METHAMPHETAMINE AND COCAINE MANUFACTURING EFFECTS ON THE ENVIRONMENT AND AGRICULTURE

I. INTRODUCTION

Imagine a farmer setting out to do his daily work of irrigating and feeding his livestock, and discovering his field has been contaminated by drug manufacturing paraphernalia. The worst part of this farmer's discovery is not that his crops and livestock are endangered, but learning that as the property owner, he is responsible for the clean up and environmental testing. Such a scenario has not been fiction for thousands of farmers throughout California.[1]

The leftover toxic waste from illicitly manufactured methamphetamines ("meth") is often dumped on private and public land, resulting in adverse affects on all aspects of agriculture and the environment.[2] The innocent property owners are financially liable for all clean up and land restoration costs.[3] They receive no reimbursement from their property insurance[4] and minimal assistance from governmental agencies.[5] California has a law that assists farmers with the excessive clean up costs.[6] The federal government funds programs that clean up hazardous chemical spills, but none pertain to meth chemicals.[7] No federal laws assist farmers with land or property restoration. Conversely, the United States ("U.S.") federal government funds programs in Colombia for the eradi-

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[1] Christine Souza, Illegal and Hazardous, California Farm Bureau Federation, April 27, 2005.

[2] DEA: Demand Reduction, Street Smart Prevention, http://www.dea.com (last visited Sept. 15, 2007).

[3] Christine Souza, Dumping Grounds?, California Farm Bureau Federation, April 20, 2005.

[4] Telephone interview with Ray Rezendez, owner of State Farm Insurance in Madera, Cal. (Aug. 20, 2007).

[5] Oregon Narcotics Enforcement Association, Methamphetamine, www.onea.org/methamphetamine.htm (last visited Nov. 1, 2007).

[6] Cal. Health & Safety Code sec 25354.5(f) (2007)

[7] Superfund, http://www.epa.gov/region09 (last visited Oct. 12, 2007).

cation of illicit coca production in tropical rain forests[8] and compensates Colombian farmers for their property losses.[9] In addition to the negative financial effects on farmers, cocaine production has a detrimental effect on Colombian agriculture and the environment.[10]

In Part I, this Comment will examine the negative effects that manufacturing meth has on agriculture and the environment. Part II will examine the American farmer's financial responsibilities and the unavailability of federal assistance. Discussion will include financial assistance provided to the Colombian government by the U.S. federal government for eradication of coca bushes, and compensation paid to Colombian farmers for destroyed crops and livestock. Finally, Part III of this Comment will examine cocaine production's negative effects on the environment and global climate change.

II. METHAMPHETAMINES

Meth is "an amine derivative of amphetamine, C10H15N, used in the form of its crystalline hydrochloride as a central nervous system stimulant, both medically and illicitly."[11] It is man-made in clandestine laboratories, "illicit operations consisting of a sufficient combination of apparatus and chemicals that either has been or could be used in the manufacture or synthesis of controlled substances."[12] After the process is complete, leftover hazardous chemicals, known as meth waste, remains.[13] The ratio of waste materials to finished product is approximately 6-to-1, therefore six pounds of toxic waste is created for every pound of meth manufactured.[14] The waste is often dumped on farms, in rivers and forests, and along roadways.[15] This has devastating effects on the environment and agriculture.

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[8] Plan Columbia: the Program of Destruction, http://www.college.holycross.edu (last visited Oct. 12, 2007).

[9] Pub. L. No.107-115, Foreign Operations Appropriations Bills, Foreign Policy (2002).

[10] DEA: Demand Reduction, Street Smart Prevention, http://www.dea.com (last visited Sept. 15, 2007).

[11] American Heritage Dictionary (4th ed. 2000).

[12] Don't Let Meth Cooks Off the Hook, www.nometh.org (last visited Oct. 31, 2007).

[13] Methnet, Recognizing Meth Waste, www.IllinoisAttorneyGeneral.gov/methnet (last visited Nov. 1, 2007).

[14] Oregon Narcotics Enforcement Association, Methamphetamine, www.onea.org/methamphetamine.htm (last visited Nov. 1, 2007).

[15] Charles Salocks, PhD, DABT, and Karlyn Black Kaley, PhD, DABT, Sodium, Technical Support Document: Toxicology, Clandestine Drug Labs: Methamphetamines, Vol. 1, Num. 6 (2003).

