the prohibition on the sale of assault

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[84] "Existe descoordinación entre agencias de seguridad. Cable 10MEXICO83," WikiLeaks en La Jornada, accessed March 2, 2012, http://wikileaks.jornada.com.mx/cables/narcotrafico/existe-descoordinacion-entre-agencias-de-seguridad-cable-10mexico83/

[85] In May 2008 the George W. Bush administration recognized the Beltrán Leyva organization (BLO) as a major drug organization, subjecting it to sanctions under the Foreign Narcotics Kingpin designation Act ('Kingpin Act'). The leader of the gang, Arturo Beltrán Leyva, was killed by Navy commands in a raid in Cuernavaca, Mexico, in December 16, 2009.

[86] The pattern of weapons supplies to Mexican drug organizations was not clear until 2009. Previous reports from the Mexican Attorney General's Office asserted that arms were bought in the U.S. for individuals who were contacted by cartel distribution networks in Mexico, but that the cartels were not directly controlling weapons smuggling into their country. But in April 2009, the arrest of Victor Varela in Arizona challenged that view. Varela told U.S. authorities he was an arms supplier directly for the Juarez cartel.

weapons was lifted a few years ago, we have seen an increase in the power of organized crime in Mexico."[87] The fact that U.S. Customs officials have been arrested and even sentenced to prison for helping Mexican drug cartels smuggle drugs into American territory, and weapons back to Mexico, only serves to exacerbate the problem.[88]

The smuggling of weapons south, to Mexico, became a scandal in December 2010, when the murder of Border Patrol agent Brian Terry revealed that the Alcohol, Tobacco and Firearms bureau (ATF) had allowed hundreds of weapons to cross the border and go directly to drug organizations as part of intelligence operation Fast and Furious,[89] which had originally intended to stem the flow of illegal guns to Mexico.[90]

LOOKING FOR A NEW STRATEGY?

As Mexican presidential elections approached on July 1, 2012, it was clear that all of the major candidates to succeed Calderón (who by Mexican law is limited to a single, six-year term as president) were wary of such horrific levels of violence and wanted to introduce drastic changes in the strategy against drug trafficking. Even Josefina Vásquez Mota, the presidential candidate from the same PAN party the president belongs to, said in Washington that, if elected, she will be tough against drug-related crime, but also will search for more political agreement when developing new policies. "No amnesty, no

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[87] President Calderón made this statement during President Obama's visit to Mexico City on April 16, 2009.

[88] Randall C. Archibold, "Hired by Customs, but Working for Mexican Cartels," *The New York Times*, December 17, 2009, accessed December 12, 2011, http://www.nytimes.com/2009/12/18/us/18corrupt.html?pagewanted=all

[89] "ATF Fast and Furious: New documents show Attorney General Eric Holder was briefed in July 2010," *CBS News*, October 3, 2011, accessed July 20, 2012, http://www.cbsnews.com/8301-31727_162-20115038-10391695.html

[90] The Fast and Furious operation was a small part of the much larger Project Gunrunner to combat firearms-related violence affecting both sides of the border. To learn more about this project, see "Borders and Law Enforcement. Project Gunrunner," http://www.usembassy-mexico.gov/eng/texts/et080116eTrace.html

pact, no deals. Whoever … will suffer the consequences," she said.[91] PRI candidate Enrique Peña Nieto, the race's front-runner, instead announced his intention to hire Colombia's top face in the fight against crime, General Oscar Naranjo, as his chief security adviser to draft a new strategy against drug organizations.[92] Naranjo, who had a decisive role in bringing down Pablo Escobar's empire, said in an interview with The Washington Post that Colombia and Mexico are similar in that drug traffickers use terrorism, and that he would be more aggressive in attacking the cartels' finances. Even though some surveys have showed that the majority of Mexicans would like the United States to send troops to help Mexico fight drug-related violence,[93] Mexico's Constitution prohibits it. A survey by The Dallas Morning News stated that 74 percent of Mexicans believe that the United States is not doing enough to stop the smuggling of American weapons to Mexico, seen as a catalyst of the skyrocketing violence since 2006. Some 52 percent of respondents to the same survey said they believed that the United States should assume a greater role in trying to reduce drug-related violence in the country, and 28 percent were in favor of allowing U.S. troops to intervene directly in the conflict. Another survey by the Pew Research Center found that 8 out of 10 Mexicans back Calderón's military crackdown against drug cartels, while 47 percent think that the campaign against traffickers is making some progress.[94]

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[91] "Josefina Vásquez Mota está en contra de pactar con el narcotráfico," CNN, October 21, 2011, accessed June 20, 2012, http://mexico.cnn.com/nacional/2011/10/21/josefina-vazquez-mota-esta-en-contra-de-pactar-con-el-narcotrafico

[92] "Peña Nieto to name Colombian as security adviser", The Washington Post, June 14, 2012, accessed June 21, 2012, http://www.washingtonpost.com/world/the_americas/pena-nieto-to-name-colombian-as-security-adviser/2012/06/14/gJQAmkCOdV_story.html

[93] "Según encuesta, la mayoría de mexicanos quiere que EU apoye contra el narco", Vanguardia, May 15, 2012, accessed June 21, 2012, http://www.vanguardia.com.mx/segunencuestalamayoriademexicanosquierequeeuapoyecontraelnarco-1287969.html

[94] "Mexicans Back Military Campaign Against Cartels", Pew Research Center, June 20, 2012, accessed on June 21, 2012, http://www.pewglobal.org/2012/06/20/mexicans-back-military-campaign-against-cartels/

With no federal police force the size of the Mexican Army, it is not clear what the alternative is to an eventual withdrawal of the military from the streets while violence continues at historic levels. It remains to be seen, however, what position Mexico's next president will take against drug trafficking. In a country rocked to the core by so much bloodshed, Calderón successor will undoubtedly face enormous pressure to stop the killings. Dialing back the current, all-out war on drugs, however, could undo any small success and political capital among the public at large, that the current policy has garnered. It remains to be seen whether Enrique Peña Nieto –who on July 1, 2012 returned the PRI to power after a 12-year absence—will continue Calderón's all-out war on drugs.

As we have seen, that Mexico became the perfect transit route for smuggling drugs on American soil was not mere coincidence. The obvious geographical factor, which made it a producer and a privileged provider of narcotics, does not explain it all. The following chapter attempts to decipher the main variables involved in the production of drugs in Mexico, from environmental factors like climate and elevation, to human variables like the proximity to roads and police presence in key areas.

Chapter 2: Exploring Marijuana and Opium Fields in Mexico: The Environmental and Human Variables that Make Cultivation Suitable

Cultivation patterns of marijuana and opium poppy, the two drugs native to Mexico, tell two different stories. The first is about climate and favorable geographical locations required for cultivation. But drug production is also built on decades of corruption that has lately been fortified by high-tech techniques that allow plants to grow faster and produce more. In fact, exploitation of technology has become so important that it is making traditional environmental factors secondary. Meanwhile, production of drugs diversifies and the proximity to smuggling routes becomes even more important.

STUDIES ON CULTIVATION PATTERNS OF ILLEGAL DRUGS

The cultivation and distribution patterns of illegal narcotics are among the more understudied topics in the academic literature on Mexican drug trafficking. There are plenty of studies on Mexico's anti-narcotics policies and law,[95] the history of drug smuggling,[96] the relationship between drugs and economics;[97] and even some research that focuses on the socioeconomic impact of drug cultivation on communities where different types of drug crops are grown.[98] But there is little written on specific, illicit crop distribution in different geographical areas of Mexico.

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[95] Peter Reuter, "Quantity Illusions and Paradoxes of Drug Interdiction: Federal Intervention into Vice Policy," *Law and Contemporary Problems* 51 (1), 1988; Maria Celia Toro, *Mexico's War on Drugs* (Boulder, CO: Lynne Rienner Publishers, 1995); Jorge Dominguez and Rafael Fernandez de Castro, *The United States and Mexico: Between Partnership and Conflict* (New York: Routledge, 2001).

[96] Astorga, *El Siglo de las Drogas*; Coletta A. Youngers and Eileen Rosin, *Drugs and Democracy in Latin America. The Impact of U.S. Policy* (Boulder, CO: Lynne Rienner Publishers, Inc., 2005).

[97] Resa Nestares, *El Valor de las Exportaciones*; Thoumi, *Illegal Drugs*.

[98] Jorge de la Herrán, "La migración campesina en Sinaloa", *Ciencia y Universidad*, 13, 1980, 77-102; Alvaro Marin, "Cambios en el financiamiento de las lanbores del campo Mexicano desde las reformas estructurales de 1983 hasta la fecha. El caso de los municipios serranos de Sinaloa," *Revista de Antropología Experimental,* 2, 2002; Arturo Lizarraga and Omar Lizarraga, "Narcotráfico, Violencia y Emigración Femenina. Estudio de Caso," Universidad Autónoma de Sinaloa,

This is in sharp contrast to an abundance of academic scrutiny of other major narcotics producers, including Colombia and Peru, the chief producers of cocaine in South America, and Afghanistan and Myanmar, the largest producers of opium and heroin in Asia, which have been profusely studied, and for which there are data on spatially located, annual estimated production. Those ongoing studies have mainly come from the United Nations Office on Drugs and Crime, which conducts periodic surveys on illegal crops to better examine the cultivation of opium, coca and marijuana (cannabis sativa).[99] The countries covered in the UNODC's studies, however, are limited to Afghanistan, Bolivia, Colombia, Ecuador, Peru, Morocco, Myanmar and Laos. The information covers a little more than a decade, starting in 2000, and is collected with the understanding and collaboration of the different governments involved by using satellite imagery and Geographic Information Systems (GIS) analysis, coupled with village surveys to trace the crops.[100]

Though Mexico is the main opium and marijuana producer in the Americas,[101] is not included in this list. It is also the case that information on Mexican marijuana and opium cultivation is scarce. That is why a serious and concentrated effort to determine the habitat suitability of each crop would be so important. First, it would allow for better research and understanding of marijuana and opium poppy's ecological impact on other flora species, as well as on the communities where illegal fields of both crops are located. Additionally, and perhaps of even greater overall significance, is the fact that determining

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Mexico, 2006, accessed March 23, 2012, http://estudiosdeldesarrollo.net/coloquio2006/docs2006/11772.pdf

[99] UNODC, "Illicit Crop Monitoring," from 2000 to 2012, accessed February 6, 2012, http://www.unodc.org/unodc/en/crop-monitoring/index.html

[100] UNODC, "South-East Asia Opium Survey 2011. Lao PDR, Myanmar," accessed February 8, 2012, http://www.unodc.org/documents/crop-monitoring/sea/SouthEastAsia_2011_web.pdf

[101] International Narcotics Control Strategy Report (INCSR), Vol. I. "Drug and Chemical Control," Mexico Chapter, Years 2008, 2009, http://www.state.gov/p/inl/rls/nrcrpt/2009/vol1/116522.htm

the chief geographical characteristics that help both illegal crops thrive could help authorities better pinpoint where such illicit production is likely to occur in the future, and thus help them eradicate it. This perspective has guided a number of studies focused on marijuana in the United States and Canada,[102] but none in Mexico.

SPECIES DISTRIBUTION MODELS

Species Distribution Models (SDM) offers a solid theoretical framework to develop studies on spatial patterns of species as a function of environmental and topographical variables, which, in turn, can be classified as indirect, direct and resource variables.[103] According to these categories, resource variables refer to matter and energy consumed by the plant (like nutrients or water), while direct variables are linked to environmental conditions that affect plants but cannot be consumed by them (temperature or PH). Indirect variables do not have a physiological impact on plants but are well correlated with species distribution. Examples of this final category include slope, elevation, geology and aspect.

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[102] Walthall et al., "What do we know about spectral signatures of illegal cannabis cultivation?," *Proceedings of the Office of National Drug Control Policy Proceedings*, 2003, accessed online February 6, 2012, http://psugeo.org/.../AppendixB03.doc; Thomas et al., "Using IT and GIS to improve crop assessments," *Proceedings of the 15th annual conference of the IIMA (International Information Management Association): Technology Twenty Years After Orwell*, Chicago, USA, 2004, accessed February 6, 2012, http://psugeo.org/Publications/MJ%20Paper%20Rev%204%20IIMA.doc; Cammie Partelow, "Using GIS to Depict Resource Risk from Probable Cannabis Cultivation Sites," San Jose State University, 2008, http://scholarworks.sjsu.edu/cgi/viewcontent.cgi?article=4584&context=etd_theses&sei-redir=1&referer=http%3A%2F%2Fscholar.google.com%2Fscholar%3Fq%3DGis%2Bcannabis%2Bcultivation%2Bpolygon%2Bfile%26hl%3Den%26btnG%3DSearch%26as_sdt%3D1%252C44%26as_sdtp%3Don#search=%22Gis%20cannabis%20cultivation%20polygon%20file%22; Hurley et al., "Tracing retail cannabis in the United States: Geographic origin and cultivation patterns," *International Journal of Drug Policy*, 21, 2010, 222-228; Martin Bouchard et al., "Journey to Grow: Linking Process to Outcome in Target Site Selection for Cannabis Cultivation," *Journal of Research in Crime and Delinquency*, 000(00), 2011, 1-20.

[103] Antoine Guisan and Niklaus E. Zimmerman, "Predictive habitat distribution models in ecology," *Ecological Modelling*, 135, 2000, 147-186.

In the case of crops, however, the distribution of plants does not depend solely on environmental and topographical variables. Because seeding, cultivation and harvest do not occur naturally, but instead rely heavily on human factors, certain variables can be controlled to create the optimal environmental conditions for the plants to grow. For example, water can be dispensed using top-notch irrigation systems that allow crops to thrive in natural conditions that otherwise could be adverse.[104] When we refer to the outdoor cultivation of illegal drugs, the human factor takes on even more relevance, considering that the production of these crops has to fulfill a myriad of conditions. Among them, a certain temperature, slope, aspect and soil characteristics are all necessary, but also proximity to roads and highways is required to make smuggling the drugs easier, while, at the same time, those doing the growing have to be far enough away from urban centers to minimize police surveillance.[105] Also, availability of rainfall via a natural precipitation regime can be supplemented using irrigation from rivers and creeks that don't necessarily have to be located nearby. That would imply that drug crops are not necessarily in balance with their environment, a characteristic that might introduce autocorrelation[106] and non-stationarity[107] in attempts to statistically model the relationship between marijuana and opium crops and their environment. Dispersal conditions, or those behaviors that lead to illegal crops' propagation and aggregation in

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[104] Fortes et al., "GISAREG—A GIS based irrigation scheduling simulation model to support improved water use," Agricultural Management 77 (1-3), 2005, 159-179; Junguo Liu, "A GIS-based tool for modeling large-scale crop-water relations", *Environmental Modelling & Software*, 24 (3), 2009, 411-422.
[105] Partelow, *Using GIS to Depict Resource Risk*.
[106] Tomás Václavík and Ross Meentemeyer, "Invasive species distribution modeling (iSDM): are absence data and dispersal constraints needed to predict actual distributions?," *Ecological Modelling*, 220, 2009, 3248–3258; Tomás Václavík, John A. Kupfer and Ross Meentemeyer, "Accounting for multi-scale spatial autocorrelation improves performance of invasive species distribution modeling (iSDM)," *Journal of Biogeography*, 39(1), 2012, 42-55.
[107] Patrick E. Osborne and Susana Suárez-Seoane, "Should data be partitioned spatially before building large-scale distribution models?," *Ecological Modeling*. 157, 2002, 249–259; Mike Austin, "Species distribution models and ecological theory: A critical assessment and some possible new approaches," *Ecological Modeling*, 200 (1), 2007, 1-19.

the space could also suggest non-stationarity. Dispersal generally accounts for population dynamics such as metapopulations and source-sink populations, a way of endogenous spatial autocorrelation,[108] as defined by Lichstein.[109] But these processes are usually not included in distribution models either because data to measure these processes are unavailable, or the factors that lead to the formation of certain specific spatial patterns in the distribution of a species are not known.[110] By using a wider definition of dispersal,[111] in this case the prey's actions in order to avoid capture, I can include the human factor that determines which areas are more suitable for marijuana and opium cultivation. According to Wiens et al.,[112] human actions can greatly contribute to fragmenting the distribution landscape of species. Further, in combination with environmental conditions, the coupled effect may push the species to isolated patches of terrain that match its requirements. In the case of marijuana and opium cultivation, the human factor largely can be accounted for by including certain distances from urban centers, or measures of population density, as well as low police presence.[113] An index of corruption or propensity for illegal behavior for the area being studied can also help determine variation in dispersal, a characteristic Bouchard (2011) describes as the "simplicity of the set up process." The cultivation of opium poppy in proximity to marijuana fields might contribute to fulfill this objective.

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[108] Volker Bahn, Raymond J. O'Connor and William Krohn, "Importance of spatial autocorrelation in modeling bird distributions at a continental scale," *Ecography*, 29, 2006, 835-844.
[109] Lichstein et al., "Spatial autocorrelation and autoregressive models in ecology," *Ecological Monographs*. 72, 2002, 445-463.
[110] Václavík, Kupfer & Meentemeyer, *Accounting for Multi-scale.*
[111] W.Z. Lidicker, "The role of dispersal in the demography of small mammals," In: Golley, F. B. et al. (eds), *Small mammals: their productivity and population dynamics*. (Cambridge Univ. Press, 1975), 103-128; Bahn, O'Connor and Krohn, *Importance of spatial autocorrelation*.
[112] Wiens et al., "Colloquium Papers: Niches, models, and climate change: Assessing the assumptions and uncertainties," *Proceedings of the National Academy of Sciences*, 106(Supplement 2), 2009, 19729-19736.
[113] Partelow, *Using GIS to Depict Resource Risk*; Martin Bouchard et al., *Journey to Grow*.

According to Diniz-Filho et al.[114] (2003), the inclusion of all the environmental variables that determine the habitat of a species may be not enough to create a valid model if there are indicators of spatial autocorrelation related to dispersal or other non resource or environmental conditions that affect its spatial patterning.[115] "The inclusion of all relevant environmental and resource determinants will not eliminate autocorrelation from residuals of the model and will lead to biases in variance and coefficient estimates, as well as model selection."[116]

Spatial autocorrelation is related to the data, while non-stationarity refers to the modeled relationship between the dependent and independent variables.[117] But while spatial autocorrelation is influenced by changes in spatial resolution, the modeled relationships are scale-dependent.[118] Therefore, the data quality is of primary importance when developing a species distribution model. If the data are imprecise, although accurate, and are also already embedded in a spatial structure that does not allow testing different resolutions, the problem of the origin of the spatial autocorrelation becomes fundamental for the model selection. When spatial dependence can be attributed to non-stationarity, Fotheringham[119] (2009) recommends using local rather than global models. Or, in other words, if the species is not in equilibrium with its environment and the

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[114] Alexandre F. Diniz-Filho et al., "Spatial autocorrelation and red herrings in geographical ecology," *Global Ecology and Biogeography*, 12, 2003, 53-64.
[115] Volker Bahn et al., *Importance of Spatial Autocorrelation*.
[116] J.J. Lennon, "Red-shifts and red herrings in geographical ecology," *Ecography* 23, 2000, 101-113; T.H. Keitt et al., "Accounting for spatial pattern when modeling organism-environment interactions," *Ecography* (25), 2002, 616-625.
[117] Patrick Osborne, Giles Foody and Susana Suárez-Seoane, "Non-stationarity and local approaches to modeling the distribution of wildlife," *Diversity and Distributions*, 13, 2007, 313-323.
[118] Giles Foody, "Spatial nonstationarity and scale dependency in the relationship between species richness and environmental determinants for the sub-Saharan endemic avifauna," *Global Ecology and Biogeography,* 13, 2004, 315-320.
[119] A.S. Fotheringham et al., *Geographically weighted regression: the analysis of spatially varying relationships* (Chichester: Wiley, 2002).

dependent variable responds differently to the predictors according to its locations, then a local statistical model may be more helpful.[120]

This section of my report is an exploratory attempt to discern the determinants of the cultivation of marijuana in Mexico. The chief goal is to determine whether marijuana and opium distribution shows spatial patterns attributable to human actions coupled with environmental conditions, while dealing with highly imprecise data disaggregated to municipal boundaries. Linear global models and local models will be compared for both drugs.

MATERIALS AND METHODS

Study system – Cannabis Sativa and Papaver Somniferum

Marijuana (Cannabis Sativa) or *adormidera blanca*, as it was first known in Mexico, is endemic to the state of Sinaloa, located in the northwest region of the country. Its presence was noted in books about plant species in the region as early as the end of the 19th century.[121] But its cultivation didn't begin to boom until the advent of the 20th century and the beginning of the prohibition of narcotics at the municipal and state level in the United States and the rest of the world.[122] By 1920, Mexico too had banned marijuana's cultivation and sale. But as early as a decade later, the first Mexican drug traffickers began being mentioned in the national press as operating in the border region with the U.S. and producing their crops in Sinaloa and in the neighboring states of Durango and Chihuahua — an area that has been dubbed "the Golden Triangle" of drug production in Mexico.[123] In subsequent decades, the cultivation of marijuana spread to

[120] Osborne and Suárez-Seoane, *Should Data be Partitioned*; Giles Foody, *Spatial Nonstationarity.*
[121] Ortega and Lopez Manon, *Sinaloa, Textos de su Historia*.
[122] Astorga, *El Siglo de las Drogas*.
[123] Ibid.

other, more distant regions, following valleys in the Sierra Madre Mountains. Crops began being detected far from Sinaloa, in areas ranging from the southernmost state of Chiapas to the Gulf Coast state of Veracruz and the deserts of the Baja California peninsula.[124] The vast quantities of marijuana crops in so many varied areas across Mexico make it a good drug specimen to try to understand the effects of human actions in its spatial patterning.

By contrast, opium poppy is not native to Mexico but is believed to have been introduced in the late 1800s by Chinese immigrants who arrived in the country to work in the mines and on railroad construction.[125] The result was the spread of a plant the locals dubbed *adormidera blanca* but was none other than opium. It began to spring up in Sinaloa shortly after the arrival of the Chinese. Opium crops then spread rapidly to neighboring states, including Sonora and Chihuahua as mining developed in the area[126] and by the 1960s was being cultivated even in the southern states of Oaxaca and Chiapas, and in the Pacific coast states of Nayarit and Guerrero.[127]

Marijuana and Opium Data

Data on eradication of these illegal drugs for 2010 were obtained from the Mexican Secretary of Defense through a Freedom of Information Act request. The data are in polygon form, and include, in detail, the number of crops and hectares eradicated by municipality. A total of 551 municipalities nationwide had marijuana crops eradicated in 2010, while 1,905 municipalities across Mexico did not have such operations (Figure 1). With regards to opium poppy, only 274 municipalities had drug plantations eradicated during the same year (Figure 2). These data were used as a proxy for presence and

[124] Astorga, *El Siglo de las Drogas*.
[125] Ibid.
[126] Toro, Mexico's War on Drugs.
[127] Astorga, *El Siglo de las Drogas*.

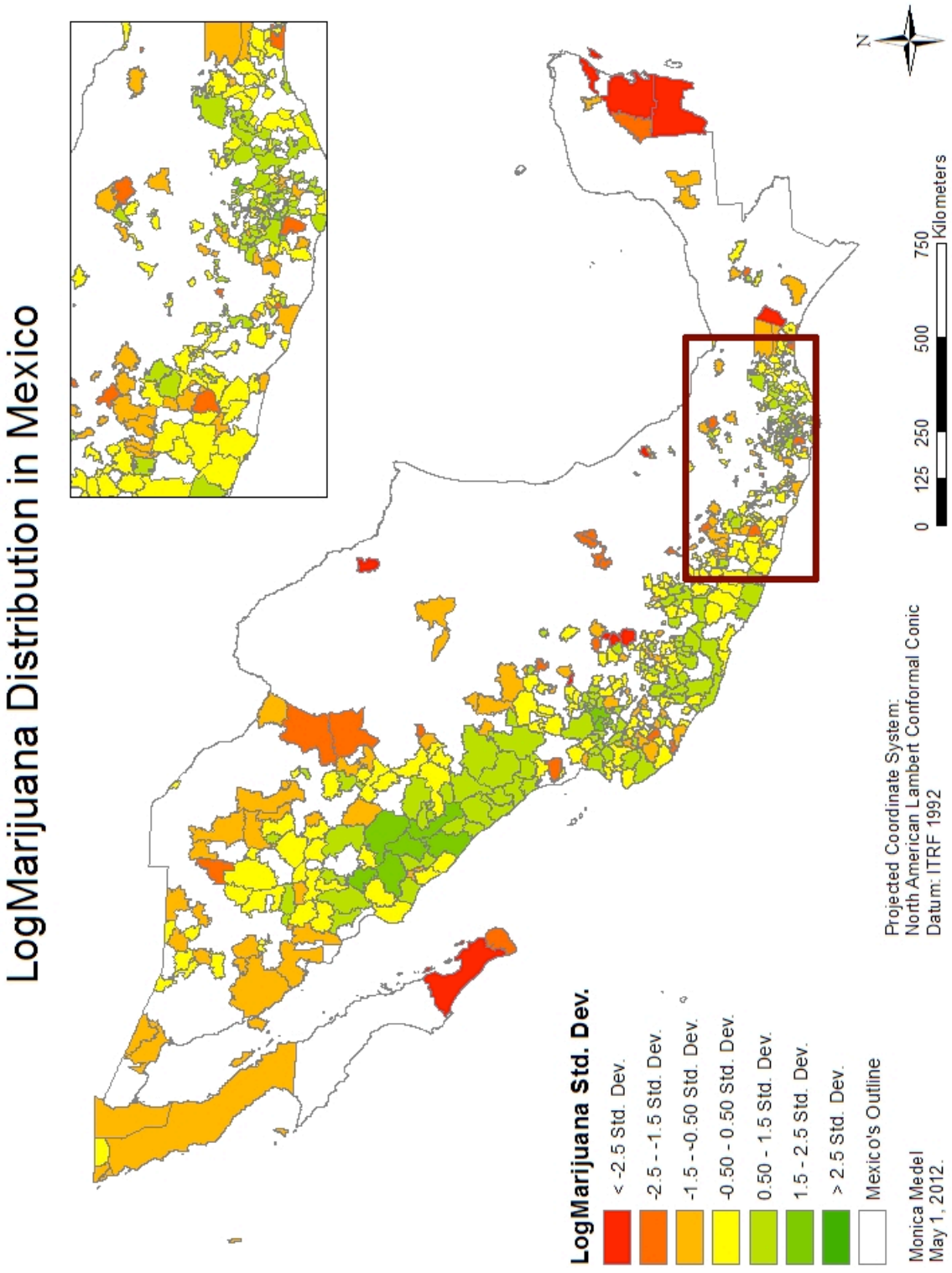

Figure 1: Marijuana Distribution in Mexico.

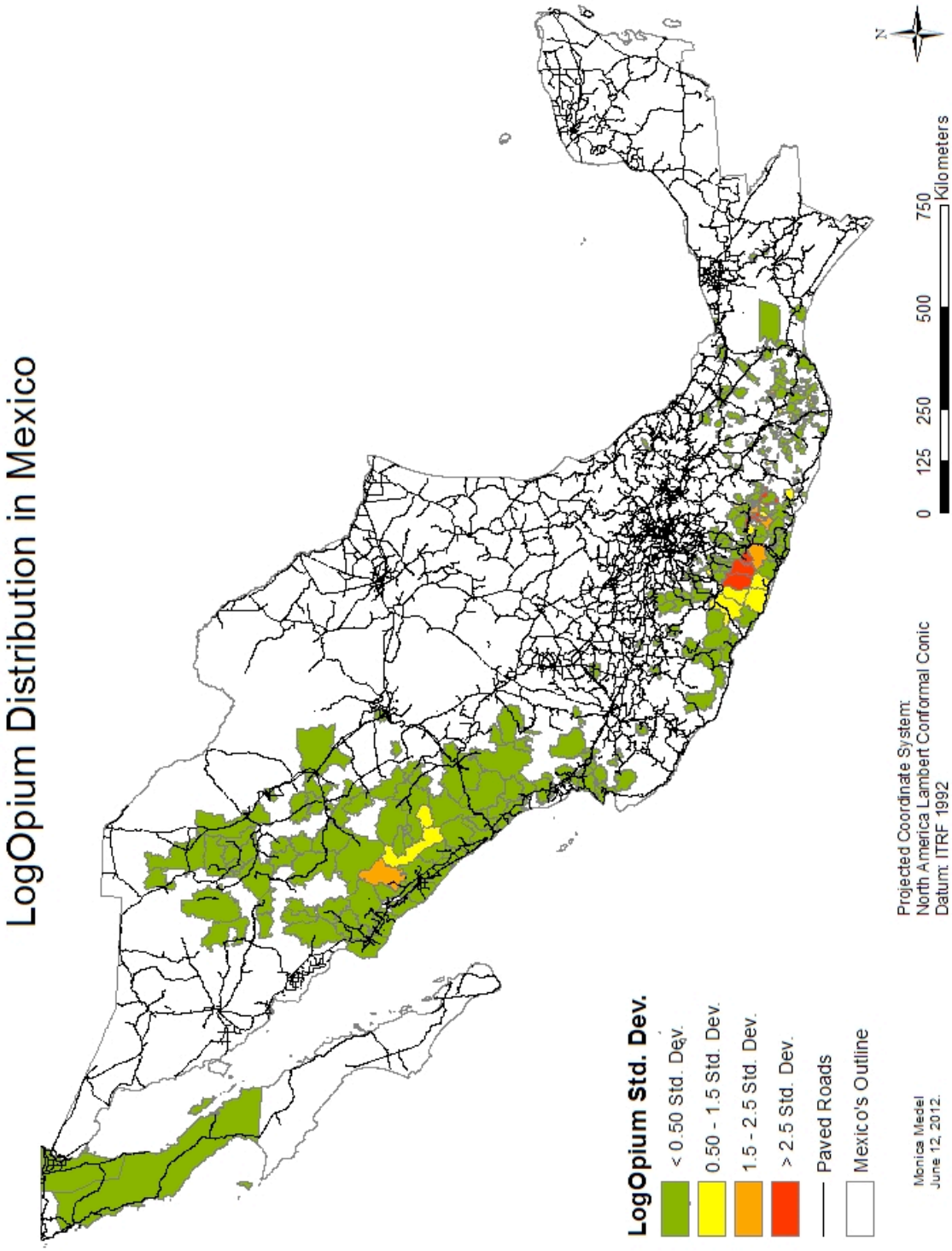

Figure 2: Opium Poppy Distribution in Mexico.

absence of marijuana and opium crops for the period of study, although the fact that an area had no eradications that year does not necessarily mean an absolute absence of the species there. The study used the information on hectares eradicated in an attempt to predict abundance of the illegal crops. Instead of using all the data with eradication and no eradication, I opted to work with the drugs range, defined as those areas where it was present. This choice was made since using the whole study area (the entire country) would have meant that those municipalities with no eradications would have dominated the model. As Bahn, O'Connor and Krohn[128] suggest, a more inclusive model would have modeled presence absence rather than abundance. Abundance information also makes it possible to work regression-based methods rather than the more commonly used binary approaches of species distribution models.[129] The marijuana and opium data on hectares was weighted by the municipality area (measured in square kilometers) to correct for differences in size and shape of the municipality polygons. Because the data distribution for both drugs was highly positively skewed, the variables MarLn and Op_H10ALn were transformed by using a logistic transformation.

Environmental Predictors

This study used two environmental variables (temperature and precipitation), two topographical variables (elevation and slope), and eight "human factor" variables, all of which were identified as crucial for the cultivation of marijuana and opium in Mexico. The latter included the number of police in the area, the population density by municipality, the total length of completed roads by municipality, and the number of drug-related killings in different municipalities. All these figures were weighted by the

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[128] Bahn et al., *Importance of Spatial Autocorrelation*.

[129] Iverson et al., "Lessons Learned While Integrating Habitat, Dispersal, Disturbance, and Life-History Traits into Species Habitat Models Under Climate Change," *Ecosystems*, 14(6), 2011, 1005-1020.

municipality area (in square kilometers) — with the exception of the homicides, which were weighted by the area of the population — and log transformed. Variables for marijuana and opium crops in hectares for 2009 were also included as predictors in the analysis of both drugs, while the crops for 2010 were included in the study of the opposite drug. The result was the following final variables:

Variable name	Explanation	Expected relationship
Has09A_Ln	Marijuana crops in 2009	+
M_H10ALn	Marijuana crops in 2010	+
Op_H9ALn	Opium crops in 2009	+
OpiA_Ln	Opium crops in 2010	+
KilPopA_Ln	Killings in 2010	-
HwyA_Ln	Total length of paved roads in each municipality	+
PopTotA_Ln	Population density	-
PoliceA_Ln	Police presence in 2010	-
Forest_D	Dummy variable for soil use type (1 for Forest and 0 for everything else)	+

Table 1: "Human" Variables.

In the case of marijuana, interaction variables were also created to account for the effects of Forest_D with OpiA_Ln (Forest_Opi), Forest and PoliceA_Ln (Forest_Pol) and the mixed impact of having opium crops and killings (Opi_Kills). (Illustration 1)

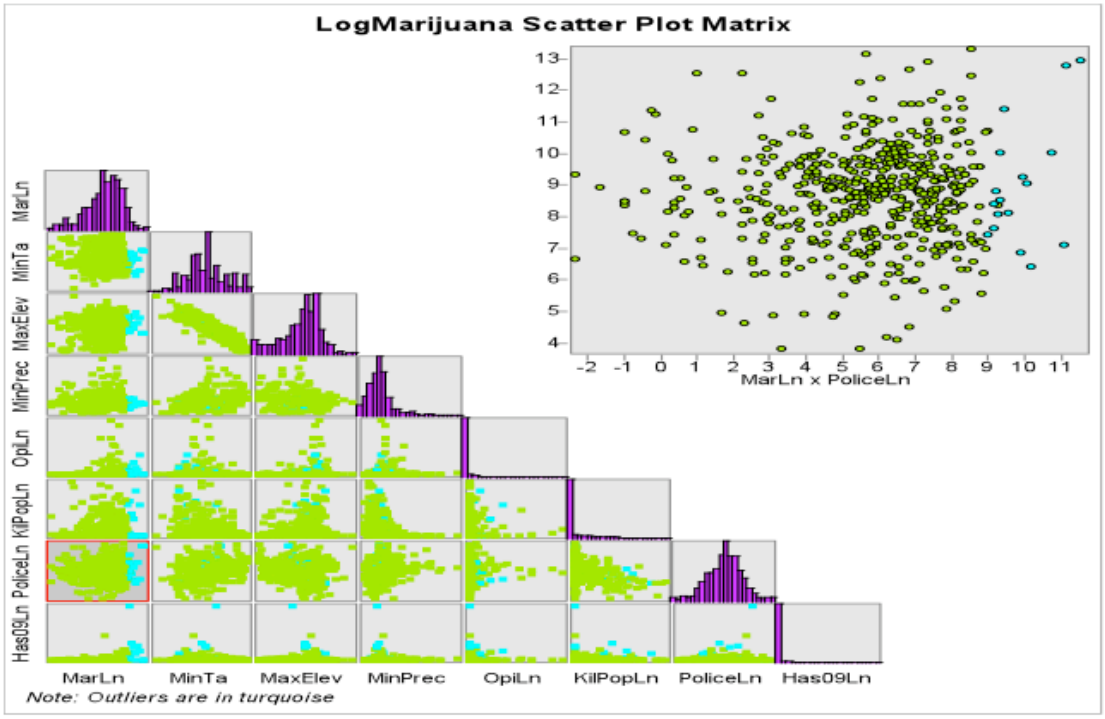

Illustration 1: Marijuana Variables Scatterplot Matrix.

Considering that non-linear effects on species abundance can be expected for most environmental parameters,[130] the variables for temperature and precipitation, as well as elevation and slope, were also included in quadratic form. In an effort to allow for the capture of as much meaningful information as possible, I decided to incorporate the minimum temperature and precipitation to the model, as well as the maximum elevation and slope, instead of the mean, as Dormann recommends.[131] The final environmental and topographic variables were as follows:

[130] Austin, Spatial Prediction of Species Distribution; C.F. Dormann et al., "Components of Uncertainty in Species Distribution Analysis: A Case Study of the Great Grey Shrike," *Ecology*, 89(12), 2008, 3371-3386.
[131] Dormann et al., *Components of Uncertainty*.

Variable name	Explanation	Expected relationship
MinTa	Minimum temperature	-
MinTaSq	Minimum temperature squared	-
MinPrec	Minimum precipitation	-
MinPrecSq	Minimum precipitation squared	-
MaxSlo	Maximum slope	+
MaxSloSq	Maximum slope squared	+
MaxElev	Maximum elevation	+ -
MaxElevSq	Maximum elevation squared	+ -

Table 2: Environmental Variables.

Temperature, precipitation and elevation data was collected from the Institute of Statistics and Geography (INEGI) in Mexico. The data was downloaded as polyline shapefiles in the first two cases, and as a Digital Elevation Model (DEM) with resolution of 1 second of arc (31.062185 meters) in the latter. The DEM was used to extract slope as well. The polyline shapefiles were converted to rasters by using the Topo To Raster tool in ArcGIS 2010. The original shapefiles and DEM have a projected coordinate system North America Lambert Conformal Conic, and the Datum ITRF 1992. The source and size for cell was maintained for the new rasters created for slope and elevation (Figure 3), while for precipitation (Figure 4) and temperature (Figure 5) the choice was made to keep the cell size at 1,000 meters to allow for enough variation — after encountering processing problems when trying to create cells of 31.06 meters.

Because the data on marijuana and opium poppy crops were disaggregated to the municipality level, that is polygon form, I extracted the minimum, maximum and mean

value of the cells in all the municipality polygons by using the Zonal Statistic tool in ArcGIS 2010.

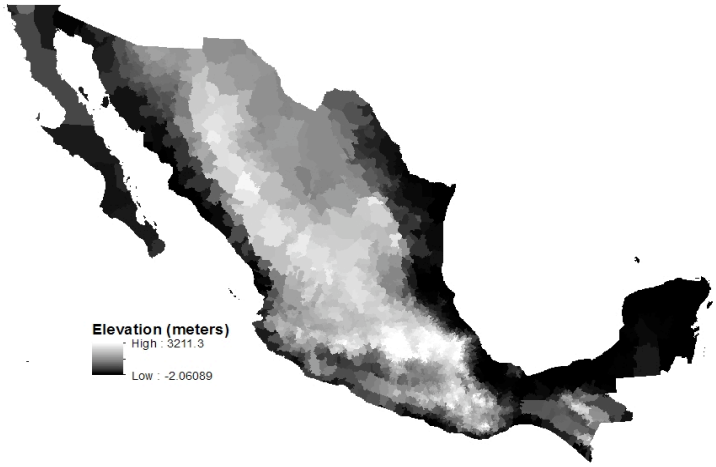

Figure 3: Average Elevation by Municipality.

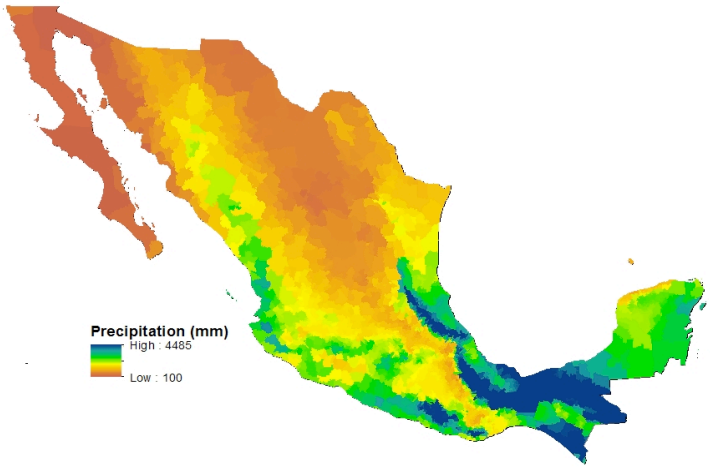

Figure 4: Average Precipitation by Municipality.

The data from INEGI on temperature was the mean annual value in degrees Celsius for the isotherms used to create the raster, while it was the mean annual rain in

millimeters for the isohyets used to build the precipitation raster. The resulting rasters, therefore do not reflect the extremes of real minimum and maximum temperatures and precipitations, but a weighted average by polygon of the mean extremes for the area.

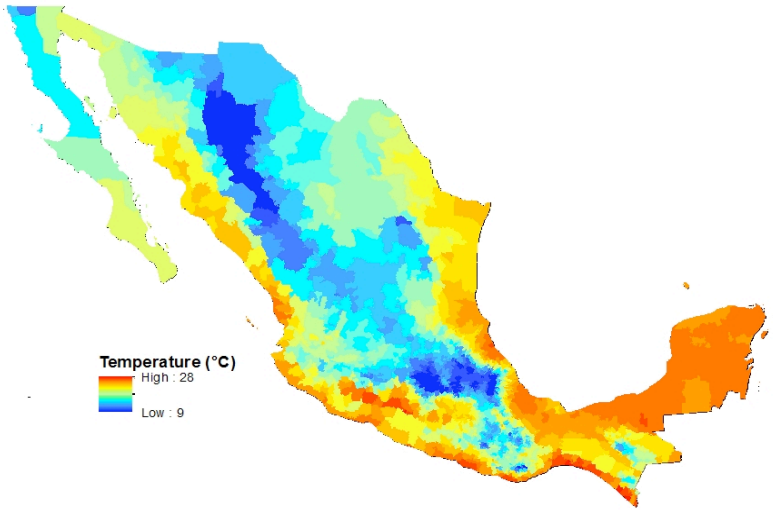

Figure 5: Average Temperature by Municipality.

The data on roads, police and type of soil used was also downloaded from INEGI. Roads data was in the form of polyline shapefiles, while police forces figures were statistical data, and type of soil was polygon data. The data from roads was summarized by polygons by using the Identity tool in ArcGIS 2010 and then Summary Statistics. The data on soil use type was extracted for every municipality by using the Zonal Statistics and selecting "majority". Once I obtained values for all the explanatory variables for the municipality polygons, I joined them in an attribute table to start the statistical analyses.

Statistical Methods

I began by applying an Ordinary Least Square (OLS) linear model to the explanatory variables to predict marijuana and opium crops in hectares. OLS is a global model based on data of the whole study area that does not allow modeling parameters to vary in space.[132] Global models assume that the relationships being studied are spatially stationary and that the parameters derived from the regression are valid for the whole data.[133] The main problem of global models is that in areas with great regional variance, the resultant parameters from the regression do not precisely explain the relationships being studied and have a poor descriptive and predictive power.

By contrast, Geographical Weighted Regression (GWR) can be seen as an extension of the regression baseline,[134] in that it allows the static parameters of the models in the traditional regression format to vary according to location. In this way, it provides a platform to explore spatial non-stationarity in a relationship among variables.[135]

Considering that both environmental variables and human factors vary greatly according to the location when analyzing drug cultivation, this study opted to compare the OLS global method and the GWR local model.

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[132] Mike Austin, "Species distribution models and ecological theory: A critical assessment and some possible new approaches," *Ecological Modeling*, 200 (1), 2007, 1-19.

[133] Foody, *Spatial nonstationarity*.

[134] C. Brunsdon et al., "Geographically weighted regression: a method for exploring spatial nonstationarity," *Geogr. Anal.* 28, 1996, 281–298; J. Kupfer and C. Farris, "Incorporating spatial non-stationarity of regression coefficients into predictive vegetation models," *Landscape Ecology*, 22, 2007, 837-852.

[135] Brunsdon et al., "Geographically weighted regression — modelling spatial non-stationarity," *Journal of the Royal Statistical Society D — Statistician* 47, 1998, 431–443; Fotheringham et al., *Geographical Weighted Regression*; Foody, *Spatial nonstationarity*.

RESULTS

Marijuana Case

OLS

All the variables were included. INEGI data on roads and police forces were lacking for some municipalities, so I dropped 34 municipalities with marijuana eradications in 2010 and kept only the 517 with complete data. All of those observations dropped, however, were crop eradications that were not among the largest discoveries of marijuana or opium crops for the year, and most were in the state of Oaxaca (Southwestern Mexico), which has so many small and isolated communities that it alone accounts for no less than a quarter of all Mexican municipalities nationwide.

A correlation analysis showed some significant correlations between the explanatory variables and MarLn, but not of great magnitude. Instead, the analysis found many significant correlations among the independent variables (Table 3).

Figure 6. Correlation Coefficients Matrix

Sample size	517	*Critical value*	(5%)	1.964581						
		MarLn	*MinTa*	*MaxElev*	*MinPrec*	*MaxElevSq*	*OpiA_Ln*	*KilPopA_Ln*	*PoliceA_Ln*	*Has09A_Ln*
MarLn		*1.*								
MinTa		*-0.0613*	*1.*							
	p-value	*0.16399*								
MaxElev		*0.12133*	*-0.8897*	*1.*						
	p-value	*0.00574*	*0.*							
MinPrec		*0.01057*	*0.33667*	*-0.23907*	*1.*					
	p-value	*0.81046*	*0.*	*0.*						
MaxElevSq		*0.08028*	*-0.87197*	*0.95998*	*-0.20431*	*1.*				
	p-value	*0.06816*	*0.*	*0.*	*0.*					
OpiA_Ln		*0.14365*	*-0.09703*	*0.14912*	*0.04574*	*0.15335*	*1.*			
	p-value	*0.00106*	*0.02738*	*0.00067*	*0.29925*	*0.00047*				
KilPopA_Ln		*0.06137*	*-0.26468*	*0.10331*	*-0.31938*	*0.09333*	*0.06002*	*1.*		
	p-value	*0.16354*	*0.*	*0.01879*	*0.*	*0.03386*	*0.173*			
PoliceA_Ln		*0.07194*	*0.26124*	*-0.16189*	*0.22779*	*-0.12745*	*-0.00756*	*-0.43066*	*1.*	
	p-value	*0.10227*	*0.*	*0.00022*	*0.*	*0.0037*	*0.86379*	*0.*		
Has09A_Ln		*0.24944*	*-0.04728*	*0.03511*	*-0.05328*	*0.01416*	*0.04426*	*0.0562*	*0.03962*	*1.*
	p-value	*0.*	*0.28324*	*0.42569*	*0.22649*	*0.748*	*0.31515*	*0.20202*	*0.36863*	

Table 3: Correlation Coefficients Matrix, Marijuana case.

Following a stepwise selection process to preserve only the variables with the most explanatory power, some independent variables were dropped one-by-one from the model. The first ones removed were those that were non-significant, with the highest P-Values. In this way, I dropped the variables for roads, population density, and slope (together with its quadratic term), as well as the quadratic expression for minimum temperature and minimum precipitation.

The resulting final model was:

MarLn = ß0 + ß1*MinTa + ß2*MaxElev + ß3*MinPrec + ß4* MaxElevSq + ß5*OpiA_Ln + ß6*KilPopA_Ln + ß7*PoliceA_Ln + ß8*Has09A_Ln + ß9*Forest_D + ß10*Forest_Opi + ß11*Forest_Pol + ß12*Opi_Kills + e

The model, measured by the F statistic and the Joint Wald Statistic, was significant as a whole, and the same was true for all the variables. However, the adjusted R^2 was a disappointing 0.1465, meaning that the model only explains 14.7 percent of all the variability in the log transformed variable for cultivation of marijuana. The Akaike Information Criterion (AIC) for this model was 2284.85. Additionally, the Variance Inflation Factor (VIF), used to measure multicollinearity, showed figures higher than 7.5 — the threshold generally accepted to keep variables in the model — for MaxElev and its quadratic term, OpiA_Ln, Opi_Kills and the interactions for Forest with Opium and Police forces. Following a stepwise selection process again, I dropped variables one-by-one until achieving VIF values for the remaining variables under 7.5.

In the end, the final OLS model kept only seven variables: five human-related parameters, in addition to direct (temperature) and indirect (elevation) predictors:

MarLn = ß0 + ß1*MinTa + ß2*MaxElev + ß3*OpiA_Ln + ß4*KilPopA_Ln + ß5*PoliceA_Ln + ß6*Has09A_Ln + ß7*Forest_D + e

All the variables were significant, the same as the model (Table 4). Although the explanatory power of the model diminished, the multicollinearity problems disappeared.

F Stat: 10.0946 Prob (>F) (7,509) DF: 0* Adjusted R^2: 0.109827

Joint Wald Stat: 65.9994 Prob (>ChiSq) (7) DF: 0* AIC: 2301.24

Koenker Stat: 19.8833 Prob (> ChiSq) (7) DF: 0.005827*

Jarque-Bera Stat: 70.4663 Prob (>ChiSq) (2) DF : 0*

Variable	Coeff.	St. Error	P-Value	Rob. St. E.	Robust P.	VIF
MinTa	0.15021	0.05218	0.0041	0.04919	0.00239	5.79
MaxElev	0.00088	0.00027	0.0013	0.00027	0.00166	5.49
OpiA_Ln	3.5131	1.83343	0.0559	1.24128	0.00483	1.079
KilPopA_Ln	0.6028	0.22825	0.0085	0.25744	0.01957	1.38
PoliceA_Ln	0.17251	0.07077	0.0151	0.07428	0.02059	1.29
Has09A_Ln	7.91378	1.43799	0.0000	3.0792	0.01044	1.014
Forest_D	0.54336	0.23608	0.02175	0.2305	0.01879	1.329
Intercept	0.8582					

Table 4: OLS Results for Marijuana Cultivation

However, the significant Jarque-Bera Statistic indicates that residuals deviate from the normal distribution, which may be an indicator that the model still exhibits problems of spatial autocorrelation. With a Global Moran's Index of 0.136525, the Z-Score of 14.140589 indicates that there is less than 1 percent likelihood that this clustered pattern could be the result of random chance.

Considering that all the OLS models run gave a significant Jarque-Bera Statistic and in many cases also a significant Koenker Statistic (which indicates heteroskedasticity and/or non-stationarity); and that the best OLS model also has both statistics significant, I moved on to apply a Geographical Weighted Regression (GWR).

GWR

The main problem when applying GWR to predict marijuana cultivation in Mexico is that it was impossible to apply the same best-model obtained for OLS, and then compare both of them. First, GWR does not accept dummy variables. The purpose of local models is introducing more variability, not less. Therefore, I had to drop the dummy variable for Forest. Also, the GWR does not work with variables that exhibit multicollinearity for the same reason, as was the case between MinTa and MaxElev. As a best substitute, I ended up applying the GWR to a model with exactly the same variables used with OLS, with the exception of MaxElev, which I replaced with MinPrec, and excluding the parameter for Forest.

In summary, the new model can be detailed as follows:

Yi = ßi0 + ßi1MinTa1i + ßi2MinPrec2i + ßi3OpiA_Ln3i + ßi4 KilPopA_Ln4i + ßi5PoliceA_Ln5i + ßi6Has09A_Ln6i + ei

Where "i" represents each location. The local variable coefficients are a function of the bandwidth of the spatial kernel chosen for the model, that is the distance or number of observations included around each point in the weighting matrix.[136] That means that close observations have a greater influence than distant ones on the resulting coefficients. Because the data for this study is embedded in irregular, asymmetrical polygons, I

[136] Foody, *Spatial nonstationarity*; Kupfer and Farris, *Incorporating spatial non-stationarity*.

selected an adaptive kernel that allows the bandwidth to change according to the spatial density of features, thus making each local estimate based on the same number of nearest neighbors.

Overall, the GWR model showed a stronger performance than the OLS models, measured by the Akaike Information Criterion (AIC), as recommended by Jetz et al.[137] (2005) because it accounts for model complexity. The AIC for the GWR model was 2206.8481, even better than the OLS model with twelve variables. The adjusted R^2 for the model also showed a significant improvement, which became even more pronounced in the final, more parsimonious GWR model with only five variables, where KilPopA_Ln was excluded (Table 5).

Model	AIC	Adj. R^2
Twelve-Variables OLS	2284.85	0.1465
Seven-Variables OLS	2301.2411	0.109827
Six-Variables GWR	2206.8481	0.27234
Five-Variables GWR	2171.0298	0.327

Table 5: Model Performance Comparative Indicators

The GWR analyses made apparent that the relationships between marijuana cultivation and the environmental and human variables were non-stationary. With the exception of Has09A_Ln, all the other parameters changed the sign of their coefficients according to the area they were located (Table 6).

[137] W. Jetz et al., "Local and global approaches to spatial data analysis in ecology," *Global Ecology and Biogeography*, 14, 2005, 97–98.

Variable	Coefficient Range	
MinTa	-0.050985	0.053087
MinPrec	-0.000681	0.002847
OpiA_Ln	-0.95656	8.663457
PoliceA_Ln	-0.150842	0.437743
Has09A_Ln	1.217778	59.820578

Table 6: GWR Marijuana Final Variables Coefficients Range.

The number of neighbors used to adapt the kernel in the last, more parsimonious GWR model was 208. The Local R^2 also showed that the model better explains marijuana cultivation in those states where the drug has been harvested for decades: Sinaloa, Chihuahua, Durango and Sonora, where it accounted for more than 30 percent of the variance in the dependent variable. Meanwhile, the model performed poorly in areas where marijuana cultivation is relatively new, like Puebla and Veracruz, in the heart of central Mexico and the Gulf Coast. The GWR model, however, did not predict well for municipalities in Guerrero state, which has also been a producer of *cannabis sativa* for decades , and which is also a heavy producer of opium poppies (Figures 6 and 7).

For both GWR models, the condition number, which evaluates local collinearity, remained below 30, which is the threshold for having reliable, stable results. However, the problem of spatial autocorrelation remained (Figure 8).

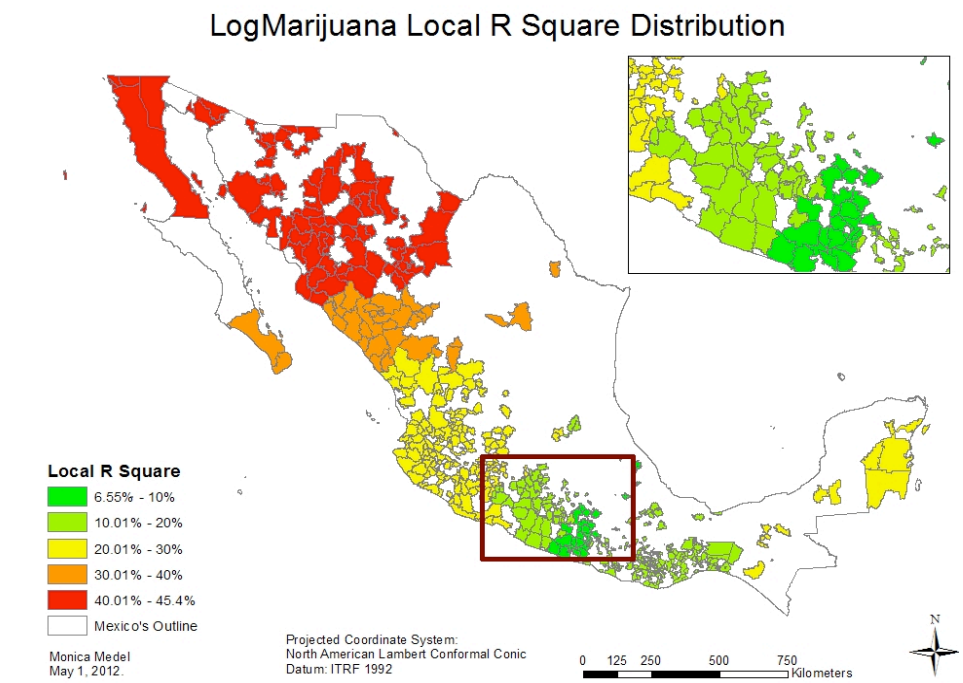

Figure 6: Marijuana Local R Distribution.

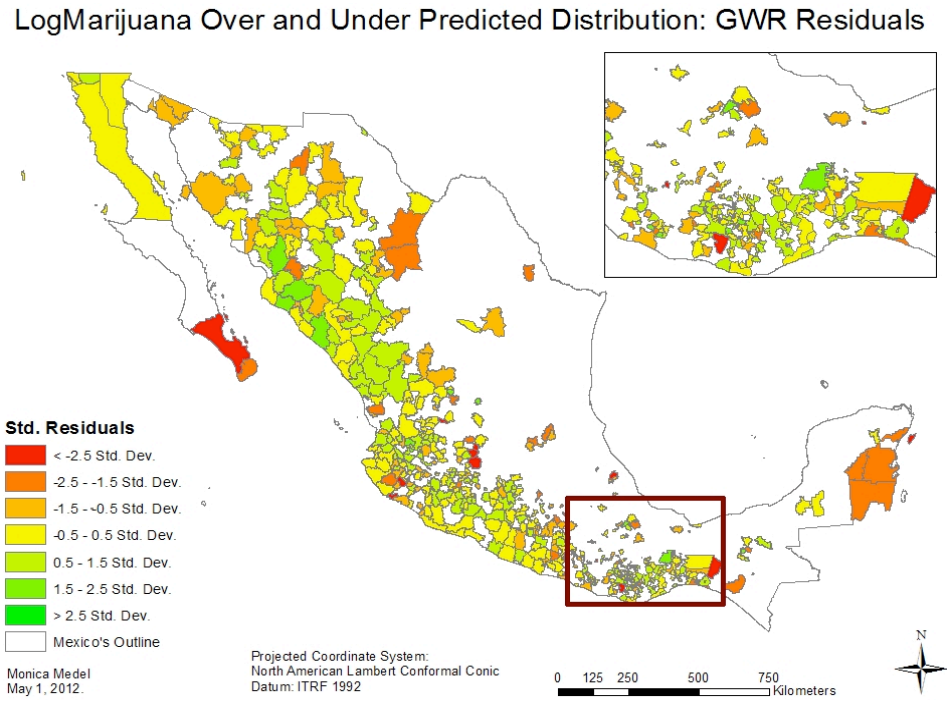

Figure 7: Marijuana GWR Residuals Distribution.

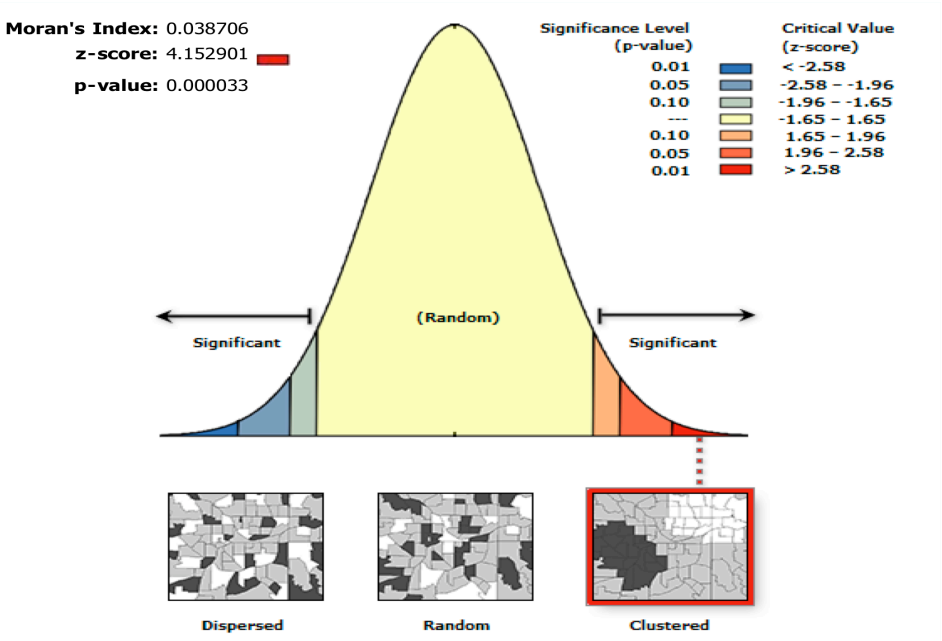

Illustration 2: Moran's Index for Marijuana Cultivation.

Opium Case

OLS

In the case of opium, I dropped 9 observations with no data for the same categories and kept the 265 municipalities with all the data. Following a stepwise selection process to preserve only the variables with the most explanatory power, the squared environmental variables, the M_H10ALn variable (marijuana eradications in 2010), the KilPopA_Ln variable, the PoliceA_Ln variable and the Forest_D variable were dropped.

The resulting final model was the following one:

Op_H10ALn = ß0 + ß1*MaxElev + ß2*MaxSlo + ß3*OpH9ALn + ß4*PopTotA_Ln + ß5*HwyA_Ln + e

Variable	Coeff.	St. Error	P-Value	Rob. St. E.	Robust P.	VIF
MaxElev	0.000003	0.000002	0.07646	0.000001	0.02599	1.255
MaxSlo	-0.000008	0.000009	0.40085	0.000003	0.02233	1.180
Op_H9ALn	0.7851	0.03383	0.0000	0.08426	0.00000	1.054
PoPTotA_Ln	0.00389	0.00113	0.000707	0.00098	0.000105	1.373
HwyA_Ln	-0.00195	0.000735	0.00823	0.000814	0.01693	1.210
Intercept	-0.00843	0.006692	0.20884	0.004497	0.06195	------

Table 7: OLS Results for Opium Cultivation.

All the variables were significant, the same as the model, which showed an Adjusted R Square of 0.698 and an Akaike Information Criterion of -1284.318. The Joint F Statistic and the Joint Wald Statistic were 123.3 and 116.2, respectively, and significant, showing a good fit of the model. However, the Koenker (BP) Statistic was also significant, a sign of heteroskedasticity or non-stationarity problems. The Jarque-Bera Statistic also indicated that residuals deviated from the normal distribution, so that I checked spatial autocorrelation problems. But after running the Moran's I Statistic, the outcome was that, given the Z-score of 1.04, the pattern does not appear to be significantly different than random (Illustration 3).

Regardless of the spatial autocorrelation report, and considering that the Koenker Statistic showed possible non-stationarity in the data, I decided to proceed with a GWR analysis.

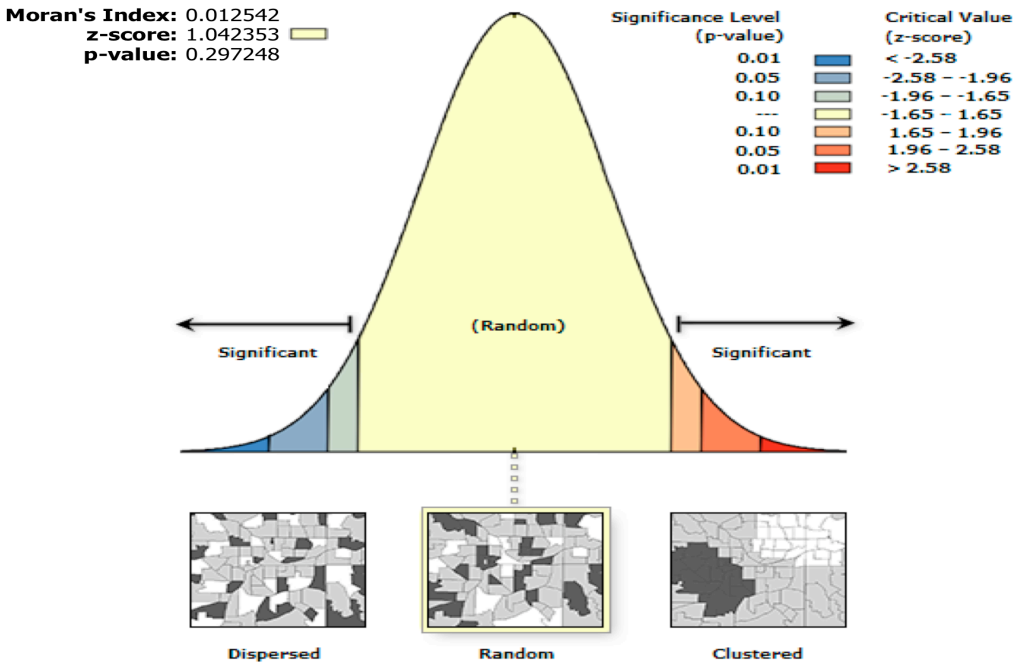

Illustration 3: Moran's Index for Opium Poppy Cultivation

GWR

In contrast to the marijuana case, the best opium model obtained with the OLS worked perfectly with the local model.

Yi = ßi0 + ßi1MaxElev1i + ßi2MaxSlo2i + ßi3OpH9A_Ln3i + ßi4 PopTotA_Ln4i + ßi5HwyA_Ln5i + ei

The number of neighbors used to adapt the kernel in the model was 136. The GWR showed a slight improvement in the AIC and the Adjusted R Square with regards to the OLS model. The AIC was -1295.43 and the Adjusted R Square was 0.728, against -1284.318 and 0.698, respectively, in the OLS model.

The Local R^2 also showed that the model better explains opium cultivation for the states of Guerrero, Michoacán, Jalisco and Nayarit, which were not the regions where the drug started first being cultivated in the late 1800s. However, these states, particularly

Guerrero, have now become the top producers of opium and heroin. The model explains more than 60 percent of the variance in the cultivation of opium in these states. For the more traditional cultivation sites, that is the states of Sinaloa, Chihuahua, Sonora and Durango, the local model explains between 38.8 and 60 percent of the variation in the dependent variable. The same was true for areas much newer to the opium cultivation like Oaxaca, Veracruz and Chiapas (Figure 8). Meanwhile, the condition numbers for the model remained below 18.21, a sign of reliable results.

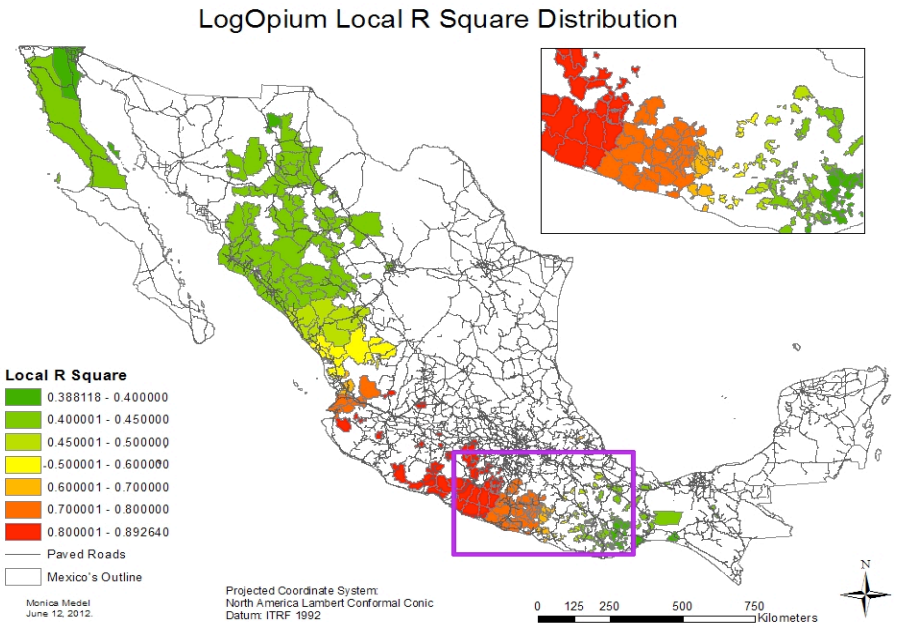

Figure 8: Opium Local R Square Distribution.

DISCUSSION

Even though there is apparent non-stationarity in the relationship among the predictors and the cultivation of marijuana, the fact that the scale of the data cannot be changed and evaluated introduces a bias in the study. Because the data are already embedded in a spatial structure, it is impossible to test the local variation with different

bandwidths by making resolution changes. However, the fact that the OLS model exhibited a poor performance in the marijuana case, while the GWR models' outcomes improved — particularly for the areas where marijuana has traditionally been cultivated and where the largest producers are located — shed a little light on the factors correlated to the abundance in the presence of these illegal drug fields.

By illustrating the geography of the relationship between predictors and the dependent variable, it is clear why the OLS, a global method, performed so badly. Chihuahua, Durango, and especially Sinaloa all have a culture of drug production and trafficking, which is intertwined with a history of local corruption and lawlessness,[138] a characteristic that makes the set up easy.[139] The coefficient analysis laid this situation bare when it was precisely in these states that police presence does not act as a major deterrent for marijuana cultivation. In fact, the effect is totally the opposite of what one would reasonably expect: police presence increases cultivation (Figure 9). But, taking into account that the data being reported here are actual eradication of drug fields, there is a possibility that it might also be an endogeneity problem.

Another example of these local relationships is that the areas that are not opium producers are, in general, not heavy marijuana producers, and therefore, the relationship between them is negative. But in those cases where marijuana and opium poppies are produced in the same municipality, the increase in the cultivation of the latter generally tends to increase the production of the former. Again, though, I might have an endogeneity problem (Figure 10).

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[138] Astorga, *El Siglo de las Drogas*.
[139] Bouchard, *Journey to Grow*.

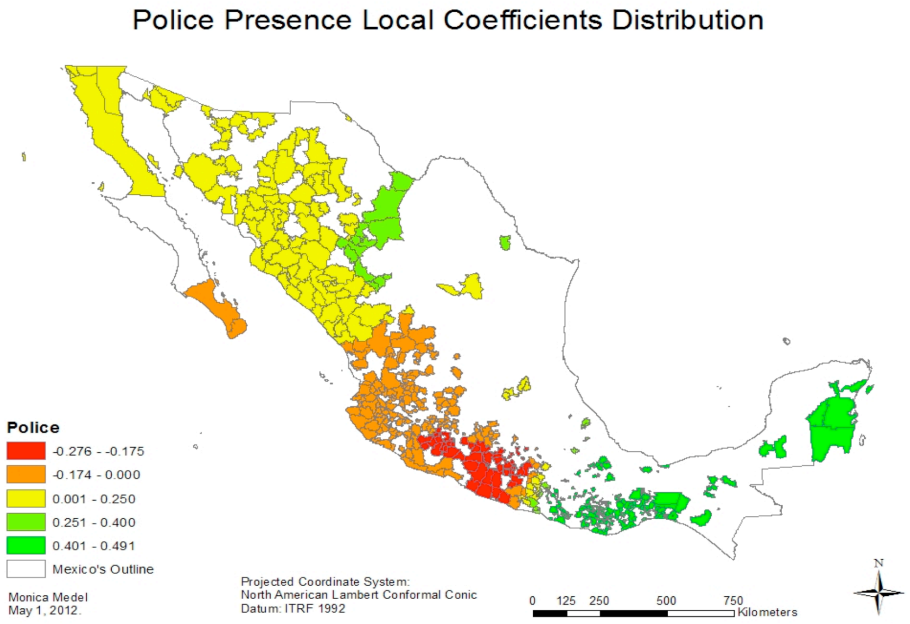

Figure 9: Police Presence Distribution Local Coefficients for Marijuana GWR.

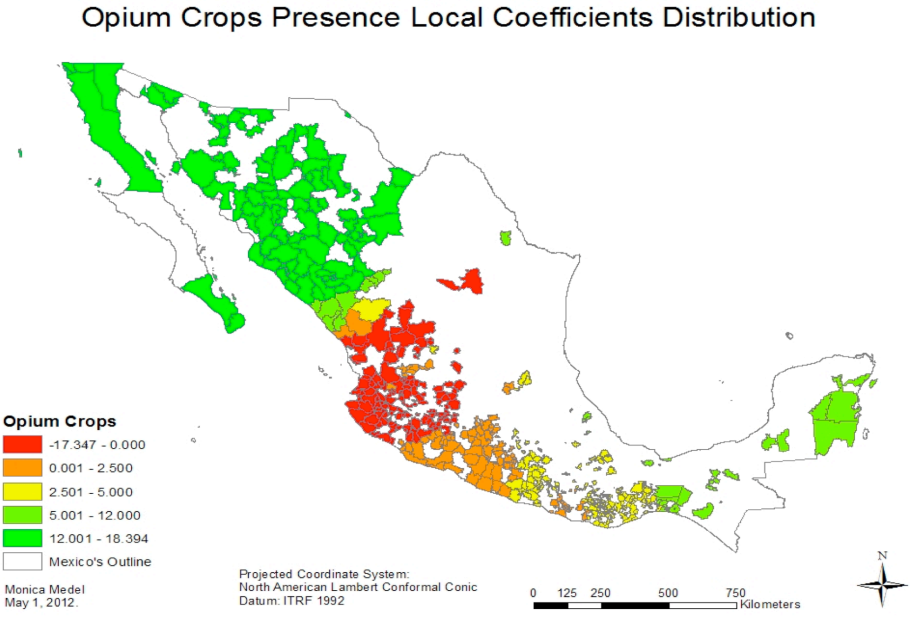

Figure 10: Opium Fields Presence Distribution Local Coefficients for Marijuana GWR.

Temperature follows the same pattern. For most production areas, an increase in minimum temperature suggests a decrease in marijuana production, with the exception of a region in the western Pacific coast, mainly in the portion of Michoacán state dubbed the "tierra caliente" or hot lands (Figure 11). The same is true for rainfall, which is heavier in southern and southeastern Mexico.[140] There, an increase in minimum precipitation tends to diminish marijuana cultivation, while in the north, were rain is less common, an increase in precipitation often helps the illegal crops (Figure 12).

In contrast to Foody's studies on species abundance,[141] which compares results from OLS and GWR models without considering non-linear responses, I included them in the models even though in most of the cases, the quadratic expression of the environmental variables was non-significant. This outcome could have been produced in part due to the lack of precision of my data.

Even though interactions between independent variables were tackled in the OLS model, I opted not to introduce interactions among the environmental variables — as Dormann (2008)[142] recommends — considering that the dependent variable was embedded in a spatial structure that made it difficult to differentiate the effects of variation to a smaller scale than the polygon that I already had for municipalities as my unit of analysis. The interaction terms for the other variables were significant in the OLS models, but introduced multicollinearity, an effect GWR models hardly tolerate.

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[140] Instituto Nacional de Estadísticas y Geografía (INEGI), *Guía Para la Interpretación de Cartografía Climatológica*, Mexico, 2005, www.inegi.org

[141] Foody, *Spatial Nonstationarity*; Foody, "Mapping the richness and composition of British breeding birds from coarse spatial resolution satellite sensor imagery," *International Journal of Remote Sensing*, 26, 2005, 3943–3956.

[142] Dormann, *Components of Uncertainty*.

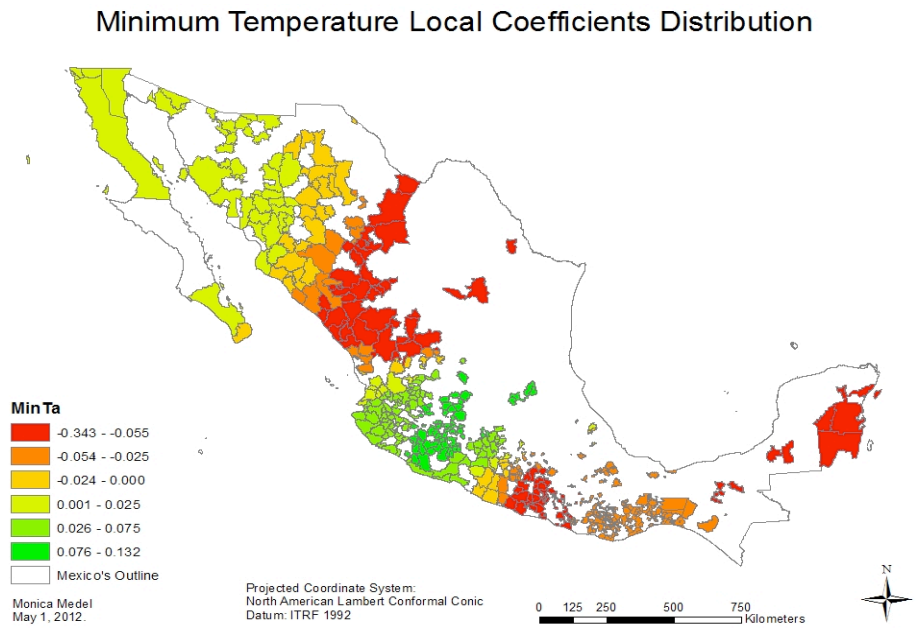

Figure 11: Minimum Temperature Coefficients Distribution for Marijuana GWR.

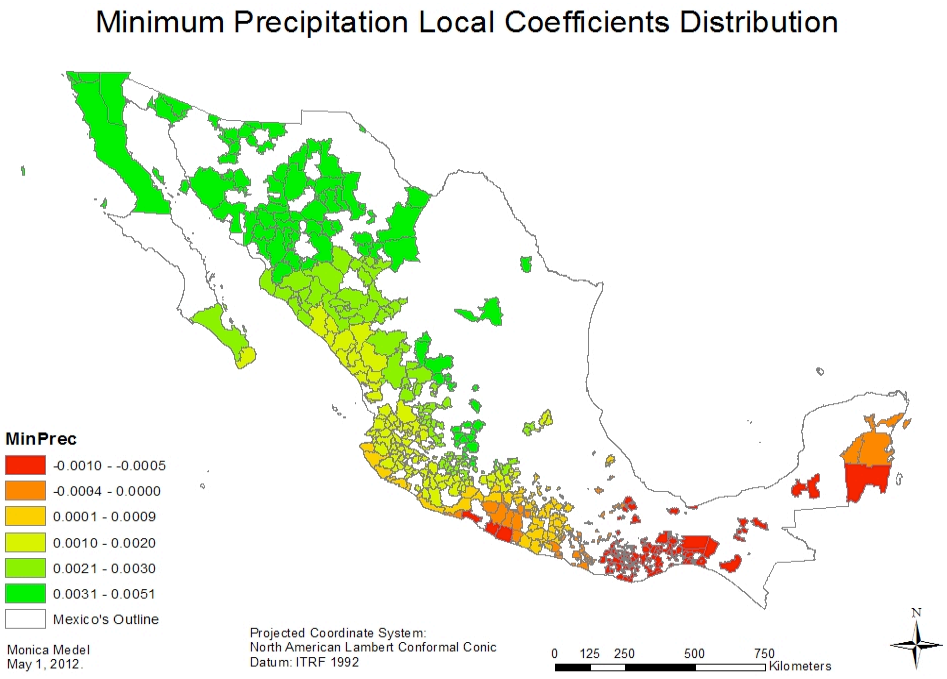

Figure 12: Minimum Precipitation Coefficients Distribution for Marijuana GWR.

For the opium case, the results were mixed. The model overpredicted and underpredicted cultivation for contiguous municipalities in Sinaloa, Durango and Guerrero, a sign of possible non-stationarity in the modeled relationship that could be linked to the location, governance, history or even the type of authorities in the different municipalities (Figure 13).

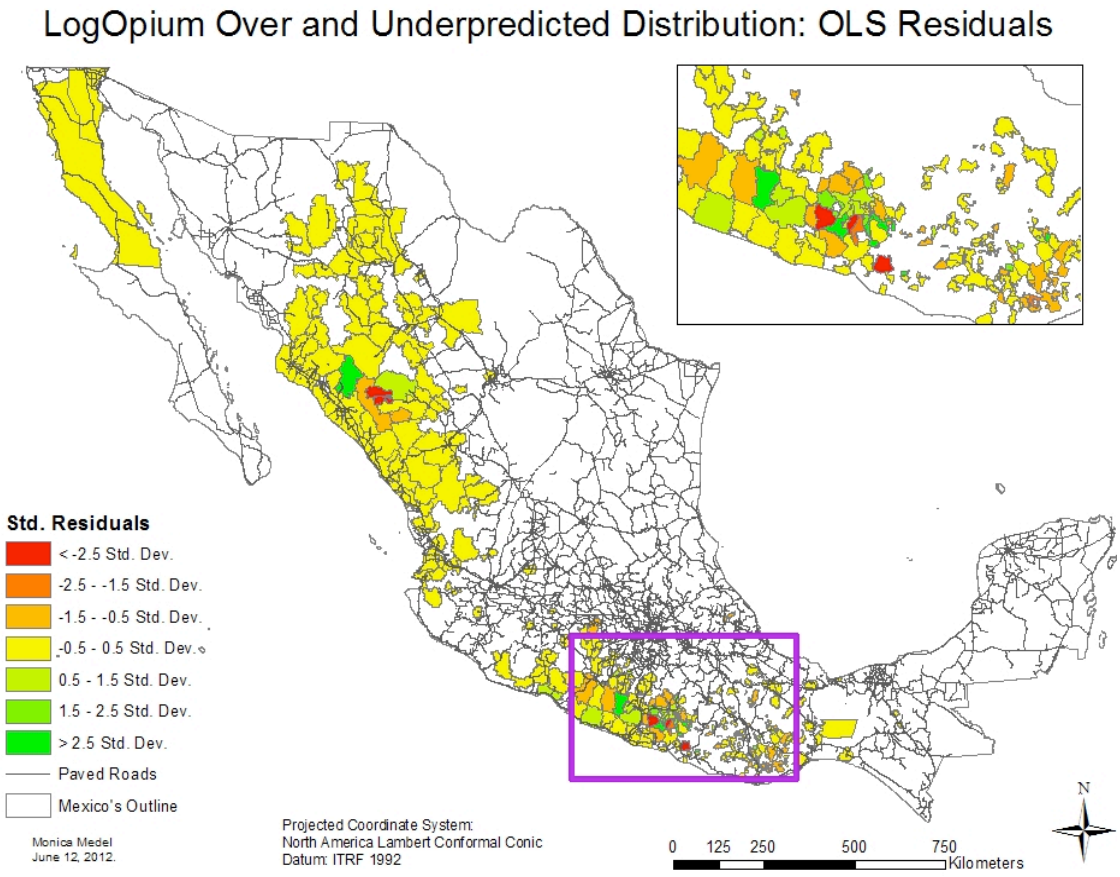

Figure 13: Distribution of Opium OLS Residuals.

But almost exactly the same municipalities' cultivation was overpredicted and underpredicted by the GWR model (Figure 14), which explains the good fit of both.

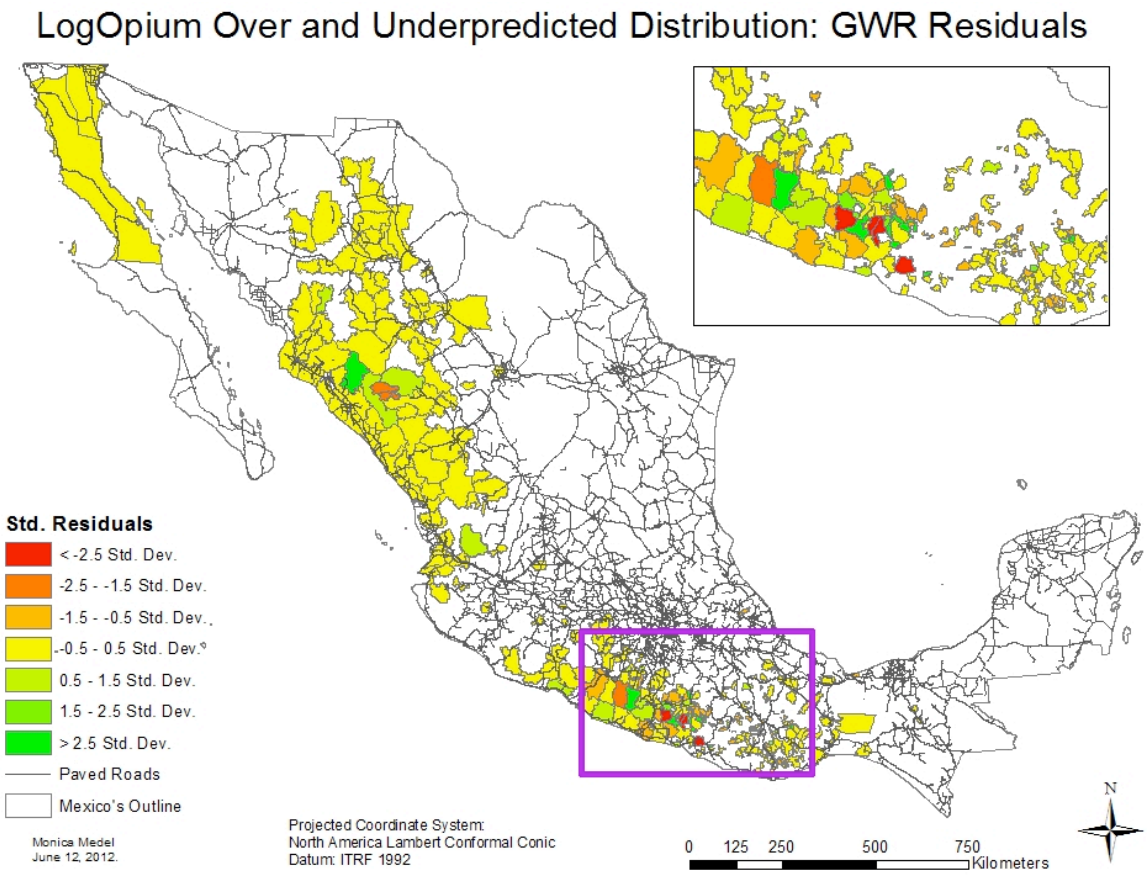

Figure 14: Distribution of Opium GWR Residuals.

The nonstationarity was corroborated by the GWR, which showed different effects from the variables MaxSlo, PopTotA_Ln and HwyA_Ln, which go from negative to positive relationships (Table 8). That means that while in some municipalities opium poppy crops grow in areas with steep slope, in others the narcotic is cultivated in more plain sites. The same is true for the population density and the proximity to highways: while for some municipalities it is a factor that is positively correlated to the production of the drug, for others it acts as a deterrent.

Variable	Coefficient Range	
MaxElev	0.000001	0.00001
MaxSlo	-0.0001	0.000005
Op_H9ALn	0.368635	0.911421
PopTotA_Ln	-0.000456	0.007293
HwyA_Ln	-0.003634	0.0026

Table 8: GWR Opium Final Variables Coefficients Range.

MaxElev behaved exactly in the same ways for both the OLS and the GWR models, having a positive relationship with cultivation. That is no surprise, considering that opium is more dependent on more specific climate conditions than marijuana. Opium poppies develop better in regions that feature both a warm temperature and moderate moisture, and do not require special irrigation, which makes the slopes of the Sierra Madre Mountains a perfect location for the plant to grow — especially considering it tends to perform poorly in other, more-tropical climates.[143]

Meanwhile, the decision to use abundance data in its whole range over the presence/absence model allowed me to better estimate relationships between the predictors and the dependent variable.[144] Interpretations are more meaningful — and descriptive of particular local conditions — when based on core areas of species distribution characterized for their richness.

In the end, the use of GWR allowed me to explain a greater proportion of variance in the dependent variable than the OLS models, providing greater insight into the determinants of marijuana cultivation. The origin of the non-stationarity in the

[143] James A. Duke, Papaver somniferum L., *Handbook of Energy Crops*, 1983, unpublished.
[144] Bahn et al., *Importance of Spatial Autocorrelation*; Dormann, *Components of Uncertainty*; Iverson et al., *Lessons Learned*.

relationships, however, remained unclear due to the impossibility of investigating its possible variation with changes in scale, and its link to spatial autocorrelation, which it is not directly accounted for by GWR.[145]

However, the fact that more marijuana plantations are starting to appear in the middle of the desert, complete with water irrigation systems, protection from the sun and hidden from police surveillance by light net-like covers,[146] supports the hypothesis of non-stationarity. Human actions are making the plant respond differently to explanatory variables according to its location, thereby making researching outdoor drug cultivation an even more difficult task.

The clout of drug kingpins and their access to new technologies is not only transforming narcotics cultivation in Mexico, but also the pattern of violence that accompanies the business. The next chapter more closely scrutinizes the phenomenon of drug-related violence and its spiraling brutality over the last decade. By analyzing the changing smuggling routes and the main political and socioeconomic factors that are related to killings, Chapter 3 is an attempt to decipher what is occurring in Mexico in terms of violence.

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[145] Jetz et al., *Local and Global Approaches to Spatial Data*.
[146] "Mexico Marijuana Plantation Reportedly Biggest Ever," Reuters, July 14, 2011, accessed May 1, 2012, http://www.huffingtonpost.com/2011/07/14/mexico-marijuana-plantation-_n_898630.html#s309904

Chapter 3: A Spatial and Statistical Analysis of Drug-Related Bloodshed

Marijuana and opium cultivation patterns are heavily influenced by human factors in Mexico. Production of both is not only driven by favorable climate conditions in one part of the country or another, but also by sociopolitical factors that make growing illicit crops easier and more desirable amid certain population strata. Even though drug fields have sprawled throughout Mexico in recent decades, the wave of violence caused by drug production and smuggling did not spike to truly historic levels until the last 10 years. If drug cultivation has flourished for more than a century in Mexico in a relatively calm environment, why has bloodshed so increased of late? The answer lies in increased competition among rival cartels. But drug gangs tend to battle one another not for control of prime cultivation areas, but for key smuggling routes north to the United States. Therefore, the increased levels of violence can be explained, at least in part, by a dramatic shift in the very nature of the drug business. From primarily producers who relied on others to move their illicit product north, Mexican cartels have become, since the late 1980s and early 1990s, the most powerful production and smuggling syndicates in the hemisphere — transforming into the kingpins of the Americas by the 2000s. With more power comes more bloodshed, and the longer Mexican cartels remain at the top of the drug-smuggling heap, the more violence they unleash.

AN AVALANCHE OF KILLINGS

Drug-related violence in Mexico has increased exponentially in the last five years, killing near 50,000 people. Even though the country has been a producer of marijuana and opium poppy for nearly a century, over the last decade it has also become the main route for smuggling cocaine onto American soil. In the last few years, meanwhile,

Mexico has also been transformed into a major producer of synthetic drugs, including methamphetamines. All of these factors have combined to make the country the perfect one-stop shop for American consumers, who constitute the largest market for cocaine and marijuana in the world and have an insatiable appetite for synthetic drugs.

The main production areas for marijuana and opium, located along Mexico's Pacific Coast, have historically been more violent than the rest of the country. But the introduction of cocaine and synthetic drugs has altered the patterns of violence and coincided with the rise of a rash of new and ruthless drug gangs that have begun battling traditional Mexican cartels for a share of the smuggling business. Into this already volatile mix came a major crackdown on drug production and smuggling launched in December 2006 by President Felipe Calderón. Given the new, and ever-shifting reality, what parts of the country are now hardest-hit by drug violence? What do these areas have in common? Why have seemingly similar regions suffered different patterns of violence?

Traditionally, areas along Mexico's northern border have been the most-coveted by drug gangs looking to establish their headquarters and dominate corridors for moving narcotics into the U.S. Killings there are constant. But proximity to American territory is no longer the only determining factor. My research shows that any city that is a hub for smuggling and/or producing at least two kinds of illicit drugs now suffers more murders and violence than others, regardless of what part of Mexico it is located in. Many of the hardest-hit areas also have low population density, and high or very high levels of marginalization, defined as concentrations of people with low income and limited access to basic services.

My analysis focuses on the period between January 2007 and December 2010, when the largest number and most gruesome drug-related killings were committed. Time-series analysis of crime data sheds light on the spatial trends these killings have followed

by determining the drug-related homicide rate for each municipality, each year, and its correlated demographic data. The results cast doubt on the overall intentional homicide figures that Mexico reports to United Nations Office on Drugs and Crime of about 11 murders per 100,000 people per year between 2001 and 2007, and under 22 per 100,000 people during the subsequent three, drug war-torn, years.[147] Statistical and spatial analysis also shows that the areas which have become producers of and/or smuggling corridors for two and three different types of drugs have expanded greatly over the four years in question, and that drug-related killings are highly spatially correlated to these areas.

VIOLENCE AND ORGANIZED CRIME

Organized crime is violent by definition.[148] Criminal syndicates pursuing profit through illegal means often face threats from new competitors who look to rip away segments of their business and steal their profits. Intimidation and violence against rivals, coupled with a demand for unwavering loyalty from members of one's own gang, are the typical responses of threatened organizations attempting to preserve the status quo and retain control over illicit operations.[149] As with other types of crime, though, organized crime has a spatial component as well.[150] It is committed in a certain area, and the offenders generally occupy a distinctive geographical zone[151] where they enforce rules

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[147] "Homicide data Series to Be Used for Trend Analysis," *United Nations Office on Drugs and Crime (UNODC)*, accessed November 26, 2011, http://www.unodc.org/unodc/en/data-and-analysis/homicide.html

[148] Geis, Gilbert, "Violence and Organized Crime", *Annals of the American Academy of Political and Social Science* 364 (1966): 86-95, accessed November 3rd, 2011 http://www.jstor.org/stable/1034756

[149] John Conklin, *Criminology* (U.S.: Pearson Education Inc., 2007), 316.

[150] Kim Rossmo, *Geographic Profiling* (Boca Raton: CRC Press, 2000); Spencer Chainey and Jerry Ratcliffe, *GIS and Crime Mapping* (John Wiley & Sons Ltd., 2005); Greg Ridgeway and George Tita, "The Impact of Gang Formation on Local Patterns of Crime," *Journal of Research in Crime and Delinquency*, 44(2), 2007, 208-237.

[151] D.T. Herbert, "The Study of Delinquency Areas: A Social Geographical Approach," *Transactions of the Institute of British Geographers*, *New Series*, 1(4), 1976, 472-492, accessed November 3, 2011, http://www.jstor.org/stable/621904

that carry punishments if they are not followed. Mexican drug organizations have certainly been territorial since the beginnings of drug cultivation in Mexico almost a century ago. But violence generally remained clustered in certain areas where production and smuggling were most pervasive (Figure 15).[152] Even though these main producer areas have spread out in the last two decades, they remain concentrated in the same region: the Pacific Coast along the Sierra Madre Mountains. They also tend to share the same characteristics: The heaviest production areas are located in regions with low population density[153] (Figure 16) and high levels of poverty-related marginalization (Figure 17).[154]

It was when Mexico began becoming the main drug supplier for the United States that violence levels increased sharply. An unprecedented wave of brutality that began spiking in 2000 has only gotten worse each year since, killing nearly 50,000 people in the last five years, and claiming 15,273 victims in 2010 alone (Illustration 4), according to official Mexican government figures.[155]

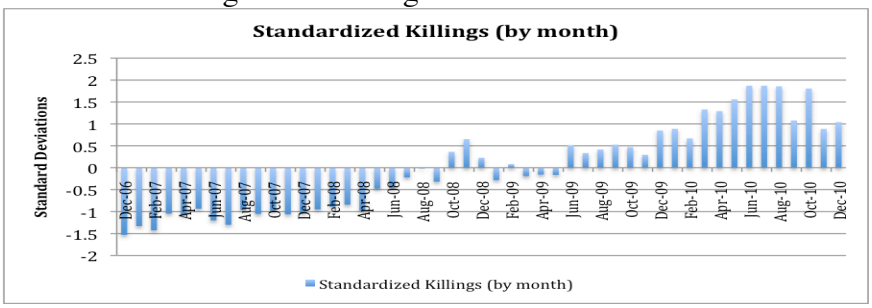

Illustration 4: Standardized Drug-Related Killings 2007-2010.

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[152] Astorga, *El Siglo de las Drogas*.

[153] Population, *INEGI, Mexico's Institute of Statistics and Geography*, 1995, 2000 and 2005, accessed October 15, 2011, http://sc.inegi.org.mx/sistemas/cobdem/index.jsp

[154] Marginalization, *SEDESOL, Mexico's Secretary of Social Development*, accessed October 10, 2011, http://sppe-svr.sedesol.gob.mx/zap/

[155] Drug-related killings database December 2006-December 2010, *Mexico's Presidency*, accessed September 18, 2011, http://www.presidencia.gob.mx/base-de-datos-de-fallecimientos/. For data on homicides from January 2011 to September 2011 see also *Procuraduría General de la República (PGR)* http://www.pgr.gob.mx/temas%20relevantes/estadistica/estadisticas.asp

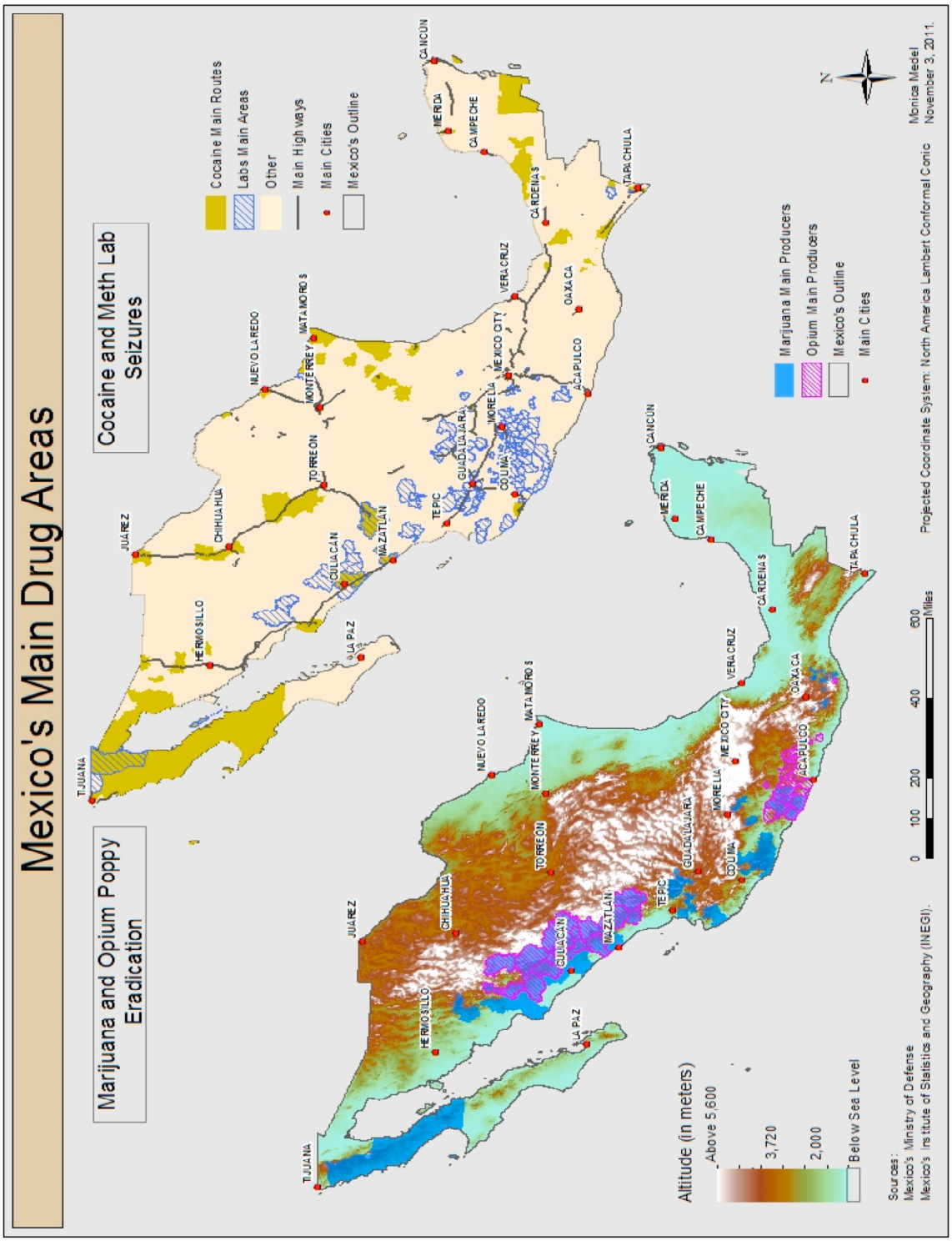

Figure 15: Mexico's Main Drug Areas.

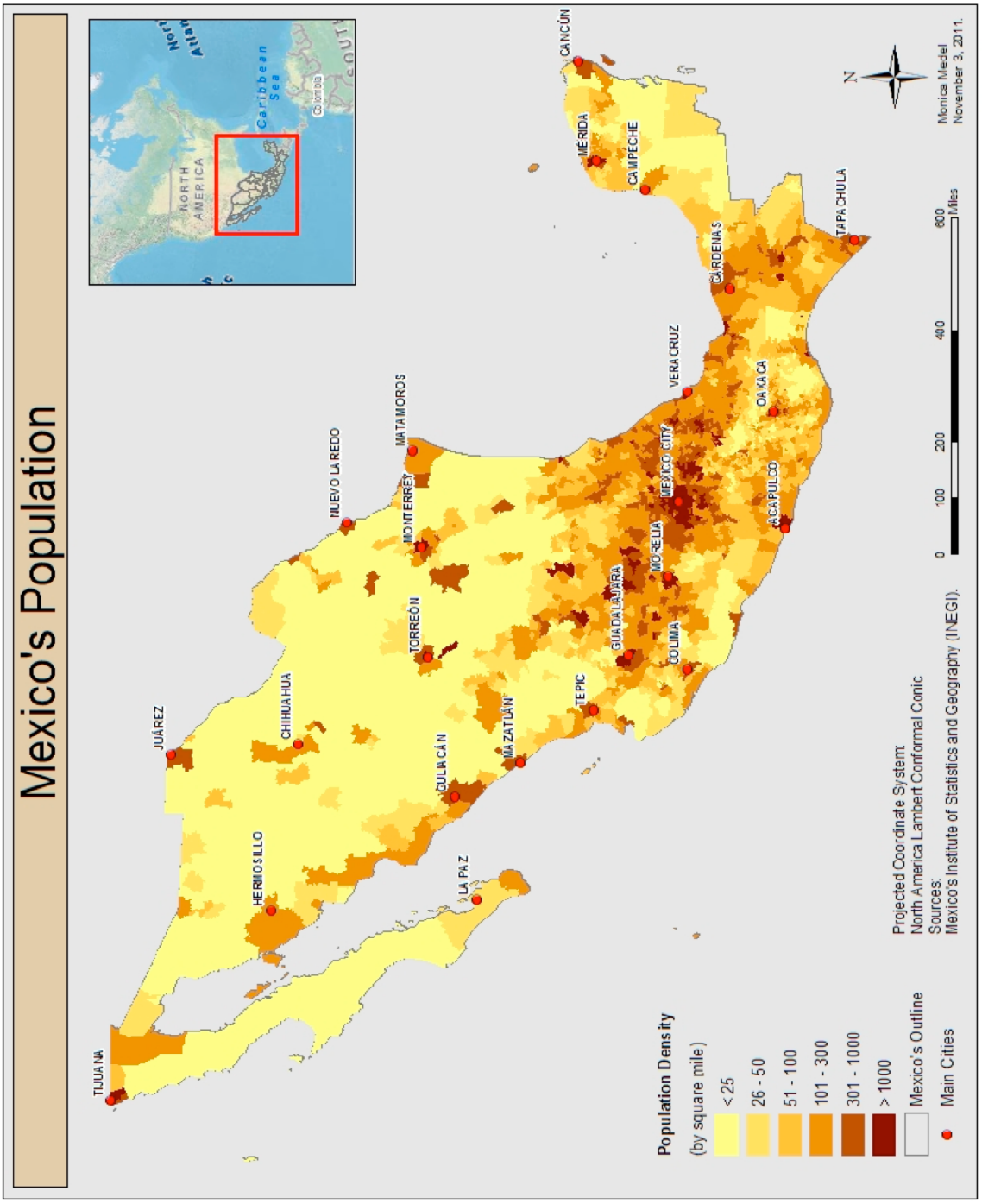

Figure 16: Mexico's Population Density and Index Map.

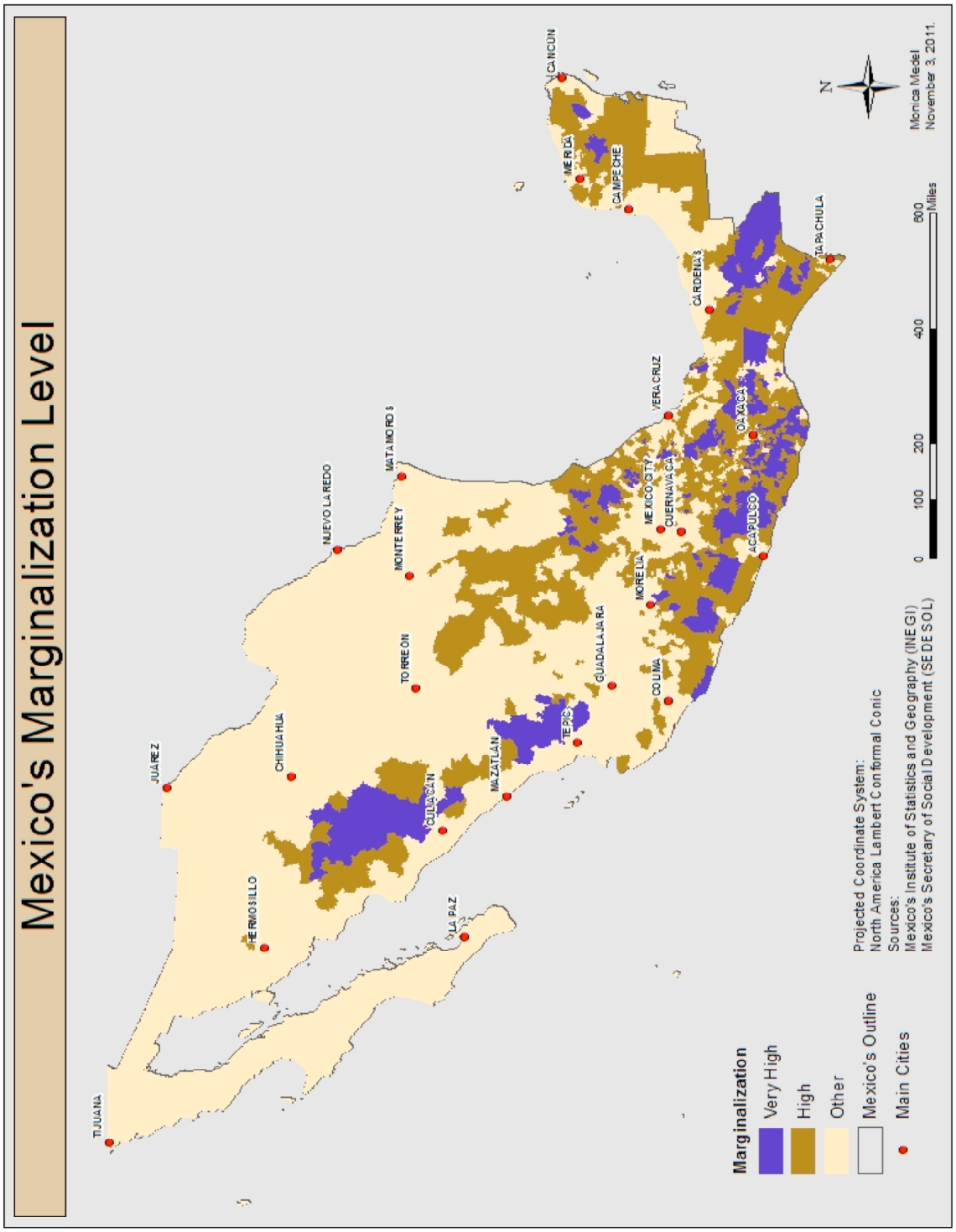

Figure 17: Mexico's Marginalization Distribution.

It is no coincidence that drug violence has exploded as Mexico has undergone a political transformation. The turn of the century coincided with the collapse of the single-party regime that ruled the country for 71 straight years, propelling opposition Governor Vicente Fox to the presidency in 2000. That prompted the emergence of new political powerbrokers and a series of fresh strategies against drug producers and smugglers, many of whom had been openly protected by the old regime, known as the Institutional Revolutionary Party, or PRI. The emergence of the *La Familia Michoacana* (LFM) organization after 2000 illustrates this point. Ongoing police investigations have pointed to links between traffickers and local authorities of the Democratic Revolutionary Party, or PRD, which defeated the PRI in the region and whose politicians have filled the void left by the disappearance of the central, monolithic power the PRI once held.[156] Unfortunately, many of those leaders are now making protection pacts with drug gangs the same way their PRI predecessors once did.

The entrenched corruption of the PRI, and the shifting alliances between politicians and drug gang leaders in different regions of Mexico where the party no longer holds absolute power, did not happen by accident, however. Geography has always been a key factor, and Mexico's close proximity to the United States, the world's economic powerhouse and also the largest global market for illegal drugs, pushed Mexican syndicates toward developing the all-powerful drug-trafficking prowess they have developed today. The shift in the country's drug smuggling hierarchy after Fox took power was also heavily influenced by a larger, international reorganization of the illegal narcotics market — a reorganization that was decades in the making, as explained in Chapter 1. Mexico had long produced drugs like marijuana and opium poppy, but its

[156] Author's interview with sociologist and Mexico's drug trafficking expert Luis Astorga in May 2010 in Mexico City.

kingpins gained stature in the late-1980s and early 1990s, when they began smuggling cocaine (Illustration 5) and took advantage of new technologies and globalization to improve production and distribution.[157] Then, unexpected help came from Washington. A U.S.-led crackdown on Caribbean smuggling routes that had moved cocaine from the jungles of South America to Miami via tropical islands forced gangs to alter how they smuggled cocaine into the U.S., pushing the flow of illegal narcotics toward Central and South America. American authorities also helped bring down the Cali and Medellin Cartels in Colombia, leaving a power vacuum that Mexican-based drug gangs had little trouble filling.[158]

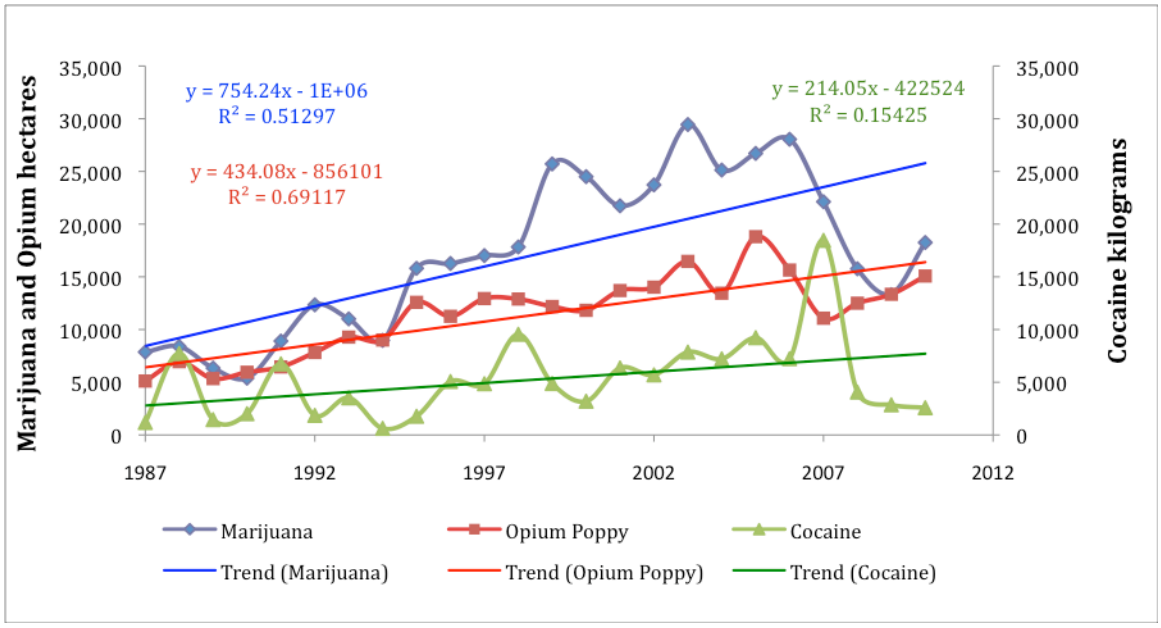

Illustration 5: Marijuana and Opium Eradications and Cocaine Seizures 1987-2010.

[157] Author's interview with Mexico's representative Manuel Clouthier, from Culiacán, Sinaloa, in May 2010, in Sinaloa.

[158] Colleen Cook, "Mexico's Drug Cartels", Congressional Research Service (RL34215; October 16, 2007), 1, accessed October 18, 2011, http://www.fas.org/sgp/crs/row/RL34215.pdf

By the early 2000s, cocaine was flowing north through Mexican territory as seamlessly as native drugs like heroin and opium poppy always had, and Mexican trafficking groups had supplanted all others around the hemisphere as the top source of illegal drugs reaching the United States.[159] As the country's influence on the smuggling world grew, however, Mexican criminal syndicates became still richer and more powerful by moving increasingly into making and smuggling highly profitable synthetic drugs.[160] They also embraced a wider range of activities — such as kidnapping, extortion, and human trafficking — and became far more complex and professionally organized, adapting to a market that was booming and thus attracted new competitors.

Violence began to increase under Fox when his new government dismantled much of the symbolic relationship that saw the previous administration protect drug smugglers in many parts of the country in exchange for bribes. There are many examples that show how the PRI, openly or covertly, helped drug organizations to grow while, at the same time, controlling the level of violence generated by those organizations. One of the most notorious cases involved the Federal Directorate of Security or DFS, whose link to the escape of the key suspect in DEA agent Enrique Camarena's murder in 1985 was the final straw that let to its disbanding.[161] Other incidents saw the surprising downfall of Mexico's newly appointed drug czar, General Jesús Gutiérrez Rebollo, in 1997. Gutiérrez Rebollo had been appointed just months earlier to head the National Institute to Combat Drugs, but was quickly arrested and accused of protecting and receiving money from the

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[159] INCS 2008, 2009.

[160] Personal interviews with Mexico's former deputy attorney general for drug crimes, Jose Luis Santiago Vasconcelos, between 2002 and 2006, when the author of this paper was a reporter, first with the Spanish News Agency EFE, and then for Britain's Reuters news service. Also, interview with former spokesman for President Vicente Fox (2000-2006), Rubén Aguilar, by the author of this report, in May, 2010.

[161] The DFS was in charge of preserving the country's internal instability for almost 40 years. However, it was also accused of being involved in repression of students, culminating in massacres in 1968 and 1971, in a period called "the dirty war."

Juárez Cartel.[162] His saga even inspired the Hollywood hit "Traffic."

But accusations of ties to drug gangs have not been limited to law enforcement. PRI governors have for decades been accused in the press, directly denounced by lawmakers in Mexico's Congress, or even arrested and tried for protecting certain drug organizations in their states — often while ensuring authorities targeted a rival. Prosecutions against PRI governors stretch back decades, but two of the most-recent involved Mario Villanueva, the former governor of Quintana Roo, home to Cancun and other glittering, Caribbean resorts. He was arrested in 2001 and charged with providing assistance to drug traffickers and laundering drug profits for the Juárez Cartel. His case came four years after the then-governors of Sonora, Manlio Fabio Beltrones, and of Morelos, Jorge Carrillo Olea, were linked to drug organizations in a story published by *The New York Times*.[163] The paper cited U.S. authorities as its main source. Also, many Mexican newspapers uncovered ties between Tomás Yarrington, the former governor of Tamaulipas, and the head of the Gulf Cartel.[164] In May 2012, U.S. federal attorneys asked to seize two properties in Texas belonging to Yarrington amid accusations he received bribes from the Gulf cartel.[165]

The Mexican Army, the main weapon in the current battle against drug trafficking, has not escaped the stain of drug-related corruption either. In a spectacular operation in October 2002, the Mexican Army took over one of its own battalions and

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[162] Statement No. 510/00. Procuraduría General de la República (PGR), accessed September 10, 2011, http://www.pgr.gob.mx/cmsocial/bol00/sep/b51000.html

[163] "Drug Ties Taint 2 Mexican Governors," *The New York Times*, Feb. 23, 1997, accessed September 10, 2011, http://www.nytimes.com/1997/02/23/world/drug-ties-taint-2-mexican-governors.html?scp=2&sq=Manlio+Fabio+Beltrones&st=cse&pagewanted=all

[164] "Hay pruebas sobre nexos de priistas con narco: PAN," *El Universal*, Oct. 21, 2004.

[165] "Tomas Yarrington, Mexico Ex-Governor, Denies Drug Tie Allegations", *Associated Press*, June 8, 2012, accessed June 20, 2012, http://www.huffingtonpost.com/2012/06/09/tomas-yarrington-drug-tie-allegations_n_1583259.html

sent all 600 soldiers back to their barracks in the town of Guamuchil, Sinaloa, to investigate them for links to drug trafficking. This was no ordinary battalion, its main focus had been to battle drug smuggling, but not all of its members were doing their jobs. "Certain important parts of the battalion protected the planting and cultivation of drugs," Defense Minister Ricardo Clemente Vega said later.[166] In November of the same year, two Army generals, Arturo Acosta and Francisco Quirós, who had previously been accused of the killings of 143 dissidents between 1975 and 1979, a period known as Mexico's "dirty war" against shadowy anti-government groups, were sentenced to prison for protecting the Juárez Cartel in the 1990s, a time when the group was headed by Amado Carrillo.[167] A decade later, two other generals were subpoenaed to testify before the federal Attorney General's office's special organized crime division. Generals Tomás Angeles, former deputy Defense Secretary until 2008, and Roberto Dawe were compelled to testify "because they presumably are linked to organized crime activities," according to the PGR, as the attorney general's office is known.[168] After the deep embarrassments of "Operation Cleanup", detailed in Chapter 1, the potential downfall of Angeles and Dawe threaten to be the biggest corruption scandal of the Calderon administration.

Calderón's strategy of militarizing the fight against drug traffickers had the unintended effect of not only causing more killings but also ensuring that they have become more brutal — featuring beheadings, victims dumped in mass graves, and corpses hung from crowded highway overpasses or tossed into rush hour traffic

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[166] The Defense Minister was quoted in a story the author of this paper wrote while working as a reporter for EFE News Agency in Mexico City on October 15, 2002.

[167] Juan Veledíaz, "Acosta Chaparro: Las deudas de un boina verde", *Animal Político*, April 21, 2012, accessed June 20, 2012, http://www.animalpolitico.com/2012/04/acosta-chaparro-las-deudas-de-un-boina-verde/

[168] "Acusan de narcotráfico a dos generales," Reuters, May 16, 2012, accessed June 20, 2012, http://eleconomista.com.mx/seguridad-publica/2012/05/16/acusan-narcotrafico-dos-generales

(Illustration 6). The bloodshed also seeped into new parts of Mexico that had been previously largely spared by drug violence.

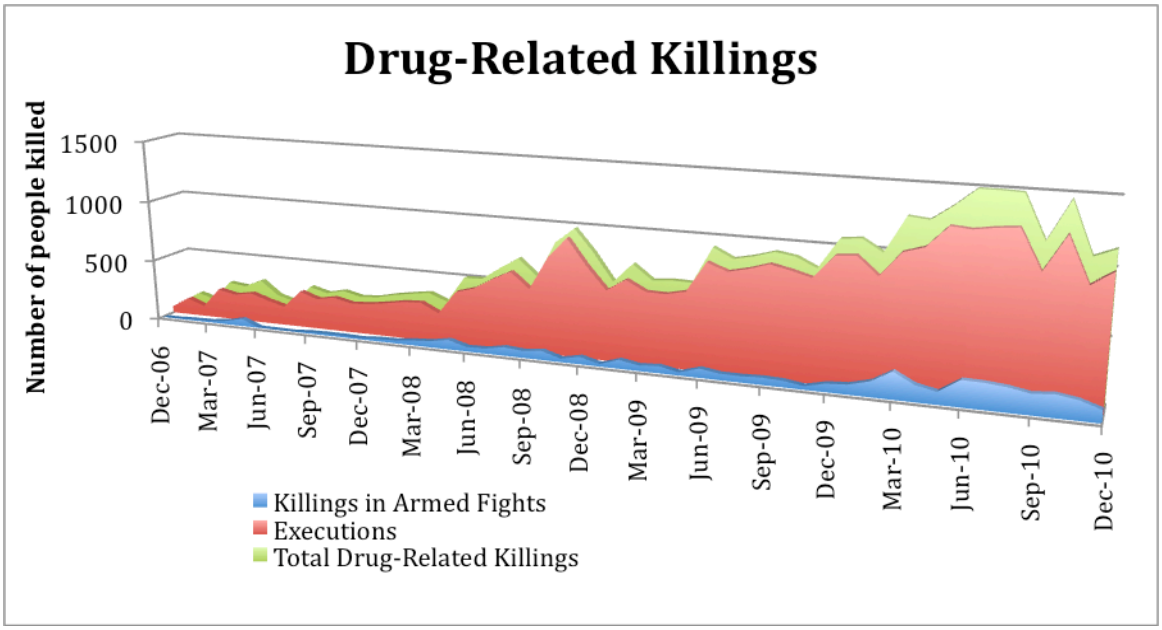

Illustration 6: Drug-Related Killings (By Type of Killing) 2007-2010.

Cartel violence also was fueled by new and growing, militia-like groups being formed within top Mexican drug smuggling organizations — a process described in Chapter 1. This is most clearly illustrated in the case of The Zetas. Beginning as the armed, enforcement wing of the Gulf Cartel in the late 1990s, The Zetas soon formed their own ruthless smuggling syndicate. Since then, the group has been responsible for two of the most-brutal Mexican massacres in recent years. The first was the 2010 mass killing of 72 illegal immigrants,[169] mostly from Central America, who were attempting to transverse Mexico and sneak across the U.S. border. The second came the following year,

[169] "Drug hitmen dump 72 bodies at Mexican ranch," Reuters, August 25, 2010, accessed June 10, 2012, http://www.reuters.com/article/2010/08/26/us-mexico-drugs-idUSTRE67O2NF20100826

when 193 people were slaughtered and dumped in unmarked graves after presumably being kidnapped while traveling by bus on a highway in northern Mexico.[170]

Such bloodshed is in stark contrast to a Mexico that had remained relatively calm with regard to drug-related violence until the late 1990s. Even though violence was always a byproduct of illegal narcotics production and smuggling activities, it stayed almost totally under control and confined to certain production areas and cities along the border with the U.S. or in such hot-beds for production as Sinaloa state. What happened in the last decade so drastically altered this reality, releasing a brutal wave of massive killings that has spread to other areas that did not previously have clear relationships with trafficking or cultivating drugs?

METHODS

Historical and policy analysis have revealed correlations between drug violence and socioeconomic and political variables of those regions where outbreaks of killings emerge. My study intends to analyze not only the demographic and socioeconomic conditions related to drug-related violence, but also the relationship between killings and municipalities that have become routes and/or producing areas for three different drugs at the same time — what I call drug hubs. With this purpose in mind, first I will run a simple linear regression and then I will do a spatial analysis, by overlay, to examine the impact in murders for municipalities that are drug hubs.

OLS

By running an Ordinary Least Square (OLS) model, this study will attempt to determine the strength of the association between drug-related killings and certain

[170] "Aumenta a 193 los muertos por matanza en San Fernando, Tamaulipas: PGR," Milenio, June 7, 2011, accessed June 10, 2012, http://www.milenio.com/cdb/doc/noticias2011/a83771a907f9b3b0aaf6153c163b67ca

prevalent social and political conditions in the municipalities where these murders occur. Seven variables were selected as predictors: three of them measure socioeconomic conditions:

Variable name	Explanation	Expected relationship
Unemp	Level of unemployment	+
BasicServ	House has electricity, potable water or access to the public sewer	-
WHeadH	Percentage of women who are head of households	+
PIllit	Percentage of people who are illiterate in the municipality	+
Catolic	Percentage of the population who can be identified as Roman Catholic	+ -
Hwy	Length of paved roads in each municipality (to measure connectivity of the area for smuggling purposes)	+
Police	Effect of police presence	+ -
PRI	Political party affiliation (0 for PRI mayors, 1 for non-PRI mayors)	+

Table 9: Variables for the OLS model to explain violence.

Also, to consider the change in political affiliation after elections, a lagged variable was included: the previous year for the municipality's political affiliation.[171]

[171] The political affiliation data were obtained from the Centro de Investigación Para el Desarrollo, A.C. (CIDAC) *Base de Datos Electoral CIDAC*, http://www.cidac.org/esp/Datos_Electorales.php

All the variables, with the exception of the dummy variable for political affiliation and the variable for road connectivity, were weighted by population of the respective municipalities. Hwy was weighted by the area of the municipio.

Almost all the variables were greatly skewed, positively (illiteracy, unemployment, police and highways presence) and negatively (Catholic population and basic services in the households). Therefore, they were log-transformed to run the model. (Illustration 7)

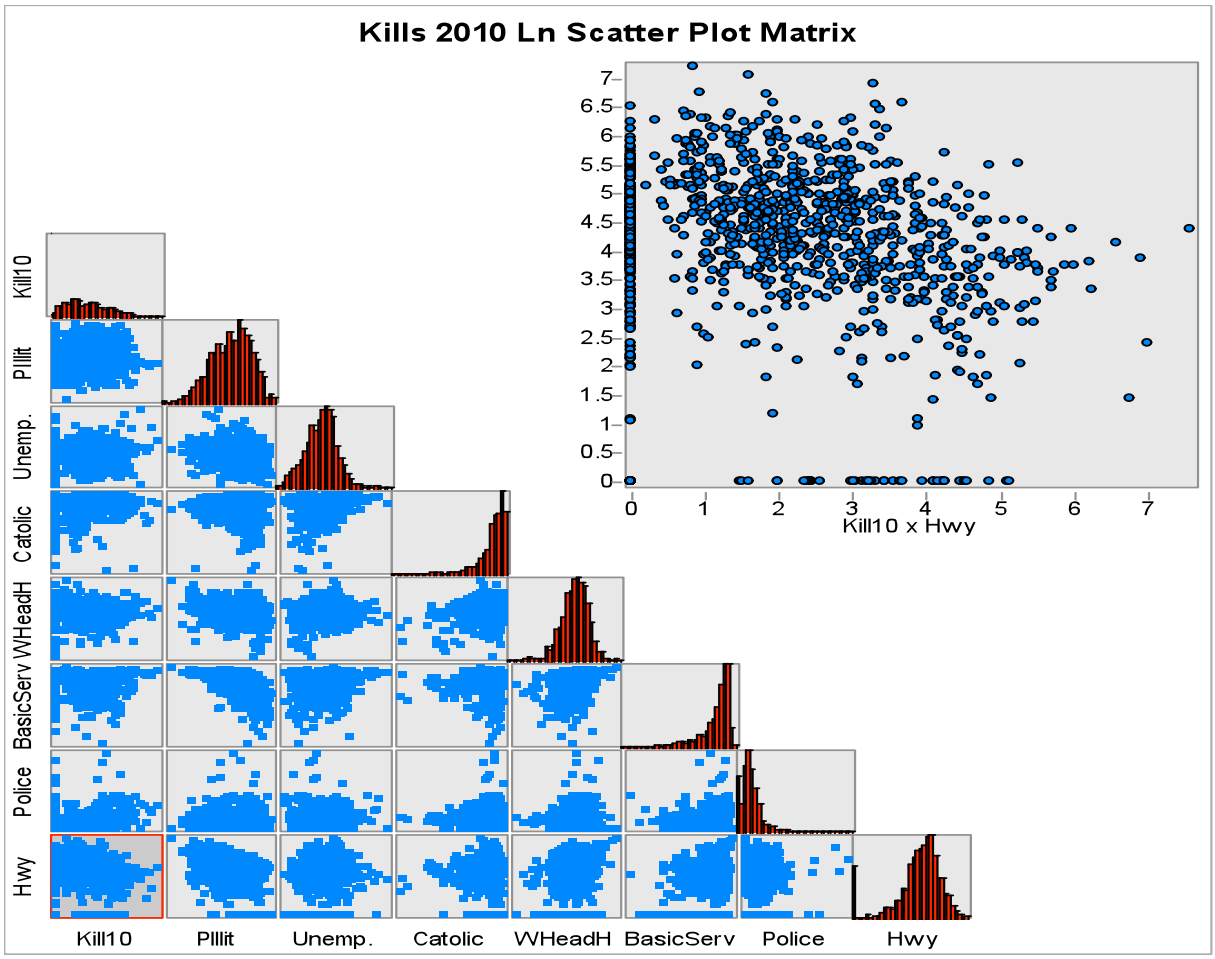

Illustration 7: OLS model's scatter plot matrix.

Data by year and municipality from the drug-related killings database released by Mexico's Presidency were used for the dependent variable. The murders were weighted by population and multiplied by 100,000 to get the killings rate by 100,000 people. Because the variable was also heavily positively skewed (with a long tail to the right), it was log-transformed as well.

There were 1,137 municipalities with at least one killing in the period being studied (2007-2010), but for a few of them there were no data on police presence while some others did not have paved roads or at least two lanes. The latter situation mainly affected some tiny municipalities in the southern state of Oaxaca, which accounts for a fifth of all the municipalities in Mexico and has many indigenous municipalities. This resulted in the exclusion of 80 observations, among them mostly the previously mentioned small Oaxaca municipalities. However, a lack of data on police presence resulted in the inclusion of several major cities, including Morelia (the capital of Michoacán), Matamoros (in Tamaulipas), and Ciudad Juárez, the most violent city in México.[172] The same model was applied for each of the four years under study.

RESULTS

A model for 2007 with all the selected variables showed that WHeadH and Hwy were significant. The Akaike Information Criterion was 3234.93 and the Adjusted R Square was a marginal 0.01128. But the Joint F Statistic and the Joint Wald Statistic, which account for a good model fit, were significant at the 0.05, the same as the Koenker statistic, which indicates heteroskedasticity and/or non-stationarity. Additionally, the Jarque-Bera statistic, which measures the plausibility of the assumption that the residuals are normally distributed, was significant. This could be an indicator that the modeled

[172] For more details on the situation in Juárez see Chapter 4, a case study about this city.

relationships are nonlinear, that the data have influential outliers or strong heteroskedasticity.

Following a step-wise process, PRI06, PIllit, PRI, Catolic, Unemp, and BasicServ were dropped. The final model showed that only WHeadH and Hwy were significant in 2007, with an AIC of 3225.741 and an Adjusted R Square of 0.0143.

Variable	Coeff.	St. Error	T Stat.	P-Value	Robust P-value	VIF
Intercept	0.693	0.244	2.834	0.00468	0.00514	-----
WHeadH	0.253	0.1414	1.7882	0.074	0.05549	1.037
Hwy	-0.1	0.0248	-4.0282	0.000068	0.000602	1.037

Table 10: OLS results for 2007 violence model.

For 2008, the all variables model had PIllit, WHeadH, and Hwy as being significant. The AIC was 3677.36 and the Adjusted R Square was 0.05329, a slight improvement with regards to 2007. The Joint F statistic and the Joint Wald statistic were significant again, the same as the Koenker and the Jarque-Bera statistics. The variables PRI07, Unemp, BasicServ, and Catolic were dropped following a step-wise process to select only the most significant variables.

The final model included the same variables that were significant in 2007 (WHeadH and Hwy) but also showed PIllit, Police, and the dummy for PRI08 as significant. The AIC for this model was 3672.08 and the Adjusted R Square was 0.0544, an improvement from the first all-variables model for the year. Again, even though the overall model as significant, the Koenker and the Jarque-Bera statistics pointed to heteroskedasticity and possible spatial autocorrelation and non-stationarity.

Variable	Coeff.	St. Error	T Stat.	P-Value	Robust P-Value	VIF
Intercept	1.325	0.4506	2.9406	0.003355	0.004863	----
PIllit	-0.2625	0.0654	-4.0121	0.000072	0.000095	1.155
WHeadH	0.5035	0.1769	2.8451	0.004530	0.004380	1.066
Hwy	-0.2082	0.033	-6.3049	0	0.000001	1.205
PRI08	-0.1734	0.0845	-2.0519	0.040415	0.040346	1.002
Police	0.0951	0.0529	1.7965	0.0727	0.065481	1.06

Table 11: OLS results for 2008 violence model.

For 2009, meanwhile, the all-variables model showed, again, that WHeadH and Hwy were significant, the same as PIllit. The AIC was 3841.655 while the Adjusted R Square was 0.0392. The statistics to measure the overall performance of the model were significant as well.

Following a step-wise process to select the most significant variables, Catolic, PRI08, Unemp, Police and BasicServ were dropped. The final model for 2009 showed that PIllit, WHeadH, Hwy and PRI09 were significant.

Variable	Coeff.	St. Error	T Stat	P-Value	Robust P-Value	VIF
Intercept	2.1819	0.38808	5.6224	0	0	----
PIllit	-0.1831	0.070586	-2.59478	0.00959	0.011089	1.1509
WHeadH	0.38876	0.190258	2.04336	0.04125	0.039049	1.055
Hwy	-0.2348	0.034892	-6.72983	0	0	1.151
PRI09	-0.15611	0.09212	-1.69465	0.09044	0.090679	1.013

Table 12: OLS results for 2009 violence model.

The AIC for the final model was 3834.968, while the Adjusted R Square was 0.040837.

The outcomes for 2010 follow the same line. WHeadH and Hwy and PIllit remained significant, but were joined by PRI09, PRI10 and Police, although the last two were significant only to the 0.10 instead of to the 0.05, like the rest of the variables. The AIC for this final model for 2010 was 3968.097 and the Adjusted R Square slightly improved in comparison with the other years analyzed: 0.0755.

Variable	Coeff.	St. Error	T Stat.	P-Value	Robust P-Value	VIF
Intercept	1.098	1.4226	0.772	0.440278	0.467025	----
PIllit	-0.3913	0.0754	-5.18439	0.000001	0.000001	1.163
Catolic	0.3095	0.3068	1.008966	0.313212	0.326532	1.029
WHeadH	0.4866	0.2054	2.368816	0.018011	0.017222	1.088
Hwy	-0.2713	0.0382	-7.10219	0	0	1.221
PRI09	-0.4606	0.12464	-3.69551	0.000243	0.000429	1.64
PRI10	0.2102	0.12438	1.690379	0.091263	0.107388	1.642
Police	0.1143	0.06109	1.871372	0.062167	0.066174	1.068

Table 13: OLS results for 2010 violence model.

Spatial Analysis

To determine the relationship between areas which were drug hubs and the distribution of killings per year, data on drugs were queried to calculate the many possible combinations of three drug hubs. Using factorials, the combinations were determined as 4 ($^4C_3$=4). Then, an algorithm was created — using Boolean algebra — to detect by iteration those municipalities that fulfilled the requirements for every

combination. The four types of drugs found in Mexico were included: marijuana, opium, meth, and cocaine. Those drugs Mexico produces were considered in almost all the different stages and categories illegal narcotics can be transported and distributed across the country. For example, in the case of marijuana, included in the variables were: packed marijuana, marijuana leaves, marijuana seeds, and marijuana plants, either seized or eradicated. For opium, meanwhile, only opium plants and opium seeds were included. Seizures of opium gum and heroin were not available for municipalities, and were only disaggregated by state. For methamphetamines, the number of labs eradicated and the packages of meth seized were included; for cocaine, the single included category was the only form in which the drug is thought to appear in Mexico: packaged cocaine.

The queries revealed every year that had any combinations of three drugs in any municipality at the same time. These municipalities can be thought of as "drug hubs," or especially key places in the smuggling routes to the U.S. used by Mexican cartels. To complete the process, drug-related killings were converted to a point shapefile, and then municipalities with at least 15 killings were selected by querying the data to do the overlay analysis.

RESULTS

The results show the progression of drug-related homicides from year to year. They indicate that in 2007, (Figure 18) the murders were concentrated in large cities, such as Ciudad Juárez, Tijuana, or Culiacán. All are also headquarters for different drug organizations. Most of the killings were distributed along the border with the U.S., along the Pacific coast, and in some municipalities in the central state of Michoacán — which has had an outbreak of violence that began in 2006. By 2008 (Figure 19), killings had spread to municipalities in the north-central part of the country, such as the cities in

Durango, Coahuila and Chihuahua states. At the same time, murders in the northern Gulf Coast, specifically in the state of Tamaulipas, also began to grow. By 2009 (Figure 20), drug-related murders had become massive in the previously mentioned states and in the Pacific Coast state of Guerrero and the nearby state of Michoacán. Drug violence, meanwhile, started increasing in areas close to Mexico's capital, like Mexico state and Morelos.

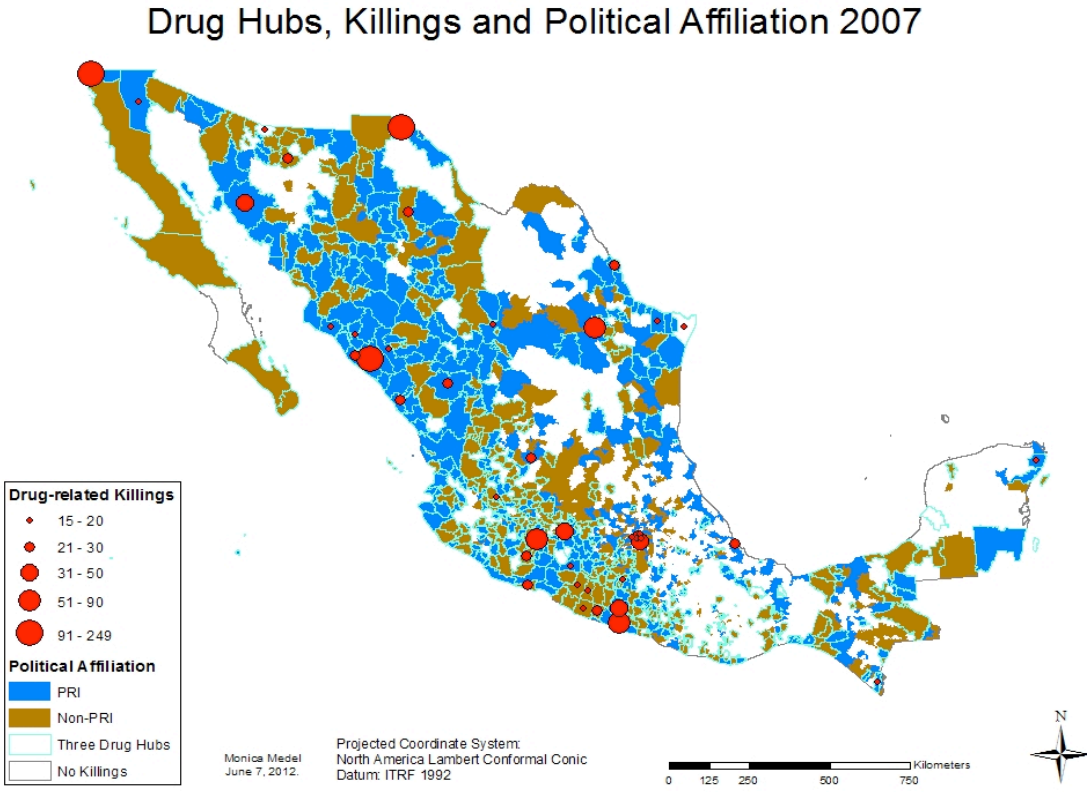

Figure 18: Killings, Political Affiliation and Drug Hubs 2007.

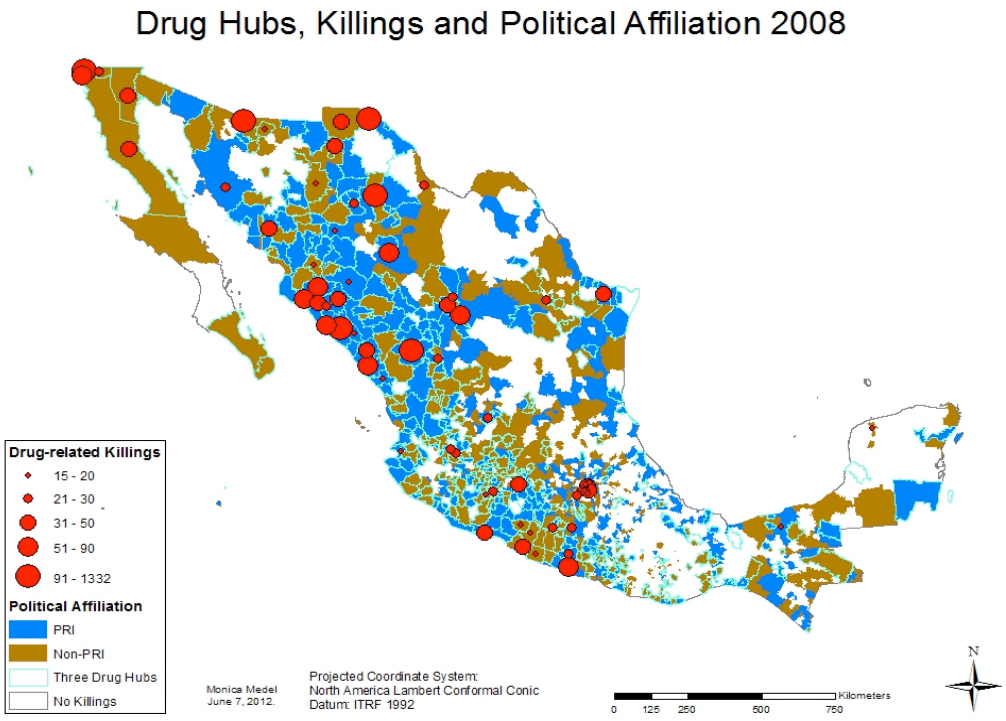

Figure 19: Killings, Political Affiliation and Drug Hubs 2008.

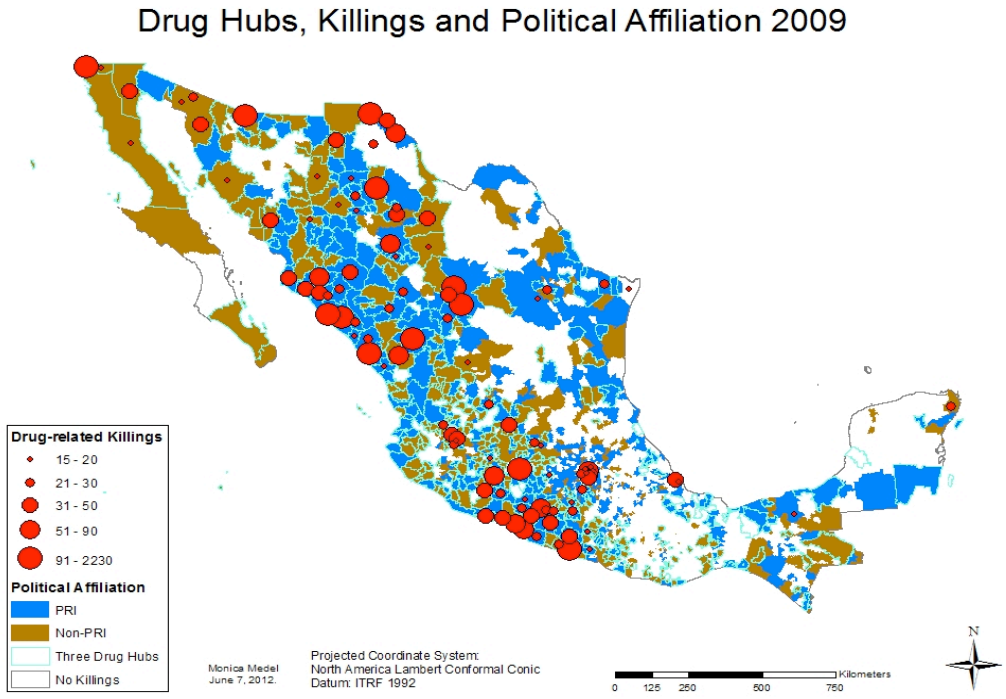

Figure 20: Killings, Political Affiliation and Drug Hubs 2009.

By 2010, drug-related killings were covering a great portion of Mexico as a whole, with hotspots in Sinaloa, as well as Tamaulipas and Chihuahua (both states on the border with the U.S.), while crime was rapidly increasing in the areas close to Mexico City. Additionally, high concentrations of murders showed up in the states of Veracruz, Tabasco and Quintana Roo. (Figure 21)

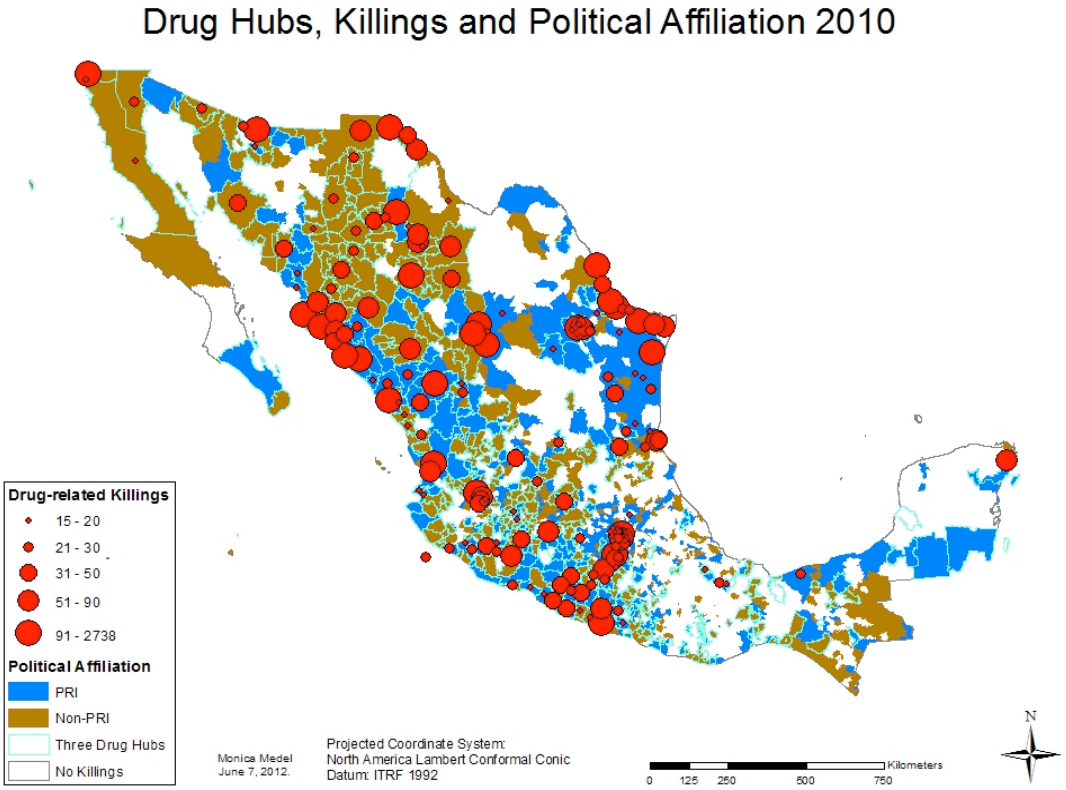

Figure 21: Killings, Political Affiliation and Drug Hubs 2010.

DISCUSSION

For all the models, the variables WHeadH and Hwy were significant, although in different directions. While Hwy was negatively correlated to the killings, WHeadH was positively correlated to their occurrence. Neither is a surprise. Households headed by women suggest more poverty and also less supervision for children whose mothers work

outside the home. The results for Hwy suggest that areas better connected by roads and other transportation infrastructure allow for faster police intervention and also give potential victims more routes on which to flee. We should also remember that the killings data are driven by the place where the bodies are found, not necessarily the point where the murder may have occurred. Many times, victims are kidnapped first and then their bodies dumped in the streets of a nearby city or even another, contiguous municipality.

The percentage of illiterate people in the municipality was also negatively correlated to killings. This result could indicate that, as previously mentioned, many of the killings occurred (or bodies were found) in cities. Illiteracy is mostly a rural problem, and that is likely why we see the negative relationship. With regards to police presence, when significant, this variable was positively correlated to the murders. This might point to two different situations: a case of endogeneity where, because a municipality is larger it has more police assigned to guarantee residents' security, or suggesting that police agents themselves may be involved in causing more violence, a theory many newspapers in Mexico have advanced. A third case, also mentioned by the press, is that because a municipality has very high rates of drug-related killings, more police and troops are assigned there, creating an endogeneity problem again. This hypothesis was not tested in this study because data on the amount of troops deployed to combat drug-related violence are kept confidential for security reasons and were thus unattainable.

The biggest surprise the results showed was that the PRI variable, when significant, was almost always negatively correlated to the killings. Academics and historians who study drug trafficking in Mexico have repeatedly asserted that violence started growing at the same time the PRI's power structure started crumbling in the late 1990s, and that violence only increased when the party lost control of the presidency entirely in 2000 and remained out of power in 2006. This study reveals that, actually

having a non-PRI mayor is most frequently related to fewer killings, not more. The exception, however, came in 2010, when the model showed the lagged variable for political affiliation (PRI09) also negatively correlated to the murders, but the variable for political affiliation for the same year (PRI10) was actually positively correlated to the killings, meaning that a possible change of affiliation during the year resulted in non-PRI municipalities being more prone to drug-related murders.

The Moran's Index to measure autocorrelation showed clustered patterns for the killings for every year, pointing to a phenomenon of possible nonstationarity, that is, that the modeled relationships are in different directions according to the municipality analyzed.

The spatial analysis was very in tune with the regression results. From the overlay analysis it is clear that the wave of killings follows a very clear pattern: Drug-related homicides almost always occur in municipalities which are already drug hubs for three different kinds of drugs. For 2007, there were 490 municipalities that were transit points for at least three different drugs. While the number decreased to 423 in 2008, it rebounded to 457 in 2009 and climbed still higher, to 484, in 2010. Even though not every municipality that is a drug hub has at least 15 homicides, the fact is that the areas hit hardest by high numbers of murders are drug hubs. Also, there is a clear progression in the use of new smuggling routes toward the central regions of the country and the Gulf coast along Veracruz state. Many of those areas are now nearly as affected by high numbers of murders as traditional cartel hotspots and border cities, including locales across Sinaloa or Tijuana.

Consistent with the results of the regression analysis, the biggest surprise here was seeing that homicides are not necessarily related to political affiliation. PRI and non-PRI municipalities are battered almost at the same rate by drug violence, and it seems that

PRI municipalities actually bear the brunt in terms of numbers of killings because the party controls the largest cities in the country.

However, it is true that the PRI, and the well-oiled political machine it built to govern the country, has indeed had a great impact on how drug violence is distributed throughout Mexico and the inability of local authorities to thwart it. Governance style and power structure also help explain the patterns followed by drug-related violence. Chapter 4 more closely examines this very problem.

Chapter 4: Case Study: Ciudad Juárez, a Failed Case of Local Governance

With a drug turf war that has already killed near 50,000 people in the past five years still raging, the candidates for Mexico's presidency in 2012 elections did not have clear strategies to stop the violence, or even reduce it significantly. Ciudad Juárez, across the border from El Paso, Texas, is the most-violent city in what has become one of the hemisphere's deadliest countries. The city is ground zero for killings and chaos amid the bloodiest period in Mexico since the country's Revolution at the start of the 20th century. A number of important factors, when examined together, help explain the unprecedented wave of violence and why Juárez specifically has been so hard-hit. Years of uneven development transformed the city from a village in the 1950s to a sprawling metropolis of more than a million residents, which today has became the fifth largest generator of wealth nationwide. Despite such riches, however, 70 percent of Juárez households live in poverty, and the city is plagued by shortages of even the most basic services, too few schools and paved roads, and spotty public transportation. Fully 10 percent of the homes in modern Juárez have dirt floors and lack proper sewerage and electricity. The city also serves as the headquarters for one of the most violent drug organizations in Mexico, the Juárez Cartel, which has little trouble recruiting new hit men and smugglers from the ranks of the city's poor and forgotten.

Certainly, ineffective local government is a chief factor in Juárez's problems, but the root causes can be traced to Mexico's unique brand of federalism — which places so much emphasis on the central government in Mexico City that it has tied the hands of local authorities both in the way it was originally implemented and how it remains in place today. That remains true despite a number of recent but largely ceremonial,

attempts at decentralization. Also at fault is an entrenched political culture that was carefully nurtured by a long-standing, single-party regime. The flawed federal process has hampered development of local governance in Juárez by giving city officials no comprehensive responsibilities and limiting their control over key public services, while also restricting the municipality by forcing it to submit to financial regulations that are too reliant on Mexico City for funding. These structural problems were exacerbated by the Institutional Revolutionary Party, or PRI, which ruled Mexico from 1929 until 2000, imposing a tradition of centralized decision-making that endures today and continues to make local governments in Juárez and elsewhere beholden to federal authorities — despite the party's defeat at the polls 12 years ago and democratization efforts Mexico has embraced since then.

Things are especially tough for authorities in Juárez, meanwhile, because being on the border with the United States means added, inherent complexities which further blur the line between where local authority stops and federal authority begins. Issues such as national security concerns, cross-border immigration, territorial disputes and multi-national commercial and trade barriers, or lack thereof — not to mention the massive flow of people and goods into and out of two large countries — make every job tougher to manage. Indeed, Juárez is truly a bi-national metropolis and an area so dynamic that it was never easy for local authorities to manage even in the best of times. Add the gruesome levels of drug violence now rocking the area to the mix, and things have only gotten tougher.

MEXICO BY THE NUMBERS

Understanding the current situation in Juárez requires taking a hard look at modern Mexico and how its economy and federal policy decisions help shape cities

nationwide. With 112.3 million inhabitants,[173] Mexico is the second-largest economy in Latin America and the top U.S. economic partner after only Canada. Its Gross Domestic Product (GDP) averaged a healthy 3.8 percent growth rate between 2004 and 2007, but the U.S. financial crisis caused massive Mexican deceleration in 2008 and 2009, when the country's economy was further pummeled by the outbreak of swine flu.[174] Mexico is heavily dependent on oil exports, trade with its neighbor to the north and remittances from migrant workers who head to the United States to work, money which dropped sharply as America's economy has faltered in recent years.[175] The economic downturn had a huge impact on the $14,104 per capita GDP reached in Mexico in 2007, reducing it by 10 percent by 2010.[176] It also hurt the country's Human Development Index (HDI), which went from 0.8275 points in 2008 to 0.826 in 2009, although that was enough to keep Mexico ranking among the nations with high human development.[177] Even though the economy started recovering in the last quarter of 2009, lasting economic and social concerns for Mexico include low real wages, underemployment and employment in the

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[173] "Censo de Población y Vivienda 2010. Cuestionario Básico," Instituto Nacional de Estadística y Geografía (INEGI), accessed June 30, 2012, http://www3.inegi.org.mx/sistemas/TabuladosBasicos/Default.aspx?c=27302&s=est

[174] Mexico's GDP was negative in 2009, reaching -6.5 percent, according to data from the National Institute of Statistics (INEGI), accessed June 30, 2012, http://www2.esmas.com/141032/inegi-economia-mexicana-cayo-6.5-2009.

[175] According to data from the Mexican Central Bank, remittances decreased 15.7 percent in 2009, to $21 billion. "La Balanza de Pagos en 2009," Banco de Mexico, February 25, 2010, accessed June 30, 2012, http://www.banxico.org.mx/informacion-para-la-prensa/comunicados/sector-externo/balanza-de-pagos/%7BD143BDA8-5C1E-9E1A-8D60-A7E4392CD374%7D.pdf

[176] Manuel Sánchez, Deputy Governor The Bank of Mexico, "Mexico's Economic Outlook: Challenges and Opportunities." Remarks at the Conference Latin America 2010: Economic, Business and Trade Forecast, Center for Hemispheric Policy, University of Miami, February 5, 2010.

[177] The HDI is a composite index that measures a country's average achievements in terms of standard of living, longevity and education. The index ranges from 0 to 1. Countries with an index over 0.800 are considered to have high human development. Between 0.500 and 0.800 make them part of the medium human development group, and countries below 0.500 belong to the low human development group. HDI and GDP per capita data for Mexico were taken from "El Indice de Desarrollo Humano en México: cambios metodológicos e información para las entidades federativas," UNDP report, March 2012, accessed June 30, 2012, http://www.undp.org.mx/IMG/pdf/Boletin_IDH.pdf

informal sector for vast swaths of the population at large, as well as inequitable income distribution and little hope of promotion or professional advancement for the largely indigenous population, especially in the country's poverty-plagued southern region. Mexico, meanwhile, remains home to one of the richest men in the world, Carlos Slim, and many of the country's companies are important international players, including communications group America Móvil, the mining company Grupo México, and cement giant Cemex. But by 2010, 36.3 percent of the population, was living in poverty, up 4.6 percentage points from 2006, while 13.3 percent of the Mexicans were indigent, according to data from the United Nations Economic Commission for Latin America and the Caribbean.[178] Also, by the end of 2009, 12.6 million workers (no less than 28.3 percent of the Economically Active Population and 1 million more than in 2008) were working in the informal sector, while only 15 million formal employees, or a little more than half of all such workers, had full written contracts that included health care benefits.[179] Such data make it unsurprising hat Mexico's Gini Coefficient – which measures inequality in income distribution – reached 0.481 points in 2010, making the country among those listed as having high inequality in income distribution in Latin America, one of the world's more inequitable regions to begin with, according to figures compiled by international development agencies.[180]

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[178] "Social Statistics," Economic Commission for Latin America and The Caribbean (ECLAC), *Statistical Yearbook For Latin America and the Caribbean 2011*, accessed March 2, 2012, http://www.eclac.cl/publicaciones/xml/8/45608/LCG2513b_1.pdf

[179] "Trabajan en el sector informal 12.6 millones de mexicanos: INEGI," Publimetro, February 12, 2010, accessed March 12, 2012, http://www.publimetro.com.mx/noticias/trabajan-en-el-sector-informal-12-6-millones-de-mexicanos-inegi/njbl!FqcAaC1zrFALKu5LBmN8wA/

[180] The Gini Coefficient ranges from 0 to 1, where 0 indicates perfect equality while higher coefficients show more unequal distribution. Available coefficients range from Denmark (0.247) to Namibia (0.743). Mexico's one was taken from the *Statistical Yearbook For Latin America and the Caribbean* 2011 by the United Nations Economic Commission for Latin America and the Caribbean (ECLAC). The regional range goes from the more equal, Venezuela (0.394) and Uruguay (0.422), to the most unequal, Brazil (0.576) and Guatemala (0.585). ECLAC 2011.

Rural poverty rates are higher than urban poverty rates in Mexico, with 42.9 percent of residents in the countryside living in poverty compared to 32.3 percent in cities in 2010, according to ECLAC.[181] But the country's population is so densely urbanized, with 79.4 percent of Mexicans living in cities by 2010,[182] that the actual number of poor people in cities is far higher than officially estimated. Mexico underwent spectacular population growth between the 1940s and the 1970s, which coincided with the implementation of the Import Substitution Industrialization (ISI) development model. ISI created an inward-oriented strategy of development built on the protection of local industries through tariffs, subsidies and barriers to imports. Special state efforts to promote major new industries were made in certain chosen cities – primate cities – which attracted hordes of workers from rural areas lured by dreams of new economic opportunities. Mass migration to cities helped Mexico climb from a population that was 35 percent urban in 1940, to 66 percent by 1980 and 79 percent by 2010.[183] Such a radical remaking of its demographic landscape was speeded by improvements in public health that lowered mortality rates and bolstered life expectancy to Mexico's current 77.2 years.[184] Those advances, coupled with robust fertility rates, triggered a jump in Mexico's population from 20.2 million in 1940 to 50.7 million in 1970, while GDP soared.[185] The population growth rate for the period was above 5 percent and has only slowly declined

[181] ECLAC, *Statistical Yearbook*.
[182] Ibid.
[183] Alan Gilbert, *The Latin American City* (London: Latin American Bureau,1998). Also ECLAC, *Statistical Yearbook*.
[184] Ibid.
[185] The economic growth rate for the period was more than 3.5 percent annually, according to Francisco Alba and Joseph E. Potter, "Population and Development in Mexico since 1940: An Interpretation." *Population and Development Review* 12(1), March 1986.

since, falling to 1.05 percent between 2005-2010 and to 0.89 percent predicted for 2010-2015.[186]

THE RISE OF THE MAQUILA

Ciudad Juárez was an important beneficiary of a 1966 plan that saw Mexico look to exploit its comparative advantage as a neighbor of the United States, the National Border Industrialization Program. The project provided tax breaks and other incentives to foreign companies to produce manufactured goods, including appliances, electronics and apparel for the U.S. market, in communities just south of the Rio Grande.[187] Mexico had the added bonus of an abundance of labor force willing to work for low wages, which, combined with low transportation costs given the area's close proximity to U.S. territory, would help keep prices low for American customers. This strategy diverted some flows of migrants from rural Mexico to the U.S. border, rather than to other cities, and was the beginning of the maquila, or assembly-for-export, industry along the northern border. It energized the economy in the region, turning it into a magnet for Foreign Direct Investment, and transforming places like Juárez into booming cities with some of the healthiest economic growth in Mexico in recent years.[188] At the same time, however, the fast and unregulated expansion led to the formation of shantytowns and a thriving informal economy. The maquila industry became a major source of foreign income for Mexico, though it has since been displaced as the top earner by oil exports, tourism and

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[186] "Social Statistics," Economic Commission for Latin America and The Caribbean (ECLAC), *Statistical Yearbook For Latin America and the Caribbean 2009*.

[187] Lawrence D. Taylor Hansen, "The Origins of the Maquila in Mexico," *Comercio Exterior* 53(11), November 2003, accessed January 22, 2012, http://revistas.bancomext.gob.mx/rce/magazines_en/24/6/tayl1103.pdf

[188] Rodolfo García Zamora, "La maquila y la inversión extranjera directa en México," *Información Comercial Española, ICE: Revista de Economía*, 795, 2001, 127-140, accessed December 28, 2011, http://www.revistasice.info/cachepdf/ICE_795_127-140__07D624377806EAED20265F6BDA5DC318.pdf

remittances.[189] Still, it is one of the main components of Mexico's international trade, which is mainly centered on the U.S., from which it gets 48 percent of its imports and sends near 80 percent of its exports.[190]

Because of a local economic structure heavily reliant on large investment from American companies – the U.S. accounts for about half of all foreign investment in Mexico191 – Juárez is even more dependant on the U.S. economy than the rest of the country. Good economic times in America fueled the maquila industry and helped the city become Mexico's fifth largest generator of wealth, but Juárez also was forced to endure the brunt of the 2008 recession in its neighbor to the north. Additionally, it has faced a slew of specific problems as a border city that the rest of the country does not. With a population over 1.37 million,[192] (Illustration 8) Juárez is located in a strategic position on the border not only with El Paso and Texas but also Santa Teresa, New Mexico. That gives it access to American highways in two states that connect to transport hubs and make it especially attractive to foreign businesses. But Mexican drug gangs covet the area for the same transportation and infrastructural reasons, and have made Juárez a top plaza, or base of smuggling operations, since the early 1990s. The city is so valuable that it has become the site of increasingly deadly territorial battles, which left about 6,437 dead in Juárez (Illustration 9), or near a fifth of the total drug-related deaths nationwide of 34,612 between December 2006 and December 2010, according to official

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[189] "Remesas bajan ritmo, crecen apenas 1.4% en marzo," Reuters, May 2, 2012, accessed June 2, 2012, http://www.elfinanciero.com.mx/index.php?option=com_k2&view=item&id=17751&Itemid=26

[190] Author's calculation based on 2011 trade data from Banco de Mexico. "Informe Annual 2011," April 2012, accessed May2, 2012, http://www.banxico.org.mx/publicaciones-y-discursos/publicaciones/informes-periodicos/anual/{F3075A61-2EF3-E85B-5A1C-E8DE4BA3FB2C}.pdf

[191] Data from Banco de Mexico from 2008 says the country received $18.59 billion in investments, 45.7 percent of which came from the U.S. "Informe Anual 2008," April 2009, accessed May 2, 2012, http://www.banxico.org.mx/publicaciones-y-discursos/publicaciones/informes-periodicos/anual/{E2479C99-47CB-19B8-92A7-D011876E8FCA}.pdf

[192] Ciudad Juárez's population represents 40.5 percent of the population of Chihuahua state and 3.19 percent of all of Mexico's inhabitants, according to municipal data. www.Juárez.gob.mx

figures on drug-related homicides released by Mexico's Presidency in January 2011.[193] (Illustration 10).

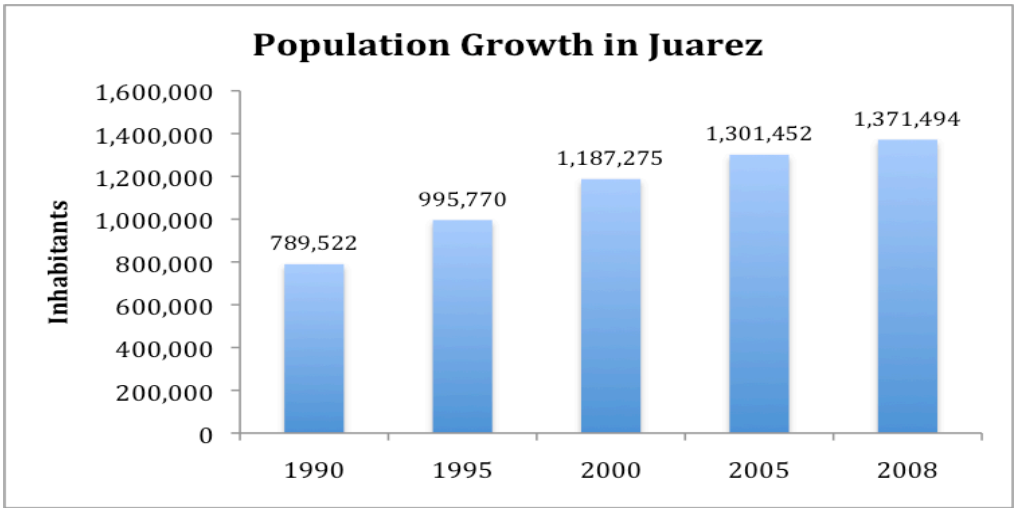

Illustration 8: Population Growth in Juárez. Source: author extrapolation with data from the Research and Planning Municipal Institute of Juárez.

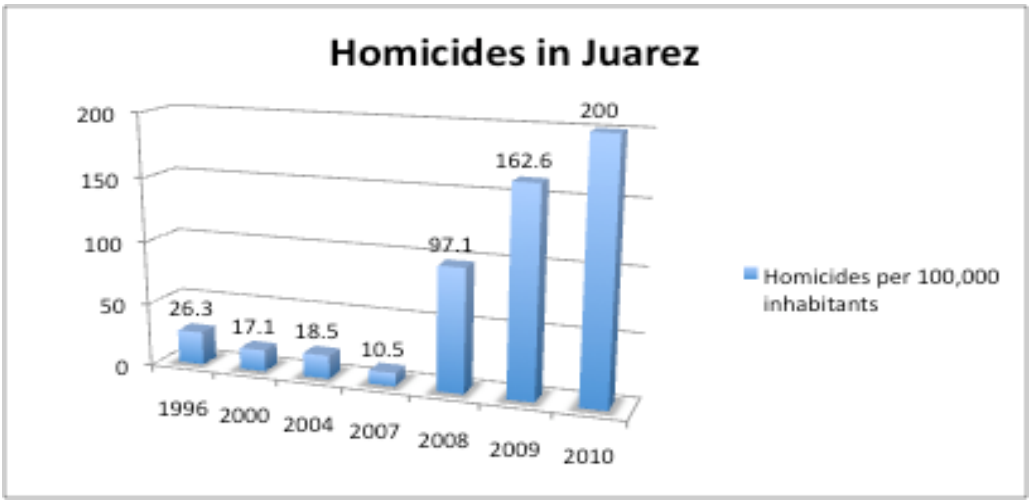

Illustration 9: Homicides in Juárez. Source: Colegio de la Frontera Norte, Mexico's Presidency.

[193] "Base de Datos de Fallecimientos," Presidencia de la República, January 2011, accessed January 2011, http://www.presidencia.gob.mx/base-de-datos-de-fallecimientos/

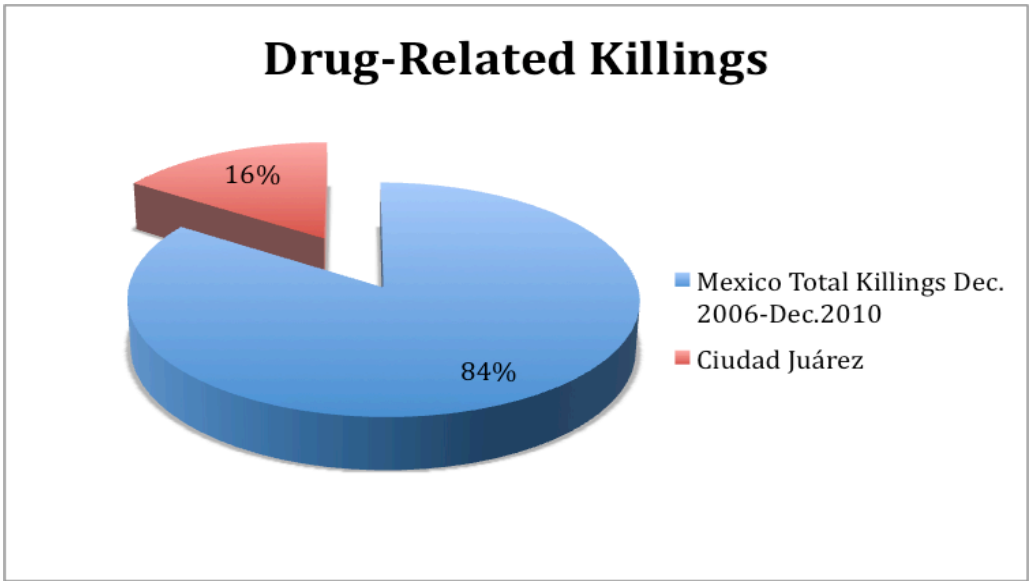

Illustration 10: Drug-Related Killings in comparison with the national total. Source: Mexico's Presidency Drug-Related Killings Database.

Indeed, drug violence in Juárez has gotten so bad that many foreign companies have scrapped new investment there,[194] at a time when it is especially needed given the devastating effects of the U.S. economic crisis on the maquila industry, which lost more than 30,000 jobs between November 2008 and July 2009, according to Mexican government data. Despite being an industrial hub, 70 percent of Juárez households live in poverty.[195] Even people working in the maquila industry earn less than $300 U.S. a month in the case of technicians and common workers (obreros), who constitute the immense majority of the 170,118 manufacturing employees at the city's 339 plants. Those factories are mostly tied to American car companies, or U.S. electronics and apparel firms, among them 70 Fortune 500 enterprises.

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[194] According to comments by the maquila association director in Juárez, Jorge Pedroza. In Robin Emmott, "Drug War Hits Mexican Economy in Crisis", Reuters, April 2nd, 2009.

[195] United Nations Habitat, *Financing Urban Shelter. Global Report on Human Settlements 2005* (London: Earthscan, 2005). www.unhabitat.org

FREE MUNICIPALITIES?

Mexico has 31 states and a Federal District encompassing Mexico City. The Institutional Revolutionary Party, or PRI, controlled the presidency for 71 straight years, making the country a single-party regime. It was not until 2000, when Vicente Fox of the National Action Party, or PAN, won the presidency, that the country began moving toward a more democratic, multiparty system.

Even though the Constitution of 1917 established a federalist political structure that mandated powerful states, years of PRI control reduced Mexican federalization to little more than a ceremonial concept. The Constitution mandates that the federal system be made up of autonomous political and administrative units known as "free municipalities,"[196] but the PRI corrupted that notion, instead building an all-powerful executive which exercised great hierarchical dominance over resource allocation among three tiers of authority: the president, state governors and municipal leaders. This gave officials at all three levels a great deal of power, as well as strong incentives not to share it. As one governor put it 40 years ago, "The federal government screws me; and I screw the municipality."[197] For decades, the PRI used political favors, bribes and election fraud not only to control Mexico's presidency, but also all major "elected" offices. Making matters worse was the fact that the party did not open its nomination process for candidates up to public scrutiny, choosing its candidates in secret and thus ensuring that only those most loyal to the PRI, and not to the duties of the political office they secured, won key posts. Because of the PRI's stranglehold on national politics, state legislatures

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[196] "Constitución Federal de 1917, República de México," Political Database of the Americas, Georgetown University, accessed May 5, 2012, http://pdba.georgetown.edu/Constitutions/Mexico/mexico1917.html

[197] Peter Ward and Victoria Rodríguez, "New Federalism, Intra-governmental Relations and Co-governance in Mexico," *New Federalism and State Government in Mexico: Bringing the States Back In*. Peter Ward, Victoria Rodríguez and Enrique Cabrero (Austin, TX: The University of Texas System, 1999), 69.

and judicial branches were crammed with party loyalists who rubberstamped presidential initiatives. Political factions other than the PRI were constrained to the existence of a few regional parties, like the PAN, which managed to elect members of the national and state Congress from time to time, but never really challenged for the presidency until Fox. For civil society, things were no better. In the best cases, key civil players remained attached to the PRI hierarchy through powerful trade unions the party controlled, while in the worst cases, those who dared attempt defy the party were persecuted or openly attacked. Facing especially harsh repression were community organizers and farming and student leaders during the 1960s and 1970s, amid a government crackdown that became known as Mexico's "dirty war."

In 1982, Mexico declared a moratorium on servicing its external debt, triggering a crisis that saw its currency crash. Barely a year later, and with the government still facing tremendous financial pressure, federal authorities began a decentralization process which sought to strengthen municipalities and promote urban development. The reform of Constitutional Article 115 gave municipalities more autonomy to formulate their budgets and collect certain taxes.[198] That same year, the PRI lost control of key municipalities in the north, among them Chihuahua City, the capital of Chihuahua state which includes Ciudad Juárez, as well as Juárez itself, to the PAN, injecting unexpected tension into the well-oiled PRI political system. The decentralization process went further when, for the first time in 1989, a non-PRI governor was elected in Baja California, also from the PAN.[199] In 1992, Chihuahua elected just Mexico's second non-PRI governor, another

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[198] Leyes Federales, "Artículo 115," Instituto Nacional de Salud Pública, accessed May 17, 2012, http://www.insp.mx/transparencia/XIV/leyes_federales/refcns/pdfsrcs/115.pdf

[199] "Mexico 2012: A Conversation with Former-Baja California Governor Ernesto Ruffo," University of San Diego, March 15, 2012, accessed May 22, 2012, https://www.sandiego.edu/about/news_center/events/events_detail.php?_focus=41075

PAN candidate.[200] The same party also won the control of Juárez and, for the first time, took a majority of the state legislature in Chihuahua. Additional reforms under the administrations of Presidents Carlos Salinas de Gortari (1988-94) and Ernesto Zedillo (1994-2000) expanded municipal resources and gave cities more responsibilities, as well as setting official transparency rules which allowed federal government less discretion to distribute financial resources while at the same time reduced local governments' leeway on spending the funding provided for development and infrastructure.[201] Also, while serving as Salinas' Education Minister in 1992, Zedillo had personally helped decentralize the Mexican public education system, funneling substantial amounts of control from Mexico City to the states. Later, as president, Zedillo transferred economic and physical resources to the states to improve government-provided health care and expand services for the poorest Mexicans.[202]

Meanwhile, political reforms were steadily making the federal Congress and local governments more representative of parties other than the PRI. First, in 1977, constitutional amendments set rules for the electoral process and guaranteed the inclusion of parties other than the PRI by establishing a proportional system guaranteeing that any party garnering a minimum percentage of votes would have a presence in the national legislature and other national offices. Then, in 1996, another reform simplified party registration, setting rules for how they were funded while guaranteeing all parties access

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[200] After panista Ernesto Ruffo Appel was elected governor of Baja California in 1989, the PAN obtained another victory in 1992 when Francisco Barrio won the governorship of Chihuahua. Yemile Mizrahi, "Administrar o gobernar? El reto del gobierno panista en Chihuahua," *Frontera Norte*, 8(16), July 1996, accessed April 14, 2012, http://www2.colef.mx/FronteraNorte/articulos/FN16/4-f16_El_reto_del_gobierno_panista_en_Chihuahua.pdf

[201] Instituto Nacional de Salud Pública.

[202] Sara Gordon Rapoport, "Change and Continuity in Attention to Poverty in Mexico." In Laura Randall eds. *Changing the Structure of Mexico: Political, Social, and Economic Prospects*. (New York: M.E. Sharpe Inc., 2006), 511.

to the press during campaigns.[203] New rules also granted autonomy for the Federal Electoral Institute, charged with overseeing elections free from PRI influence, and to the Electoral Tribunal, which became part of the judicial branch to ensure it would be independent while ruling on electoral disputes. As a result, from not having a single non-PRI governorship in 1988, opposition parties took 12 by 2000. And, while in 1988 only 39 municipalities were headed by parties other than the PRI — or just 1.69 percent of all municipalities nationwide representing only 1.84 percent of Mexico's population — by 2000, non-PRI parties took control of 43 percent of the country's municipalities, representing the equivalent of more than 53 million Mexicans, or more than half of what was then the country's entire population.[204] Things moved even more quickly in the federal Congress, where opposition parties first won a plurality in 1997, and also wrested control of the powerful Federal District, home to Mexico City, from PRI hands that same year.[205] State legislatures were becoming more pluralistic too. A continued obstacle to ensuring non-PRI parties are represented, however, remains that most states have term limits that only allow congressmen and mayors to be elected to a single, three-year term. Such a system makes it hard for opposition parties to gain momentum and puts unnecessary strain on the quality and continuity of projects attempted by leaders, unless they come from an established PRI machine that knows it has a good chance to win the next election.

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[203] "Partidos Políticos," Tribunal Electoral del Poder Judicial de la Federación, México, March 2011, accessed June 30, 2012, http://www.te.gob.mx/ccje/Archivos/manual_partidos.pdf

[204] "Reforma Política y Procesos Electorales en México," Document distributed by Mexico's President's Office, August 2000, accessed May 1, 2012, http://zedillo.presidencia.gob.mx/pages/pub/publics/c-mex/democracia_ago2000.pdf

[205] PBS Interview with Cuauhtémoc Cárdenas, the PRD elected mayor of Mexico City in 1997, the first non-PRI mayor of Mexico's capital. The story was published in August 12, 1997, accessed May 4, 2012, http://www.pbs.org/newshour/bb/latin_america/august97/cardenas_8-12.html

CIVIL SOCIETY STEPS IN

Even as opposition parties were slowly chipping away at the PRI stranglehold on smaller offices through the decades, however, the PRI continued to dominate Mexico's presidency, meaning that the government of Mexico and the PRI were synonymous. Even in 2012, after the party lost the two previous presidential elections and had been out of office for 12 years, it is difficult to describe governance in Mexico without mentioning the PRI, which was the glue that held an otherwise dysfunctional political system together. Indeed, the country's government was in many ways a suit tailored to fit the PRI since its inception in 1929. This helps explain why power has always been so concentrated with the Mexican president in a country that is technically federalist. Another key factor, however, is the institutional, normative and organizational support — or more simply put, the bureaucracy — that government relies on.[206] It remains to be seen, although, how the new PRI administration headed by Enrique Peña Nieto can adapt to this multiparty system.

But the PRI did not limit its dominance of the country simply to politics, and worked to extend its tentacles into all facets of civil society, allowing participation only from social and labor associations which it kept co-opted and embedded within its own power structure. The party achieved this mainly through the use of labor and trade unions for every sector, from the powerful oil workers, to industrial employees, farmers and teachers,[207] all of which the PRI corrupted, then used to perpetuate itself as the unchallenged governing authority in Mexico. Despite the systemic constraints, truly independent protest groups emerged, especially in the late 1960s and 1970s, which were

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[206] Tonatiuh Guillén, "Ayuntamientos y Pluralidad Política en los Municipios Fronterizos del Norte de México," *Frontera Norte*, 7(13), January 1995, accessed February 2, 2012, http://www2.colef.mx/fronteranorte/articulos/FN13/7-f13_Nota_Ayuntamientos_pluralidad_politica_en_municipios_fronterizos.pdf

[207] Ward and Rodríguez, *New Federalism*.

quickly repressed by the authority.[208] Efforts to oppose the PRI's institutional control were more successful in Juárez than many other places, and city leaders finally began to break it in the 1980s.

Meanwhile, the decentralization that hit its stride during the same decade also led to increased democratization of the political process and helped an independent civil society gain strength. The ranks of the political opposition to the PRI also became more crowded. Joining the PAN, which was founded in 1939, was the Green Party — formed in 1986 — and the left-leaning Democratic Revolutionary Party, or PRD, which was born in 1989. The following year saw the formation of the Worker's Party, and a party called Convergencia was founded in 1999. Also joining the political fray were small, regional parties. Today's Mexican political arena is far more competitive and the PRI's dominance is weaker, though rules about what constitutes a legal party are strict and voter turnout remains surprisingly low, especially since casting a ballot is compulsory.

During national elections in 1997, 2000, 2003 and 2006, voter turnout reached only slightly higher than 50 percent, and even during the historic 2000 vote, abstention rates were 36 percent. They then climbed to 58.2 percent in mid-term elections three years later, according to figures from the Federal Electoral Institute and the Universidad Nacional Autónoma de Mexico. Scholars blame voter apathy on a crisis of representation, which has seen the public remain disillusioned with its electoral choices, failing to

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[208] This period started with the emergence of student's movements and their quick repression in the massacres of Tlatelolco (1968) and "Jueves de Corpus" (1971). Then a guerilla movement emerged in the impoverished state of Guerrero, in the Pacific coast of the country. Leaded by the rural teacher Lucio Cabañas, the party of the poor became a threat against the PRI authority and it was, eventually, annihilated. For moe details about this period, dubbed "the dirty war," see Verónica Romero Sánchez, "Los movimientos armados en México, 1960-1980. Breve comparación de las estrategias aplicadas y sus objetivos," Universidad Autónoma Metropolitana, Mexico, December 9, 2003, accessed June 29, 2012, http://148.206.53.231/UAMI11426.PDF

identify with the three major parties — PRI, PAN and PRD — even if three options is better than one of the old days.[209]

Indeed, Juárez, which had led the opposition to the PRI in decades past, had one of the lowest turnouts for local elections in the whole country. In 2007, just 27.85 percent of residents voted in a mayoral election, while only 29.5 percent of residents cast ballots in the 2009 gubernatorial race.[210] According to Joseph L. Klesner, in more than half of the nation's electoral districts, the PAN and the PRI face off, while in a much smaller number of districts the PRD battles the PAN.[211] The closed fight between these three parties is caused in large part by a system that only allows candidates to run as part of parties, not as independents or with the sole support of grass-roots organizations. As Tonatiuh Guillén puts it: "The rules that acknowledge the actors allowed to participate in local politics (the Constitution and electoral law) establish representation restrictions. Only political parties can participate (…) There is no room for non-party political organizations or independent candidacies."[212] Such a scenario played out in today's Juárez, which has a PRI mayor, Héctor Murguía, while Chihuahua's governor, César Duarte (2010-2016), also hails from the PRI. Murguía will be in office through the end of 2013, meaning there should be little political conflict in planning joint initiatives, especially for education or the allocation of resources for infrastructure that come via the federal government's trust for state infrastructure, known by its Spanish initials FIES. The city council, or cabildo, has 18 regents (nine are women), from four parties: the PRI

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[209] Joseph L. Klesner, "The Not-So-New Electoral Landscape in Mexico," Presentation given to the conference on "Mexico's 2003 Mid-Term Election Results: The Implications for the LIX Legislature and Future Party Consolidation," Institute of Latin American Studies, University of Texas at Austin, September 15-16, 2003.

[210] "Estadísticas Electorales," Instituto Estatal Electoral de Chihuahua, accessed June 30, 2012, http://www.ieechihuahua.org.mx/Default.aspx?mod=content&id=55

[211] Klesner, *The Not-So-New Electoral Landscape*, 1.

[212] Guillén, *Ayuntamientos y Pluralidad Política*, 8.

(9), the PAN (7) and Nueva Alianza (PANAL) and the PRD with one each, plus one trustee. Not surprisingly, the PRI and PAN are the biggest parties in the city and state, where in the last 30 years, both have vied to become the most-powerful. (Table 14)

Period	Governors	Mayors
2010	César Duarte (PRI)	Héctor Murguía (PRI)
2007		José Reyes Ferriz (PRI)
2004	Jose Reyes Baeza (PRI)	Héctor Murguía (PRI)
2002		Jesus Delgado (PAN)
2001		José Reyes Ferriz (PRI)
1998	Patricio Martinez (PRI)	Gustavo Elizondo (PAN)
1997		Enrique Flores (PAN)
1995		Ramon Galindo (PAN)
1992	Francisco Barrio (PAN)	Francisco Villarreal (PAN)
		Carlos Ponce (PRI)
1989		Jose Macías (PRI)
1986	Fernando Baeza (PRI)	Jaime Bermúdez (PRI)
	(1985) Saul Gonzalez (PRI)	Alfredo Urías Cantú (PRI)
		Miguel Corral (PAN)
1983		Francisco Barrio (PAN)
1980	Oscar Ornelas (PRI)	José Reyes Estrada (PRI)

Table 14: Ciudad Juárez political affiliation in the last 30 years.

However, elsewhere in Mexico, the new political climate of greater openness and tolerance for dissent bolstered the emergence of a series of civil associations, especially in the fields of human rights and organizations representing ethnic populations. Such groups forced leaders to approve a traditional system of governance, "usos y costumbres," in some local governments, including in the southern state of Oaxaca, home to large and diverse indigenous population. Also, the federal government authorized the

creation of "autonomous municipalities" in Chiapas after the uprising of the Zapatista rebels in 1994.[213] A massive 1985 earthquake in Mexico City, meanwhile, marked a watershed transformation for the development of civil society there. The slow response from PRI authorities triggered the formation of neighborhood associations and committees to help rescue people buried under fallen buildings and other debris, and gathered food and medicine for survivors.[214]

Even though Juárez does not have a large indigenous population, the pattern of new civil groups emerging as a reaction to a transcendent event is repeating amid the acute outbreak of drug violence. Many civil associations and non-profits, or NGOs, are mobilizing resources to combat the effects of violence in cities most affected by the killings and to assist the victims and their families. At the national level alone there are new academic centers that research crime, closing the gap left by a lack of official data on the topic.[215] Specifically in Juárez, where not only has drug violence taken its toll, but also around 400 women have been killed in largely unsolved crimes committed under strange circumstances in the 20 years, there is a myriad of associations which assist victims of violence, including Casa Amiga, groups that help former members of street gangs, like Centro de Asesoría y Promoción Juvenil, and associations that monitor the local social environment, including Ciudadanos Comprometidos por la Paz. The city has also developed organizations to provide relief for the poor through soup kitchens and clearing houses offering special attention to migrants, who constitute much of the city's largely transient population.

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[213] Instituto Nacional de Salud Pública.

[214] Ward and Rodríguez, *New Federalism*.

[215] Among the new think tanks to study crime in Mexico, it is worth to mention the Centro de Investigación Para el Desarrollo (CIDAC, http://www.cidac.org/esp/index.php) and Insight Crime (http://www.insightcrime.org/). The first one is a research institute on politics and the second one analyzes crime from a journalistic point of view.

The increasing violence in Juárez has also been a catalyst for the establishment of innovative participation mechanisms and collaborations that have allowed citizens' to become more active. One example is the women's council, which groups members of civil associations, the media, NGOs and the government to advance women's proposals. Another way the community has gotten more involved is through a massive public campaign that made the unsolved killings of women in Juárez a national issue, prompting the federal government to create a special prosecutor's office to investigate even before drug-related homicide rates began to spike.

Such groups still have a lot of work to do, however. Violence in Juárez has become so dire that tens of thousands of residents have left the city, fleeing elsewhere in Mexico or simply crossing the border into El Paso, where local media reports at least 30,000 people had moved between 2007 and early 2010.[216] Voting with their feet,[217] people showed their discontent with the city's inability to guarantee basic public safety and protect them from drug gangs. Estimates from academics and city officials put the exodus at between 75,000 and 200,000 since mid-2008.[218] "Garbage and unopened mail gathers around the doorways of empty office buildings and once upscale suburbs are devoid of cars," the British news agency Reuters reported in February 2010. For the press the situation is not better. There are at least five newspapers with local content that are published daily in Juárez, as well as other, statewide periodicals. But the constant threat

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[216] "Police estimate 30k flee Juárez violence, Rep. Beto O'Rourke says," El Paso Times, February 20, 2012, accessed December 9, 2011, http://www.elpasotimes.com/ci_14437627. Also see "Juárez demographer says 30,000 to 50,000 persons fled Juárez to the U.S. as a result of drug-war violence since 2008," Mexodus, June 31, 2011, accessed June 30, 2012, http://mexodus.borderzine.com/immigration/Juárez-demographer-says-30000-to-50000-persons-fled-Juárez-to-the-u-s-as-a-result-of-drug-war-violence-since-2008/

[217] Akin L. Mabogunje, "Local Institutions and an Urban Agenda for the 1990s," in *Urban Research in Developing Countries: Perspectives on the City*. Vol. 4. Edited by Richard Stren and Judith Kjellberg. (Toronto, Canada: Centre for Urban and Community Studies, University of Toronto, 1995), chapter 2.

[218] "Mexicans flee drug war city in fear of killings," Reuters, February 18, 2010, accessed December 9, 2011, http://www.reuters.com/article/2010/02/18/mexico-drugs-idUSN1819528920100218

of drug traffickers seeking revenge on journalists has taken a toll, and many reporters are choosing to censor their own work to keep from risking their lives.[219] In 2009, of 13 reporters killed by drug gangs, two were from Chihuahua and one of those was hailed from Juárez.

The violence has not stifled democracy in the city, however. Not only has Juárez effectively rotated between political parties — electing leaders from each major party for a variety of key posts since 1989 — but the city also has become one of Mexico's first to establish and fully embrace laws designed to increase official transparency and access to public information. Juárez enacted major freedom of information rules locally in 2005, just three years after the federal government established nationwide regulations on governmental transparency.

Juárez also has favored innovative mechanisms for bolstering public participation in city development, including a municipal development planning committee (COPLADEM) and the researching and planning institute. Both are designed to involve citizens in decision-making and planning goals. The development planning committee includes the participation of officials from federal, state and municipal governments in addition to representatives from business and education associations and neighborhood committees. Such a structure is now mandated by law in Mexico, and yet many cities still don't have one.[220] Juárez does, but it is not perfect. Meetings are often plagued by

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[219] Alfredo Corchado, "Cartels use Intimidation Campaign to Stifle News Coverage in Mexico," *Dallas Morning News*, March 8, 2010, accessed December 10, 2011, http://www.dallasnews.com/news/20100308-Cartels-use-intimidation-campaign-to-stifle-8187.ece. Also see the editorial "Qué quieren de nosotros?" (What do you want from us?) that El Diario de Juárez published in September 9, 2010, after the second killing of a reporter from the newspaper in less than two years, http://www.diario.com.mx/notas.php?f=2010%2F09%2F19&id=ce557112f34b187454d7b6d117a76cb5

[220] Andrew Selee, "Exploring the Link Between Decentralization and Democratic Governance," in *Decentralization and Democratic Governance in Latin America*. Joseph S. Tulchin and Andrew Selee eds. Woodrow Wilson Center Report on the Americas #12 2004. Chapter 1, accessed December 19, 2011, www.wilsoncenter.org

absenteeism, and the committee finds that its responsibilities in the city often overlap with those of the research and planning municipal institute, which is in charge of preparing an urban development plan. That institute's board has 22 members, 11 with voting rights — among them 6 representatives from civil society (including business associations and education leaders).[221] It has been in place since 1995, but its proposals are not mandatory for the municipality, which always has final say on every project, even though the institute is supposed to be its adviser. As a result, many key proposals on the construction and location of housing complexes, as well as development of necessary infrastructure for new real estate projects and neighborhoods have been ignored, contributing to Juárez's unchecked urban sprawl in recent decades.

ANALYSIS: FACTORS CONTRIBUTING TO THE RISE OF DRUG CARTELS

A lack of education and poor municipal services, as well as uneven development in Juárez, have for decades combined to create the perfect breeding ground for the outbreak of violence we see today. A key factor is the maquila industry, which, though it creates much wealth, also condemns many families to poverty. The housing supply for the up to 40,000 people who immigrate to the city every year[222] in search of factory jobs – and which, for the most part, depends on national programs sponsored by the federal government – is badly planned and has largely failed to meet the needs of that population. What housing is available has been built far from the traditional city center, creating environmental problems and transportation challenges. The rise of the maquila industry increased the price of land in Juárez and, at the same time, attracted people who cannot

[221] Instituto Municipal de Investigación y Planeación, Ciudad Juárez, Chihuahua, http://www.imip.org.mx/imip/imip.php

[222] José Luis Coronado, "Diagnóstico de Salud en Ciudad Juárez," in *Diagnóstico Geo-Socioeconómico de Ciudad Juárez y su Sociedad*, Colegio de la Frontera Norte and Instituto Nacional de las Mujeres, Ciudad Juárez, Chihuahua, 2005, Chapter 6.

afford to purchase housing on the legal market, relegating at least 40 percent of the people in the city's most densely populated zones into squatter settlements by 1993, according to the municipality data. According to data from the Instituto Municipal de Investigación y Planeación (the municipal planning and research institute known by its Spanish initials IMIP), 25 percent of houses in Juárez (some 75,000 total) featured "unacceptable conditions due to the low quality construction, lack of basic services and inadequate dimensions" by 2000.[223] Additionally, the housing deficit was by then as high as 80,000 dwellings according to some sources.[224] In less than a decade, meanwhile, well-meaning government programs helped turn that deficit into a surplus, but of homes usually too expensive for the modest wages of city residents. A national housing program started by the Fox administration in 2000 brought a real estate boom to Juárez but, because of rising land prices, the new housing complexes – which lacked paved streets, parks and even access to the municipal power grid – were located far from downtown.[225] To properly afford the houses, families living in them had to have incomes worth 3 to 4 times Mexico's minimum wage, or about $500 a month, a salary not easily achieved in a city where 58.4 percent of residents live on less than what amounts to three times the minimum wage, or about $400 a month.[226] The result was 116, 208 housing units left empty of the total 416,574 the federal government had built in Juárez by 2009, according to the IMIP.[227] Even though the housing program is the federal government's

[223] "Plan de Desarrollo Urbano," Instituto Municipal de Investigación y Planeación (IMIP), Ciudad Juárez 2002, 51.
[224] "Diagnóstico Social. Juárez, Sociedad Fragmentada," Plan Estratégico de Juárez, August 2003, accessed December 18, 2011, http://www.planJuárez.org/files/pdf_287.pdf
[225] "Plan de Desarrollo Urbano," Instituto Municipal de Investigación y Planeación (IMIP), Ciudad Juárez 2010, accessed December 28, 2011, http://www.imip.org.mx/pdu/PDUSEPT2010.pdf
[226] The minimum wage for 2010 was about 55 Mexican daily depending on three distinct geographical areas. Its value in U.S. dollars was calculated using the official exchange rate for March 12, 2010, when one dollar was worth 12.57 pesos.
[227] IMIP, *Plan de Desarrollo Urbano 2010*, 104.

responsibility, it's up to the local zoning authorities to decide where real estate complexes can be developed. The disorganized urban sprawl that has come to characterize Juárez proves that city officials have failed to do a good job.

In addition to housing shortages, the inefficiency of Juárez's zoning and planning is evident in just how much of the city is encompassed by vacant lots, even in downtown areas – and it is a problem that is getting worse, not better. From about 2,500 hectares, the equivalent of 11.3 percent of the city's surface area in 2001, vacant lots increased to 9,160 hectares or 30.5 percent of the city in 2008, according IMIP figures.[228] (Illustration 11)

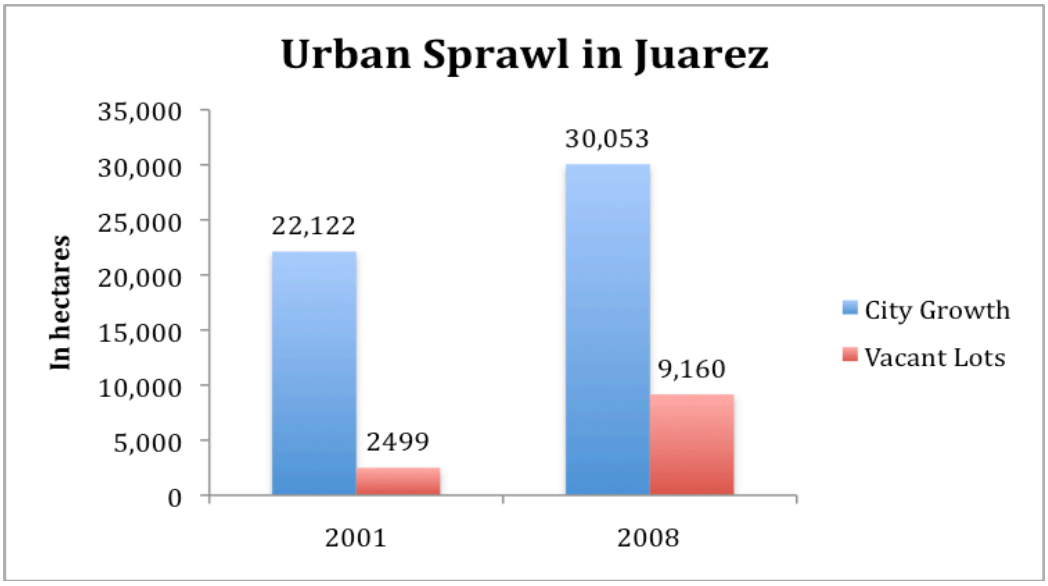

Illustration 11: Urban Sprawl in Juárez. Source: Author extrapolation with data from the Research and Planning Municipal Institute of Ciudad Juárez.

[228] IMIP, *Plan de Desarrollo Urbano 2010*, 93.

So much uneven development served to further increase segregation of the city, with clearly identified areas for the squatters, or desperately poor residents living in basic government housing, and the wealthy. (Figure 22)

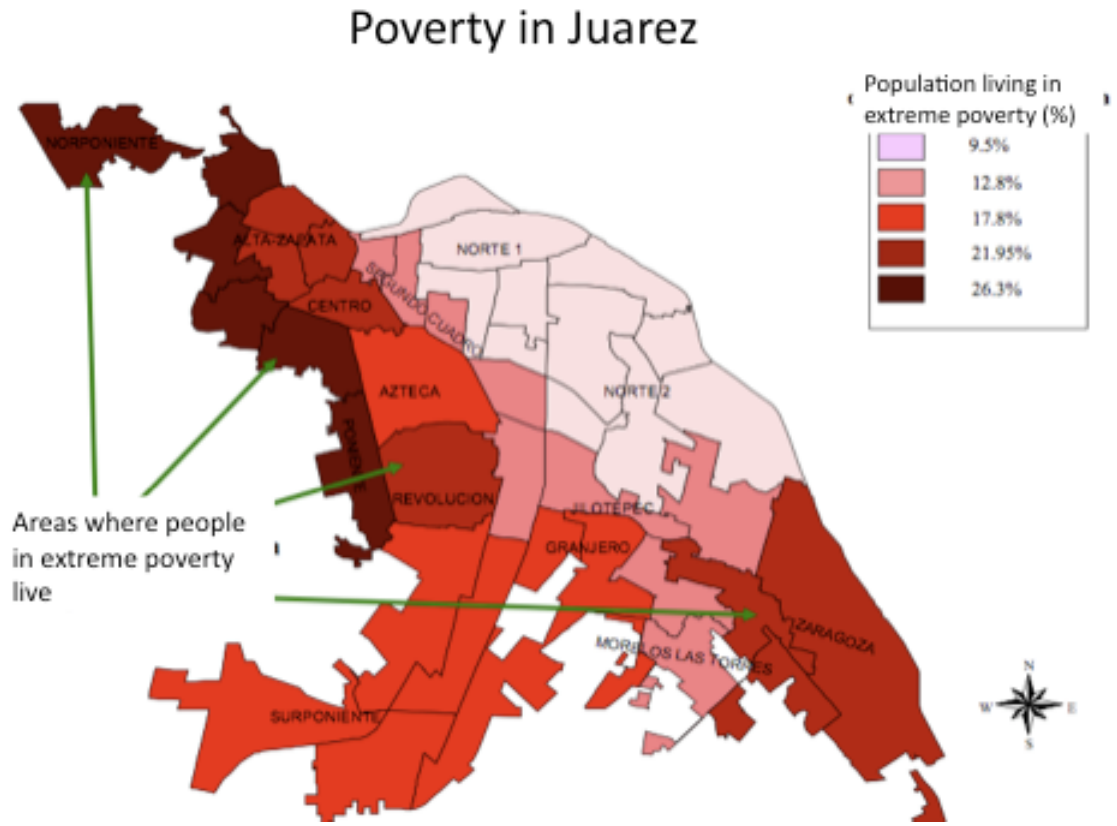

Figure 22: Segregation in Ciudad Juárez.

Juareños, or Juárez residents, have long complained that their city has a woefully inadequate public transportation system, even though state authorities control the sector. Statewide leaders use a series of routes which are dived up into different concessions, but which have all too often been transformed into handouts that are distributed so one corrupt leader or another can win favor.[229] In less than a decade, meanwhile, Juárez

[229] IMIP, *Plan de Desarrollo Urbano 2010*, 214.

became a sprawling city where the most common form of transportation is by car. According to the IMIP, *juareños* make 4 millions trips a day. Figures for the city's use of public transportation have remained little changed since 1996, when 25 percent of the population used it, compared with 22 percent in 2006. The car has remained by far the most-used means of transportation then and now, accounting for more than 50 percent of all trips.[230] By 2006, however, 28 percent of *juareños* used non-motorized vehicles or walked, despite the lack of infrastructure for bicycles and pedestrians. Even though the city's paved streets increased 43 percent by 2008 to 5,167 kilometers, 37 percent of all Juárez roads are still dirt.[231] (Illustration 12) Also, the few buses that do traverse the roads are mostly discarded school buses from the U.S.,[232] without defined routes and with limited schedules, making it tough on maquila workers who have to arrive on-time to keep their jobs.

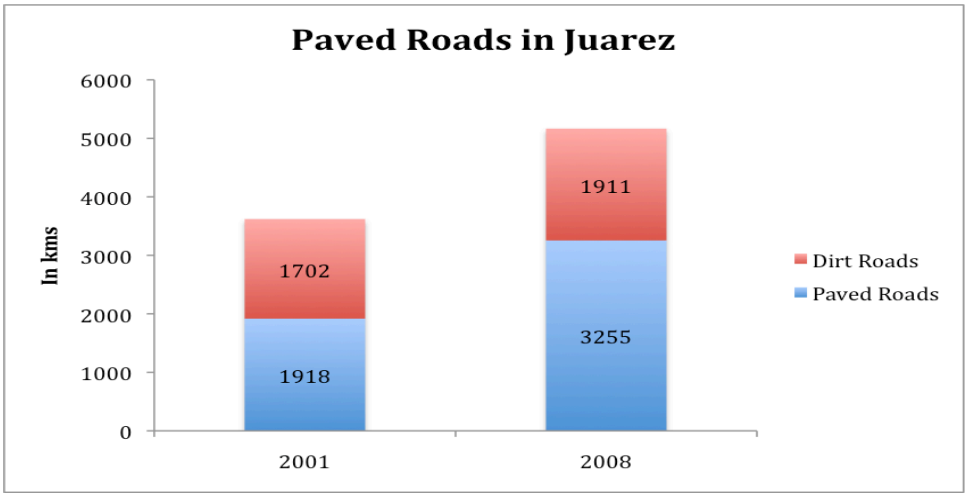

Illustration 12: Paved Roads in Juárez. Author extrapolation with data from IMIP.

[230] Ibid,,196.
[231] IMIP, *Plan de Desarrollo Urbano 2010*, 205.
[232] Armando Martínez de la Torre, "El Diseño Industrial como Factor de Desarrollo Futuro para el Transporte Público en México," *Actas de Diseño* N.9 (Buenos Aires, Argentina: Facultad de Diseño y Comunicación, Universidad de Palermo, Julio 2010).

Education, which is a state responsibility, is in equally poor shape in Juárez. Even though mandatory primary schools serve 98 percent of the children in Juárez, middle school – which is divided into general and technical schools and is also compulsory – faces a deficit of classrooms. That shortage is especially concentrated in general schools, which only feature classrooms for 65 percent of all their students.[233] But even in cases when official statistics on children serviced by local schools do not look bad, the quality of education they receive in those schools does. Most schools that have enough classrooms still lack libraries, labs and recreation areas for recess and physical education.[234] According to official figures, only 85.3 percent of middle school-age children were registered to attend classes. Things at the high school level – which is not mandatory – are far worse. Only 54.3 percent of school-age teenagers are enrolled. (Table 15)

Education in Juarez

	Number of classrooms Private & Public	Classroom Deficit	Student percentage attending school from total school-age children
Pre-School	N/D	271	69.9
Elementary School	3,543	430	97.9
Middle School	821	430	85.3
High School	378	138	54.3

NOTE: All data from 2008 and 2009.

Source: Author extrapolation based on data from the research and planning municipal council of Juarez.

Table 15: Education. Author extrapolation with data from IMIP.

[233] IMIP, *Plan de Desarrollo Urbano 2010*, 131-134.
[234] Ibid.,130.

Instead, schooling for older students often falls to private schools, thus creating a pay-for-education system that is unaffordable to children from the poorest families. As a result, many students drop out, leaving them with little to do but wander the streets, where they can be co-opted by drug smuggling gangs looking for new recruits, as former Juárez mayor José Reyes Ferriz (2007-2010) pointed out at a conference at Austin in April 2010.

More local-level problems can be found when examining Juárez's supply of potable water and electricity. Eleven percent of residents do not have water service, access to the power grid or connections to the sewer system, while one out of three houses have just one bedroom.[235] Additionally, the two sewage treatment plants the city relies on do not have the capacity to meet the needs of 1.37 million people.

All this means very poor living conditions for most *juareños*, leading many scholars to argue that young people can easily be enticed into the underworld of drug smuggling simply by the promise of a slightly better life. While some dispute those assertions, there's no denying that crime has skyrocketed in the last decade, over the same timeframe when 500 different street, youth and criminal gangs have begun operating in the city, according to Mexican media reports. In 2000, the Juárez murder rate was 17.1 per 100,000 people, but by 2008 it had shot up to 100 per 100,000 people, and to 205.5 per 100,000 people in 2010.[236] The latter figure compares to a national rate of 21.5 murders per 100,000 inhabitants that Mexico reported to the United Nations Office

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[235] IMIP, *Plan de Desarrollo Urbano 2010*, 103.

[236] Author own calculations based on the drug-related homicides database released by Mexico's Presidency in January 2011.

on Drugs and Crime (UNODC).[237] A 2005 study on crime in the city noted that 60 percent of the killings were by firearms and that 64.1 percent remained unsolved.[238]

Juárez has for decades been the headquarters of the powerful drug cartel named for the city. But the level of brutality of drug-related violence has reached unprecedented levels in recent years, suggesting that the Juárez Cartel and its activities are not the only cause. Drug smuggling in the city can be traced to the prohibition era of the 1920s United States, when the Juárez population boomed, fueled by shipping alcohol north of the border. During the PRI's 71-year reign, the country's drug smuggling business remained far less violent, thanks in large part to a false sense of stability built on institutionalized corruption. When the PAN started to win elections in Chihuahua and other states, however, things got bloodier.[239] Then Vicente Fox won Mexico's presidency and vowed to crackdown on all smuggling. By 2002, his government had killed the dreaded enforcer of the Tijuana-based Arellano Felix Cartel and captured the syndicate's operations manager, while also arresting the head of the powerful Gulf Cartel. Those body blows to drug smuggling trigged a vicious turf battle, however. Today, Juárez continues to be plagued by struggles between the Juárez Cartel and operatives from the Sinaloa organization, a former Juárez Cartel ally that became a rival thanks to power shifts.

Corruption in the judicial system has long been a staple of Mexican life. The many different police forces, from municipal to judiciary and even bank police, create many feuds among rival law enforcement agencies, and make security forces less

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[237] "Homicide data Series to Be Used for Trend Analysis," United Nations Office on Drugs and Crime (UNODC), accessed on November 26, 2011, http://www.unodc.org/unodc/en/data-andanalysis/homicide.html

[238] Julia Monárrez Fragoso, "Violencia e (in)seguridad Ciudadana en Ciudad Juárez," *Diagnóstico Geo-Socioeconómico de Ciudad Juárez y su Sociedad*, Colegio de la Frontera Norte, Instituto Nacional de las Mujeres, Ciudad Juárez, Chihuahua, 2005, Chapter 9.

[239] Astorga, *El Siglo de las Drogas*.

cohesive and their agents more vulnerable to being corrupted. Additionally, because drug trafficking is a federal crime investigated only by federal forces, and given that the Mexican judicial system has lagged behind other branches of the federal government in decentralization, the results are a big gap in the capacities to enforce the rule of law when it comes to drug-related crime.[240] In an effort to tackle this problem, the Calderon administration undertook a massive judicial reform plan in 2008 meant to revamp the criminal justice system in Mexico. New oral procedures were introduced, along with changes to the police agencies and tougher measures to fight organized crime.[241] In the meantime, however, with almost no resources to fight drug trafficking, the president sent the Army to the places hit-hardest by drug-related violence. The permanent deployment of 10,000 troops and federal police to Juárez since 2008 has had a largely negative impact on the city, complete with accusations of human rights violations by soldiers and continued corruption within the ranks of the military, even though a special, additional fund has since been established by the federal government to alleviate financial pressures caused by the local government's increased spending on security in those areas most-affected by drug-related violence.

ANALYSIS: MUNICIPALITIES LAG BEHIND

Another key factor in analyzing what went wrong in Juárez, like in many other Mexican cities, is the fact that the previously discussed decentralization and democratization programs did little to change the economic fortunes of the country's cities because real economic decentralization remained stagnant. Despite a 1983 reform that gave greater autonomy to municipalities and strengthened their revenue generating

[240] Selee, *Exploring the Link*.
[241] David A. Shirk, "Justice Reform in Mexico. Change and Challenges in the Judicial Sector", Trans-Border Institute, University of San Diego, May 2010, accessed June 30, 2012, http://catcher.sandiego.edu/items/peacestudies/Shirk-Justice%20Reform%20in%20Mexico.pdf

capabilities, Mexico's central government retained control over local governments via funding provided through federal contributions known as *aportaciones* and *participaciones* federales, which represent close to 65 percent of the revenues received by municipalities, according to data from Moody's Investors Service.[242] Most of the federal funding local governments receive is determined by the fiscal coordination system, a mechanism that assigns resources based mainly on the population size of each state (45 percent) and on an efficiency criterion which seeks to give priority to states that have generated high tax revenues thanks to efficient tax collection (45 percent). The remainder is used to redress inequality and provide additional funding to those areas that received less federal support based on the first two factors.[243] Analysts have long said that the mechanism of *participaciones* is basically flawed because it provides no clear incentive for states and municipalities to allocate resources toward productive investments. Also, the criterion of population size simply favors large states without any consideration of social conditions and challenges within each particular region. Finally, setting 10 percent aside to make up for inequalities in the rest of the system effectively discourages states from improving their tax collection methods.

Other important revenues for states and municipalities come via federal spending on infrastructure and physical investments within their borders. Before decentralization which building projects would get funded and where was decided by the federal office in charge of infrastructure investment, which encouraged influence peddling that favored the best-connected and richest local warlords. Mexico finally moved to reform the

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[242] "Desafíos Crediticios que Enfrentan los Estados y Municipios: Auge y Caída de las Expectativas Racionales," Moody's Investors Services, September 2, 2009.
[243] "Aportaciones Federales Para Entidades Federativas y Municipios," Mexico's Federal Congress Report, Centro de Estudios de las Finanzas Públicas, 2006.

decision-making process for infrastructure projects in the 1990s, and that overhaul helped speed the decentralization to state governments of many key federal programs previously mentioned, including major components of government spending on education and health care. In the case of infrastructure and construction spending on things like regional schools and hospitals, states already had some control, but it was expanded. Municipalities, meanwhile, gained domain over supplying their inhabitants with potable water, sewerage, and trash collection, as well as guaranteeing public safety and security. In order to provide local governments with the necessary resources for these new responsibilities, the federal government created funds which became known as *aportaciones*, and which were overseen by officials charged with ensuring that local officials were really spending the money they received on the tasks they were assigned.

The main problem that this system poses, however, is it is highly dependent on federal annual revenues, which in turn rely on Mexican oil exports, a source that provides a little more than one third of the nation's fiscal revenues each year. Oil is of course extremely vulnerable to external market forces, and it is becoming an ever more dangerous commodity for Mexico's federal budget to rely so heavily upon with each passing year because the country's largest oil field, Cantarell, is drying up.[244] The amount of crude reserves at that site and around the country is steadily shrinking. The system also creates tension between states and municipalities which have to negotiate the priority of their projects and deal directly with the demands of the workers involved. Hammering out agreements with labor can be tough when dealing with large trade unions, like the powerful teachers' association, a bargaining process authorities at the federal level were more accustomed to, and thus better equipped to handle. The teachers also won from the

[244] Catherine Bremer, "Mexico's top oil field declining fast –Pemex," *Reuters*, February 7, 2007, accessed June 25, 2012, http://www.reuters.com/article/2007/02/07/mexico-oil-idUSN0742625120070207

central government the right to control education funding transfers to different areas of the country. That means they have ensured the most money goes year after year to the schools with the most powerful teachers, thus guaranteeing that the system is all the more inequitable for other schools where the teachers are not politically connected and can't win extra resources for themselves, their schools facilities and their students.[245] Those are key reasons why, despite a greater level of decentralization, we see a lack of schools in places like Juárez continue to be a problem: the city's education sector was not as powerful as those in other communities around the country and therefore does not have the political clout to win funding that could make a real difference.

While Mexico's states remain fully tethered to funding from the federal government, however, municipalities have a little more leeway. Besides federal contributions, local governments or *ayuntamientos* have their own source of revenue, which contributes in many cases at least some fraction of their operating budgets. They can collect certain taxes, particularly property taxes, as well as solicit payment from their inhabitants for services including garbage collection, public lightning and businesses licenses. They also can charge for parking permits and assess parking fines. Mexican municipalities are also allowed to incur public debt as long as they obtain authorization from their state's legislature and agree that the resources generated will not be used for current expenditures but instead go toward productive investments, such as building streets and sidewalks or making hospital improvements.[246] But that tool has proven to be troublesome for many cities. They can borrow from a development bank or commercial bank, or by issuing bonds, with the latter used most frequently by Mexican municipalities

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[245] Mexico's Federal Congress Report, *Aportaciones Federales*.

[246] Fausto Hernández Trillo, *Manejo de riesgos financieros en entidades federativas de México: Fondo de Contingencia Estatal para enfrentar Riesgos Macroeconómicos* (Mexico: Centro de Investigación y Docencia Económica, 2000).

since the mid 2000s. The result has seen many cities fall into heavy debt, especially some in the state of Mexico, just outside the nation's capital.

States have less power over their own purse strings, even relatively wealthy ones. Chihuahua is considered among Mexico's richer states, and is not highly dependent on federal funding. Still, according to a federal congressional analysis of the federal budget for 2009, transfers of federal resources to Chihuahua alone accounted for 5.3 percent of the nation's overall GDP that year.[247] Chihuahua's total revenue reached nearly 13.4 billion Mexican pesos (then equivalent to $1.07 billion U.S.), from which the federal contributions were near 8 billion pesos. If we consider that about 2.5 billion pesos went to entitlements and preexisting expenditures, the result is that 80 percent of the state's revenue came from the federal government in 2009. Chihuahua's own revenues came mainly from payroll and toll-road taxes. The bulk of spending went to education and social development. But the state economy suffered a decline in 2008 that pushed unemployment levels higher, from 4.95 percent in June 2008 to 7.7 percent in June of the following year. That hurt tax revenues. Manufacturing, especially the maquila industry, is the main source of jobs in Chihuahua, accounting for 43.8 percent of all formal employment, followed by the commerce and the service sectors, each of which contribute about 17 percent. Chihuahua's economy's heavy dependence on the U.S., and the 2008 recession that so punished its neighbor, have affected the state's revenues and its capacity to finance public infrastructure – a situation that has led to the state's use of short-term credit lines and a taking on of long-term debt worth 2.350 billion pesos, while also issuing bonds backed by toll-road revenues. Chihuahua has borrowed so much and taken

[247] "Proyecto de Presupuesto de Egresos de la Federación 2009: Gasto Federalizado propuesto para las Entidades Federativas," Mexicos' Federal Congress, Centro de Estudios de las Finanzas Públicas, September 2008.

such an economic hit, in fact, that the financial ratings agency Standard and Poor's downgraded its outlook for the state from "stable" to "negative" in 2009.[248]

Economic deceleration has also affected Juárez's revenue capabilities, and those shortfalls have come as the local government is spending more than ever on police forces in an attempt to quell the unprecedented violence of the drug war. One positive factor is that, despite the U.S. recession, Juárez had more flexibility than Chihuahua state to raise funds from collecting taxes and service payments from a myriad of wealthy, foreign companies that have maquila plants within its borders. By 2010, the city was generating 47 percent of its revenue from those sources (worth $102.3 million), while the rest came from contributions from the federal government, which have been growing in the last few years – particularly in items designed to help the municipality cope with drug crime – and in the same year accounted for $110.9 million. Since 2006, however, revenue produced by Juárez fell, and in 2011 it reached only 45 percent.[249] (Table 16)

The war on drugs and the massive deployment of troops to the city to help counter drug-related violence have made public safety expenditures in Juárez the city's second-highest overall expenditures behind urban management, rising from 24.5 percent of the budget in 2007 to 28 percent in 2010, excluding money spent on debt service payments.[250] All that extra spending helped generate operational deficits in Juárez in 2008, 2009 and 2010, which the city made up for by incurring more debt. After years of following a conservative line on budget management that included no borrowing, in 2008

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[248] "Revisa Perspectiva del Estado de Chihuahua a Negativa de Estable," Standard and Poor's, July 30, 2009, www.standardandpoors.com.mx

[249] "Estado de Resultados," Ciudad Juárez, Tesorería Municipal, May 14, 2012, http://www.Juárez.gob.mx/transparencia/5.-%20Finanzas/edo-result12.pdf

[250] "Folleto Anexo al Periódico Oficial. Presupuesto de Egresos para el Ejercicio Fiscal del año 2009 de los siguientes municipios: Chihuahua, Juárez, Delicias, Aldama, Cuauhtémoc, Camargo, Hidalgo del Parral, Jiménez, Meoqui y Casas Grandes," January 24, 2009.

the city acquired a credit line of 250 million pesos (worth $20 million U.S.),[251] an amount equal to all the revenue from additional outside sources Juárez received in 2009.

(Results in Mexican Pesos)					
Income		2006	2007	2008	2009
Taxes		66,313,456	747,457,621	745,644,329	682,625,792
Fees		282,421,318	320,368,488	347,917,598	251,389,171
Products		119,774,100	166,407,262	39,627,287	37,450,527
Surcharges		334,886,305	270,060,648	259,730,235	265,527,501
Own Revenue		1,405,395,181	1,504,294,021	1,392,919,450	1,236,992,991
Participations		1,080,431,749	1,127,770,683	1,292,520,352	1,516,132,693
Extra Revenue		0	-	0	408,825,383
	Total Income	2,485,826,931	2,632,064,704	2,685,439,803	3,161,951,068
Expenditures					
Public Security		681,420,841	643,762,334	832,943,343	876,274,991
Municipal Management		71,664,260	77,692,734	90,419,881	97,372,147
Intergovernmental Relations		31,743,885	38,510,192	36,941,457	38,444,430
Communications		28,581,362	29,327,465	30,264,054	87,272,717
Urban Management		952,700,342	1,116,223,982	924,599,187	982,710,876
Social Management		489,302,607	528,867,510	598,581,380	991,257,974
Administrative Management		215,690,278	172,372,138	209,851,003	213,546,346
Development Management		14,639,031	13,724,367	19,083,324	20,305,592
Debt Service		-	-	-	14,593,526
	Total Expenditures	2,485,742,609	2,620,480,725	2,742,683,632	3,321,778,604
	Surplus	84,321	11,583,979	(57,243,829)	(159,827,536)

Table 16: Ciudad Juárez Financial Results, from www.juarez.gob.mx

The city's physical layout, full of old squatter settlements and new housing complexes in urgent need of better basic infrastructure, put still more pressure on the local budget, as do entitlement programs like pensions for city employees, which represent 7 percent of total operational spending. After analyzing the situation and determining that additional pressures on city revenues may lead to less investment expenditures and, thus, to more

[251] "Fundamento: Ciudad Juárez, Chihuahua (Municipio de)," Standard and Poor's, April 3, 2009, www.standardandpoors.com.mx

debt, Standard and Poor's lowered Juárez's investment rating from "mxAA" to "mxAA-" in April 2009 and then halted grading the municipality's debt altogether in June of the following year. As a way to stop the financial bleeding, state and local authorities looked to the federal government for help. Chihuahua lawmakers in the federal Congress began lobbying for more funding for the city by arguing for modifications in how federal funds are allocated. Under the current system, metropolitan areas receive special funding from the central government. Juárez, despite being a major metropolis, has only one municipality and thus – the congressmen asserted – is being unfairly and unnecessarily punished by the funding structure. The legislators argued that Juárez residents received less federal support per capita than residents of cities over 1 million inhabitants in other states.

CONCLUSIONS: SLOW REFORM, LINGERING PRI EFFECTS, HORRIFIC VIOLENCE

Decentralization and multi-party democratization in Mexico have not resulted in truly independent "free municipalities." The country's major decentralization drive has, in many cases, changed the administrative workings of governance, but it has been far less successful in altering economic realities and, perhaps more importantly, modifying long-held attitudes. A 12-year respite from 71 years of control by the Institutional Revolutionary Party, meanwhile, has undoubtedly had profound effects on Mexico's political, economic and social structure, but it has not been as transformative for local governments struggling to find their own way. Leaders of municipalities far from Mexico City still behave as they did during the era of all-powerful PRI presidents, who needed only to snap their fingers to get whatever they wanted. When problems arise, local authorities and even civil society groups almost always simply try to get the attention of the federal government, then sit back and wait for help to arrive. It is hard to blame them.

Indeed, some of those responses remain the correct and only thing to do since local governments continue to lack the authority, budgetary resources and often even the political will to meet the needs of their populations. While it faces the same institutional constraints as all Mexican cities, Ciudad Juárez is far from hopeless. As a border city, it has a number of advantages, including an extremely privileged location for trade which has allowed it to enjoy special status designed to attract foreign investment and which, in turn, has encouraged a steady stream of new workers to move to the area. The huge concentration of foreign companies in the city has also allowed local authorities to build a far larger local tax base and thus face fewer budgetary problems than other places. Those funds have also made the city less dependant on the central government for funding than is normal in Mexico, though its reliance on Mexico City of course still runs deep. Juárez's border location also has some serious drawbacks, and chief among them is the fact that the city is headquarters to the Juárez Cartel. Its battles have transformed Juárez into the most-violent city in all of Mexico with astounding speed, and saddled it with one of the highest homicide rates per 100,000 inhabitants in the world. So much killing has had disastrous social, financial and quality-of-life implications, but has also raised troubling questions about autonomy as the city works with the federal government to try to curb the wave of bloodshed.

But drug violence is not the only problem. If we analyze local governance by administration and distribution of basic services in Juárez, the result is not good. For starters, authorities on every level have completely and totally failed to guarantee the safety and security of *juareños*. Also, education coverage is insufficient and most of the population remains poor in an otherwise wealthy city, living in terrible conditions because of urban sprawl, and major deficiencies in transportation, infrastructure and housing problems. Even though education is not a municipal responsibility,

mismanagement of it at the state level is felt the most among the city's population, creating the perfect incubator for juvenile gangs that ally themselves with drug traffickers. Meanwhile, well-intentioned federal government policies, such as housing programs, are poorly managed at the local level by officials who give more weight to political considerations than the real needs of residents, resulting in failed projects that contribute to the disorganized layout of modern Juárez. Finally, mixing responsibilities for different services among varying levels of government can be detrimental. For example, public transportation in Juárez is poor and relies on old, heavily polluting buses that do not serve the whole city and have limited schedules. Public transportation is controlled by the state government under a concession system that breeds corruption. But roads and city planning are up to municipal authorities who have not done a good job either, leaving many streets unpaved and failing to provide infrastructure for bicycles and pedestrians, a problem especially acute in a city that is so spread-out – all of which makes it difficult for buses to find reasons to run new and expanded routes.

Therefore, if we analyze local governance in Juárez by scrutinizing the entire process – taking into account the relations between federal, state and local governments; the political structure under which all three must operate; and the actors involved at every level and their real capabilities – the result is equally discouraging. Political society, which often intermingles with the Mexican public sector's basic structure, is over-represented in the political process, allowed to lord over too key areas, starting with the setting of policy agendas, spilling over into decision-making and policy implementation, and even into final evaluation initiatives. When the PRI was in power before 2000, Mexico's political process was highly centralized and undemocratic. While the party was out of power until 2102, much of the political structure it created endured, though to a much lesser extent, under the PAN. Gains by opposition parties and truly democratic

elections undid the single-party regime, but as Tonatiuh Guillén asserts, "that does not mean there is democratic governance."[252] Instead, the institutional design of municipalities tends to replicate authoritarian patterns in the definition and implementation of municipal policies. In municipal elections, for example, Mexicans cannot vote for mayor and city council members separately, they are clustered together in singular lists of candidates presented by each party. This system guarantees a majority for the winning party, even though electoral law calls for proportionality criteria designed to ensure minority parties have at least some representation on city councils. Therefore, power is still very much centered with the mayor, and the city council is reduced to largely a ceremonial role where officials act as a rubberstamp. That reduces accountability and makes it even more difficult for city residents to call their elected officials to task on key issues. An electoral system that so restricts re-election also helps reduce official accountability, though some strides were made in that area when Juárez approved a transparency law that required its leaders to make public all financial data and get citizens access to all public information they need.

Some strides have also been made in giving civil society more of an active political role, one which was for decades marginalized or co-opted by government. Two such initiatives are the municipal development planning committee and the urban planning municipal institute. But both organizations lack enough power to challenge entrenched public-sector habits of centralized decision-making and a culture of putting partisan considerations first – an especially disheartening fact when considering that both represent some of the most successful attempts to empower Juárez civil society. In fact, reform in this area has been so incomplete and slow that, in many cases, civil society has

[252] Guillén, *Ayuntamientos y Pluralidad Política*, 131.

begun seeking out its own new and unique ways to express itself – including protests and street demonstrations, as well as direct lobbying efforts before the federal government, which continues to be recognized as the true center of power, despite all the decentralization efforts and other reforms. That is what occurred in the case of so many unsolved murders of women in Juárez – civil associations pressured federal authorities after local officials failed to act. As Ward and Rodriguez put it: "While there has been little participatory democracy in Mexico, there has been considerable political mass participation."[253]

It would be unfair to declare local governance shortfalls in Juárez entirely the fault of the municipal government, since federal and state governments also determine much of what goes on in the city. Indeed, both the federal and state governments have put a great deal of extra strain on local authorities through archaic rules, control of resources and domain of certain key services like health and education. Municipalities have, by law, well-defined tasks and responsibilities such as supplying their inhabitants potable water, trash collection and sewage service, public lightning and roads, as well as guaranteeing public safety and security. They also collect certain taxes and fees and benefit from a well-established system of revenue transfers from the central government under the *participaciones* system. These non-conditioned transfers can be used for any purpose the municipality decides. But the majority of the resources are distributed via the state, whose legislature establishes the amounts and timeframe for distribution, which often caused cities to complain about unfair distribution formulas and delays. That led states to establish their own fiscal coordination laws in the 1990s, a mechanism similar to the federal fiscal coordination system which establishes different rules and formulas to

[253] Ward and Rodríguez, *New Federalism*, 34.

transfer funds to local governments to avoid arbitrary discretion and nepotism. Chihuahua passed its own fiscal coordination law in 1996.[254]

The central government also sends to municipalities, via states, other contributions. These conditional transfers must be used in social spending, under the *aportaciones* system. These resources are focused on improving infrastructure, such as supplying potable water, sewerage, electricity to and the municipal urbanization of poor neighborhoods, as well as education and health care infrastructure and public security. But most of the funding is subject to the discretion of state governments, which are supposed to pass them on to cities based on poverty figures. States sometimes ignore those rules, however, so that it is not uncommon to see mayors complaining publicly about it. The possibility of incurring municipal debt and how much cities can borrow also requires approval from state legislatures. Therefore, even though free municipalities are not subordinated to the state government and are free to manage their own budget by law, in practice they have their leeway constrained by the will of the governor in office. That is why a lack of sufficient schools in Juárez is not entirely the fault of Juárez officials.

In many municipalities, the transfers from the central government are the main source of revenue. That is not the case in Juárez, however, which had managed to develop a transparent and well-organized method of collecting taxes and generating a surplus, at least until 2007. The many foreign companies that had maquila plants in the city made it easier for Juárez to generate tax revenue, fees and surcharges that were larger than federal contributions in 2008. That, and a conservative fiscal approach, helped Juárez avoid taking on debt for years, but the economic crisis in the U.S., coupled with the drug war, forced local authorities to finally turn to borrowing. Federal contributions

[254] Ward and Rodríguez, *New Federalism*.

to Juárez increased last year, but ratings agencies say that is unlikely to continue in the near future given that Mexico's overall revenue has fallen thanks to lower oil prices and the fact that the country has less crude to sell given the decline of its Cantarell field.

With regard to the institutional capacity to develop complex tasks, municipal administrations only last three years with no possibility of reelection, which makes tackling any long-term project difficult. Also, the political culture, which still tends to see elected municipal offices as spoils for political parties that can be expected to adhere strictly to the central party line, further hinders development of an effective system of personal management. Despite that, Juárez has managed innovations to improve delivery of services to the community, while working in-tandem with citizens. For example, a local program called "Improve Our Neighborhood" involves inter-institutional and community participation at all stages, from the very definition of the program to the implementation and evaluation of it. The project favors neighborhood involvement to prioritize demands, while fostering coordination to fulfill them. Other innovative plans that require community participation and also foster alliances between government and business associations have been developed to strengthen public security, improve coverage of education and promote employment under the urban development plan. But the lasting impact of these efforts is unclear, and also mayors are under no obligation to implement or continue them.

Still, even though all of Juárez's problems cannot be blamed on local officials, there are many gross deficiencies that can be, such as zoning and city planning, which are the direct responsibility of the municipality and have not improved. Juárez has expanded greatly in recent decades, placing more pressure on its woefully inadequate basic services and roads, and, as people are forced to live farther from the city center, the lack of public transportation and sufficient proper housing becomes all the more acute.

In summary, all the flaws inherently built into Mexico's federalist system and political process, coupled with uneven decentralization reforms which failed to give municipalities enough control over the supply of the public good while also failing to create incentives for them to generate their own revenue, have combined to boycott competent governance in Ciudad Juárez. Seventy-one years of authoritarian and centralized rule by the PRI only exacerbated the problem, not just in Juárez but also in cities across Mexico – making them too reliant on federal authority whenever things go wrong, especially problems with public safety or insufficient funds to balance local budgets. Worse still, it is hard to imagine things improving much in Juárez in the short term, given not only the entrenched nature of its political and social characteristics, but also all of the new and far more-pressing problems that have cropped up of late. The drug war has crushed all notion of public security in the city, and until people feel safe again, it will continue generating problems in other areas – from lackluster community participation to falling investment in Juárez by foreign companies. The municipal capacity to generate its own revenues is a positive tool and one that could help Juárez make small improvements in a number of areas. But a lack of accountability among city authorities – an issue that can't be fully addressed without modifying bans on reelection – makes it difficult for *juareños* to get their concerns and demands heard and to force their government to make real progress on improving their lives. For all of these reasons, today's Juárez is a rich city full of poor inhabitants, and is likely to stay that way.

RECOMMENDATIONS

As we have seen, while some of Juárez's problems are unique, it shares many others with all Mexican cities. Even as political and administrative decentralization and democratization has advanced at a robust pace, Mexico's cities have found themselves

unable to wield their new power. That lack of true reform at the local level leaves them no choice but to fall back on Mexico City for help when real crises arise. As Ward and Rodríguez put it: "The abrogation of responsibility to higher authorities is an endemic feature of the Mexican political system."[255]

In Juárez, that is what happened when federal authorities had to create a special prosecutor's office in order to make headway on 10 years of unsolved killings of women, but there are other examples in other places. In 2002, a group of farmers seized the town of San Salvador Atenco outside Mexico City to oppose a plan to build a new airport on their land. A hostage standoff followed, and was only quelled when the federal government negotiated a solution. Four years later, striking teachers seized the center of the southern city of Oaxaca, crippling all commerce and civil life, and only returning to their classrooms when Mexico City sent federal troops. Cities racked by drug violence, from Nuevo Laredo in the summer of 2005 to Tijuana at various times, asked the president to send troops to help quell the bloodshed, and federal authorities have similarly taken to the streets of Juárez in recent years. Indeed, during the Calderon administration, 15 of Mexico's 31 states asked for and received federal support to cope with rising drug-violence. Federal intervention means the military and national police take over public safety operations in entire cities, forcing local law enforcement to obey their orders. President Vicente Fox began relying on federal authorities and troops to fight the drug war in 2005, dispatching reinforcements to border cities as part of operation "Safe Mexico." Fox's successor, Felipe Calderon, used the army even more, launching a series of "joint operations" that brought nearly fully half the country under military command.

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[255] Ward and Rodríguez, *New Federalism*, 33.

Instead of relying more heavily on the federal government, Mexico should take comprehensive and lasting steps to strengthen its cities. Municipalities need to be given more control over their own political systems and, most importantly, their own budgets – moves that will allow them to solve small local problems, then tackle the latest, most difficult challenges, including uncontrolled drug violence. Relatively small, but targeted and important reforms at the municipal level may prove that Mexico, far from being on the verge of becoming a failed state, as the U.S. Defense Department asserted in recent years, simply faces a systematic failure of local governance nationwide. Whether a new incarnation of PRI government, led by the recently elected Enrique Peña Nieto, can successfully oversee such small but important transformations remains to be seen.

Chapter 5: Implications and Concluding Observations

Unprecedented levels of drug-related violence in Mexico did not happen by accident. They have been fueled by decades of a centralized power structure that encouraged corruption while fomenting inequality and tolerance for a phenomenon that government authorities mistakenly believed they could keep under control. Shifting U.S. anti-narcotics interdiction efforts in the 1980s, coupled with political changes in Mexico, created the perfect incubator for new competitors in the country's illegal drug business at a time that drug organizations found themselves forced to evolve and adapt to new and changing market conditions to survive. In an area such as the illegal drugs market, where there are no written laws, the strongest ones rule. And Mexico's kingpins learned the lessons of their new reality fast.

IMPLICATIONS

Three basic factor that help explain Mexico's current, dominant position in the illegal drugs market that focuses on the United States lie with 1) the country's superior production capabilities, 2) its vast and deeply entrenched existing organized criminal syndicates, and distribution structures, and, of course, 3) its geography.

A look at the history of Mexican drug smuggling simply confirms the obvious: Mexico has been a long-time producer of illicit drugs, but it was also one that, for decades, remained a relatively small competitor for the insatiable U.S. market. The country's drug networks and know-how existed but needed the impetus to be awakened and realize their full potential. Chapter 1 traces the evolution of drug organizations in Mexico from mom-and-pop businesses to the large, well-organized and cut-throat syndicates they have become today. From a centralized and static hierarchy in the beginning, drug cartels have transformed into ever-evolving organizations that for some

periods operate in coordination with one another while at other times viciously battle each other for control of key plazas for production and storage of drugs or lucrative routes for smuggling. The era when rival kingpins partied together and kept things largely peaceful between their different gangs coincided with the golden years of the Institutional Revolutionary Party, when its politicians were all-powerful. According to Luis Astorga, Mexico's central power was highly effective in keeping drug organizations under government control because the country's peculiar form of federalism allowed the president to enjoy far-reaching personal latitude.[256] To put it another way, the president was the figure that controlled everything. From him, the chain of command simply flowed to the governors of the country's different states, and then to the mayors of key municipalities, as Chapter 4 describes. For drug kingpins it was easier, and more economical in terms of time, money and business success, just to negotiate directly with the chief boss of government in their territory, knowing in that way that any deal would be respected. Cartel leaders could co-opt the PRI and leave it at that — and there were generally enough different drug hubs and corrupt political leaders around the country to keep many rival drug syndicates rich and happy, and thus reduce the need for bloodshed.

This way of operating remained strong and supported Mexico's illegal drug trade until the mid-1980s, when it began to crumble following changes in Mexico and the United States. On the one hand, the Reagan administration enforced a zero tolerance policy against drugs that helped trigger the downfall of the Colombian cartels during the subsequent decade. On the other, the beginning of the PRI's loss of political power in the 1980s culminated with Mexico's passage from a single-party political regime to a multi-party democracy in 2000. That was the year *Panista* businessman and rancher Vicente

[256] Astorga, *El Siglo de las Drogas*.

Fox became the first non-PRI president since 1929. The cartels, from their most-powerful kingpins to their low-ranking producers, smugglers and foot-soldiers, have had to react to this new reality: the country's historic political and economic realignment, a redefinition of priorities and specific international and local legislation, and the rise of a novel way of doing business, spurred on by new technology, more-efficient division of labor and modern techniques of outsourcing and diversification.

Soon, the Mexican drug organizations had filled the power vacuum left by the Colombian cartels after their downfall at the hands of a U.S.-led crackdown. The Mexicans not only already had the necessary links with the Colombians to continuing smuggling cocaine seamlessly, but also had existing, well developed distribution networks in the United States. In a few short years, they became the kings of the drug business in the Americas.

This wave of changes was the equivalent of a revolution for the Mexican drug business. With increased profits pouring in from moving cocaine — a more expensive drug than the marijuana Mexicans were used to smuggling to the United States — the Mexican organizations added new products and refined the production of old ones. Examples of these are the methamphetamine labs that started mushrooming in the country's central region and the production of black tar, a less pure form of the heroin traditionally produced from opium poppy crops in Mexico. Black tar quickly found a niche in the American market while meth exploded in popularity, only making the drug cartels richer and more powerful. Drug production also was perfected and, as Chapter 1 and Chapter 2 detail, the introduction of advanced technology in the process has allowed Mexican organizations to increase annual harvest yields while also making illicit crop cultivation possible in areas where climate and other factors made it impossible before. New irrigation systems have helped traffickers grow marijuana in the middle of the

desert, for instance. Today, human variables, such as automated systems of irrigation, genetically modified plants, close proximity to highways to facilitate smuggling, and a political system that still allows for corruption despite the PRI's loss of absolute power are all collectively more important than traditional environmental variables such as temperature, precipitation or altitude in determining successful drug production. The latter, which were the most important conditions for opium poppy and marijuana to thrive in the early 1900s, have been relegated to almost mere afterthoughts, as Chapter 2 notes.

So much power was not always good news for Mexican drug cartels, however. So much clout in the smuggling world has also attracted new competitors, some of whom have no experience with or real interest in cultivation and instead have focused on big-profit smuggling, especially of cocaine. The new groups established themselves primarily along Mexico's eastern border with the United States, as well as in the Gulf coast region, both mostly territories that had not yet been claimed by Mexico's traditional drug syndicates, which tended to be headquartered along the Pacific coast, building their fiefdoms in areas long known as prime real estate for growing opium and marijuana.

The first such new group, the Gulf Cartel, was born in the late 1980s. A little more than a decade later, it had become Mexico's bloodiest drug organization, dramatically altering the pattern of violence that had traditionally surrounded the business. The Gulf cartel created a fully armed wing, made up of co-opted former elite Mexican military commandoes that quickly ratcheted up violence to previously unseen levels. Extortion and kidnapping, which had not been part of traditional, drug-related crime, suddenly became rampant in the states of Tamaulipas, the headquarters of the Gulf cartel, and Baja California, home of the Tijuana smuggling organization, in the early 2000. The Tijuana organization had been weakened by the capture and killing of two of its two heads: Benjamin and Ramón Arellano Félix, respectively. That body-blow to the

Tijuana cartel, along with the capture of Gulf Cartel head Osiel Cárdenas, were seen as major successes for the Fox administration. Former assistant attorney general for drug trafficking, José Luis Santiago Vasconcelos, told me in an interview in 2003 that increasing numbers of extortions and kidnappings in Tijuana were a byproduct of the weakening of the cartel that had traditionally dominated the area's drug smuggling. If the drug business were battered, hit men and other cartel operatives still had a way to make money — especially since the Gulf Cartel had provided a blueprint for others to follow.

However, these victories for the government against Mexico's top drug organizations only ensured that, after removing top kingpins, others stepped up to take their place, but often only after a bloody internal battle for control within the drug gang. In 2005, Fox took his administration's war on drugs a step further, dispatching the military to the border cities of Nuevo Laredo and Tijuana and to other key drug production and smuggling hubs, in order to beat back outbreaks of violence. This wave of bloodshed was caused, to a large extent, by the fact that the armed wing of the Gulf Cartel, a group known as the Zetas, decided to form its own cartel and began competing for its own share of the drug business. As the Zetas tried to muscle their way into territories and important smuggling routes, their battles with the traditional smuggling syndicates in those areas turned increasingly violent. So ferocious were the Zetas in their push for power, that older smuggling gangs began creating their own armed wings, and began staffing them with recruits from the ranks of street gangs in Mexico and the United States.

Meanwhile, another ruthless gang, *La Familia Michoacana* (LFM), emerged in the central state of Michoacán, which had previously been known for growing avocados and for its beautiful, mountainous landscape. Even though Michoacán had been an opium and marijuana producer for decades, it was not one of the largest in Mexico. But it was

located in a strategic area. Michoacán features a Pacific coastline and easy access to the major port of Manzanillo in nearby Colima state, one of the largest entrance points for chemical precursors used to produce methamphetamines, Michoacán also borders Guerrero and Jalisco states. The former is a heavy producer of marijuana and opium and has become an epicenter for violence in recent years which has radically transformed for the worse many areas, including the formerly luxurious beach resort of Acapulco. Jalisco, meanwhile, now rivals Sinaloa as Mexico's largest methamphetamine producer. LFM became well known across Mexico and the world one night in September 2006, when a group of commandoes, wearing black clothing and ski-masks, tossed five severed human heads onto the dance floor of a nightclub in the city of Uruapan, warning that *La Familia* did "not kill women or innocent people" (apparently trying to separate themselves from other cartels) and that only killed "those who should die."[257] From then on, Michoacán was transformed into one of the most violent states in the country. In fact, Fox's presidential successor and fellow *Panista* Felipe Calderón, a native of Michoacán, deployed the first contingent of troops to the state right after declaring an all-out war on drugs upon taking office in December 2006. In all, thousands of soldiers were sent to more than a dozen states were drug-related violence had erupted. Six years later, the outcomes were decidedly mixed, so much so that the PAN's chances of capturing a third-straight presidency disappeared. While the Calderón government bragged about the spike in drugs, weapons and money seized from drug organizations amid its crackdown, drug-related homicides skyrocketed. Indeed, the government's strategy to attack the hierarchy of different cartels resulted in the emergence of new and ever-more vicious factions fighting to keep their share of power and influence. But the Calderón crackdown also had

[257] Jaime Márquez, "Decapitan a 5 en Uruapan; tiran cabezas en un bar," *El Universal*, September 7, 2006, accessed July 18, 2012, http://www.eluniversal.com.mx/estados/62434.html

an effect on the traditional hubs and routes used by the criminal organizations to smuggle narcotics. New locations for drug cultivation, storage and distribution have begun to appear every year throughout Mexico, and where they do they bring a trail of killings. Drug hubs and bloodshed are closely coupled – and both are spreading, as Chapter 3 explains.

Power vacuums and changing balances in the strength of the cartels as a result of Calderón's strategy against the hierarchy of these organizations had the unintended effect of greatly disrupting the structure of the business. Internal battles added to bloodshed already being caused by territorial disputes between rival cartels and smugglers' battles with police and soldiers. The result was yet more killings on all sides. Some cartels were weakened but others ended up gaining strength, and the fights to control key territories of drug production, storage and smuggling routes just kept getting worse. That is part of the explanation for the spread of violence to new areas of the country and its increasing levels, with massive and more gruesome crimes, in areas that are key points for moving narcotics onto U.S. soil, such as border cities and seaports.

In this context, it is not surprising that violence has links to certain socioeconomic characteristics derived from the power and market structure that is predominant in Mexico. Heterogeneous development has created pockets of poverty and inequality throughout the country, and where these conditions meet the presence of some key activities in the illegal drug business — such as being in an area where drugs are already common produced, stored or smuggled — violence erupts. As Chapter 3 illustrates, violence is correlated to pockets of Mexico where there are a great number of female-heading households and is more common in urban rather than rural areas. It is also most prevalent in places that are less well-connected to highways and which are governed by the PRI.

Even though academics have generally agreed in concluding that drug violence first began emerging in areas where the PRI's hold on power was most-tenuous, particularly those municipalities that elected authorities from the PAN in the late 1980s and early 1990s, the current pattern of violence no longer demonstrates that pattern. Statistical analyses now show that PRI-controlled areas are equally vulnerable to violence as PAN areas. In fact, municipalities controlled by the Democratic Revolutionary Party or PRD in Mexico City and Michoacán, have also suffered escalating problems with violence.

FINAL CONSIDERATIONS

As the Mexican government sees it, the problem is the reorganization, not of drug gangs, but of the "drug business model," amid a new political and economic environment. Political corruption, which for decades allowed smuggling to flourish, is now finally being stamped out, at least to some degree. The crackdowns have hit the country's main trafficking organizations hard, but far from weakening them, the operations have simply forced them to shift into new areas of expertise and business opportunities. As Calderón noted in March 2009, drug trafficking in Mexico was "formerly a business geared exclusively toward drug trafficking to the U.S. but now seeks to position itself to control the market."[258]

The origin and development of drug organizations and trafficking in Mexico have been closely linked to the prohibitions established in the United States and that country's unwavering demand for drugs, a demand that has only grown more-complex over time. But equally important have been the political conditions in Mexico, which favored

[258] President Felipe Calderón in a speech on March 12, 2009.

corruption and gave rise to safety nets for drug smugglers. These protection networks sheltered the cartels since their infancy, with a total disregard for laws and social norms of behavior. Such corruption was further fueled by an environment of poverty and social marginalization as a result of socio-economically heterogeneous growth which favored only certain regions of the country and left others on the fringes of society, further increasing equality gaps throughout Mexico.

Mexican drug violence is not a new phenomenon, but its extreme cruelty of late, and its spread to locations outside the headquarters of traditional cartels have been an unwanted consequence of the reorganization of drug organizations after the PRI's downfall and the capture of two of the main cartel's heads. The process of emergence of new leaderships proved to be a bloody one, as was their efforts to defend their territories from other organizations that tried to shoot their way into control of new areas of Mexico. Still another factor was the army and police, which sometimes engaged in their own shootouts with well-armed drug gangs in their efforts to quash them. This struggle was made all the more deadly by an unending supply of heavy weaponry now being smuggled south from the U.S. since the expiration of the American assault weapon ban.

The Mexican military, which had been considered relatively impervious to the striking levels of corruption seen in Mexican police, proved instead to be more vulnerable than previously thought to the allure of money, a discovery that became increasingly apparent as successive presidential administrations relied more and more heavily on the support of soldiers to try and beat back drug production, smuggling and violence. The growing involvement of troops in the offense against drugs, in retrospect, has largely served to benefit, rather than hinder, the cartels. Instead of working to break them up, many soldiers have crossed to the other side and become hired killers. That may be a key reason why, during their last major operation against wanted kingpin Arturo Beltran

Leyva in Cuernavaca in 2009, authorities chose Navy commandos instead of Army special forces to move in and make the actual arrest.

President-elect Enrique Peña Nieto, of the PRI, revealed in a *New York Times* editorial on July 2, 2012, his plan to fight drug-trafficking, and its related violence. The new strategy echoed the failures of the Calderón administration and promised a ready-made remedy. In place of an all-out drug war, Peña Nieto announced the creation of a 40,000 person National Gendarmerie, a new police force assigned to focus exclusively on rural areas, as well as the expansion of the federal police by "at least 35,000 officers."[259] Peña Nieto also vowed to increase spending on security and the fight against organized crime, ceding no truce to drug traffickers but promising a reexamination of the current antidrug policies to improve efficacy and efficiency. "To those concerned about a return to old ways, fear not… I reject the practices of the past, in the same way I seek to move forward from the political gridlock of the present," he wrote. "I will continue the fight, but the strategy must change."

A major drawback of his plan, however, is that, in retrospect, historical corruption has defeated previous governmental attempts to start new police forces from scratch. The most-recent such attempt came under President Fox when his administration commissioned the *Agencia Federal de Investigación* (AFI). It remains to be seen if Peña Nieto 's efforts can ultimately prove successful.

Crackdowns of all kinds have historically failed to quell the illicit drug business in Mexico, even though they tend to placate Washington and its "Just Say No" approach to the problem. Instead, they allowed Mexican cartels to take advantage of the opportunity to reinvent themselves and become even stronger and more violent, more

[259] Enrique Peña Nieto, "Mexico's Next Chapter," *The New York Times*, July 2, 2012, accessed July 4, 2012, http://www.nytimes.com/2012/07/03/opinion/mexicos-next-chapter.html?_r=1

complex and diversified. The consequences of the latest anti-drug campaign in Mexico which Peña Nieto will now launch are as of yet unclear — but if history is any guide, authorities should not expect a stirring success.

FURTHER RESEARCH CONSIDERATIONS

The drug business in Mexico works the way it does because of the steady demand of narcotics in the United States. Further research should consider tracing the connections and networks Mexican cartels have been able to build on American soil. Also, further study should focus on the intermediaries that allow smuggled drugs to flow into the United States, beginning with cases of corruption within the ranks of U.S. Immigration and Customs Enforcement.

Another factor that needs to be tackled is the lack of precision in Mexican government data, both in terms of violence and drug cultivation. New technologies such as Geographic Information Systems (GIS) are of great help in discovering spatial patterns, which in this case are so essential to making the best policy decisions and actually achieving the desired outcome. Mexico's data on violence, as well as on drug seizures and eradications, are only disaggregated to the municipal level, which diminishes the precision of the results of studies using this software.

Finally, even though new technologies are extremely helpful in providing the academic analyses needed and offer accurate and meticulous results that are vital to helping find viable solutions, they cannot solve the problem of violence and drug cultivation and smuggling by themselves. In the end, what is needed is bilateral political will, and coordination between Mexico and the country where the demand comes from, the United States, to articulate sound policy that can effectively battle one problem at a time. The main challenge, though, is for Mexico to ultimately decide what takes priority:

simply placating and calming rising levels of violence or putting a real and lasting dent in drug smuggling. Authorities in Mexico, as well in the United States, must decide what it is they seek to accomplish, and then must agree on their best, joint efforts, to make it a reality.

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Vita

Monica Cristina Medel earned a Master of Arts in Latin American Studies and a Master in Public Affairs from the Teresa Lozano Long Institute of Latin American Studies and the Lyndon B. Johnson School of Public Affairs at the University of Texas in August 2012. A native Spanish speaker who is fluent in English and Portuguese, Monica supplemented her quantitative and statistical training by using Geographic Information Systems (GIS) mapping technology to scrutinize drug-related violence in Mexico and examine how government policy in Mexico and the United States has helped shape the pattern of horrific levels of bloodshed. A native of Chile, Monica spent 15 years as a journalist there, as well as in Mexico and Cuba. While working for the Spanish news agency EFE in Chile, Monica covered the military, writing about army officers being tried for human rights violations during the dictatorship of Augusto Pinochet. She was soon promoted to Mexico City, where she started writing pieces about drug-related violence. She eventually was hired away to the British news service Reuters, where she won an award for breaking 26 exclusives her first year while continued covering the war on drugs. While earning her degree in Austin, Monica also served as lead Spanish-language blogger for the Knight Center for Journalism in the Americas, and as rapporteur for a 2010 conference that brought together Mexican and American journalists who cover the border to discuss the risks they face. She is also a past winner of the Foreign Language Area Studies Fellowship, the McIlhany Endowed Presidential Fellowship and the CONICYT Bicentennial Becas Chile Fellowship.

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