A. Meth Dump Site's Effects on the Environment

Meth manufacturing negatively affects forests, rivers, wildlife, and the air.[16] In California, large areas of trees, vegetation, and soil have been contaminated by toxic meth chemicals.[17] In Sitgreaves National Forest, meth-lab fumes killed 150 year-old ponderosa pine trees, juniper, and pixon pines.[18] Meth labs frequently explode, which causes the burning of forests and vegetation.[19] The fires release solid carbon combustion particles and greenhouse gases, including carbon dioxide and methane.[20] These gases affect global warming and climate change.[21]

Often, hazardous meth waste is dumped into rivers and streams, which contaminates the water. [22] The waste kills fish, birds, amphibians, and small animals. [23] Ammonia, a chemical used to make meth, is hazardous to aquatic organisms because it depletes oxygen from water, and suffocates them.[24] In Kansas, 33,000 salmon died of "gill rot" near the Klamath River, as a result of fifty meth labs surrounding the river.[25] The toxic chemicals enhanced the gill rot, making it impossible for the salmon to recover.[26] This affects the eco-system and endangers the food chain further through hunting and fishing.[27]

Meth manufacturing also contributes to air pollution.[28] Iodine and red phosphorous are combined and heated during the pseudoephedrine reduction stages of manufacturing.[29] They create a toxic, lethal, and odorless gas called phosphine.[30]

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[16] DEA: Demand Reduction, Street Smart Prevention, http://www.dea.com (last visited Sept. 15, 2007).

[17] Press Release, Office of National Drug Control Policy, U.S. Links Illegal Drug Production, Environmental Damage (Apr. 18, 2003).

[18] Marilyn Berlin Snell, Welcome to Meth Country, Sierra Magazine, Jan/Feb 2001.

[19] Earth Observatory, www.virtualcentre.org (last visited Nov. 10, 2007).

[20] *Id.*

[21] *Id.*

[22] Dawn Slade, The Cost of Meth: Environment, Tax Dollars, and Lives, Mille Lacs County Times, Feb. 11, 2005,

[23] *Id.*

[24] Karlyn Black Kaley, PhD, DABT, Ammonia, Technical Support Document: Toxicology, Clandestine Drug Labs: Methamphetamines, Vol. 1, Num. 1 (2003).

[25] What Caused Salmon Deaths? www.siskiyoudaily.com (last visited Oct 15, 2007).

[26] *Id.*

[27] Oregon Narcotics Enforcement Association, Methamphetamine, www.onea.org/methamphetamine.htm (last visited Nov. 1, 2007).

[28] Marilyn Berlin Snell, Welcome to Meth Country, Sierra Magazine, Jan/Feb 2001.

[29] *Id.*

[30] *Id.*

B. Meth Dump Site's Effects on Agriculture

Meth labs and agriculture are intertwined.[31] Labs and waste dump sites have been discovered on chicken, turkey, and cattle ranches; dairies; vineyards; and orange groves.[32] As seen below, they adversely affect all aspects of agriculture.

Meth lab operators choose farms to manufacture meth and dump the byproduct because they are isolated.[33] Farmlands are condemned and destroyed, and livestock and crops are ruined.[34] The farmers are financially liable for the land destruction and are not compensated for lost crops or livestock.[35] The Agricultural Crime Technology Information and Operations Network reports that "farmers have to do the clean up or pay to have someone pick it up. If they don't do it, it is hazardous, and it takes productive land away from them. It costs the farmers, no matter how you look at it."[36]

Meth cookers dump the waste in streams and drainage systems, and the chemicals absorb into the soil and get into ground water.[37] Cattle are subjected to the waste through their drinking water and grazing fields.[38] The chemicals affect the cattle's kidneys and liver,[39] resulting in death.[40]

Meth waste is often dumped near crops and in water sources used for irrigation, which adversely affects crop production.[41] Orchards have been taken out of use because of this exposure to the toxic chemicals.[42] A Fresno, California orange grower lost two years worth of production due to meth contaminants.[43] A Livingston, California farmer had harm-

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[31] John M. Shutske, Farmers' Responsibilities in the War Against Methamphetamine, 2, March 2006.

[32] Christine Souza, Illegal and Hazardous, California Farm Bureau Federation, April 27, 2005.

[33] John M. Shutske, Farmers' Responsibilities in the War Against Methamphetamine, 2, March 2006.

[34] Christine Souza, Illegal and Hazardous, California Farm Bureau Federation, April 27, 2005.

[35] Christine Souza, Dumping Grounds?, California Farm Bureau Federation, April 20, 2005.

[36] *Id.*

[37] Marilyn Berlin Snell, Welcome to Meth Country, Sierra Magazine, Jan/Feb. 2001.

[38] *Id.*

[39] *Id.*

[40] Press Release, Office of National Drug Control Policy, U.S. Links Illegal Drug Production, Environmental Damage (Apr. 18, 2003).

[41] Dr. Nora D. Volkow, Methamphetamine: Toxic, Addictive, Devastating, Get the Facts!, Science World, Oct. 24, 2005.

[42] Glenna Jarvis, Zeroing In On Meth Labs, The Madera Tribune, June 06, 2003.

[43] Christine Souza, Illegal and Hazardous, California Farm Bureau Federation, April 27, 2005.

ful chemicals dumped in his almond orchard three times in one year.[44] In vineyards, the chemicals ruin grapes and the vines have to be completely removed, inhibiting future crops.[45] Additionally, fire and debris from meth lab explosions destroy orchards and vineyards, ruining any opportunity for future crops.[46]

Meth cookers often steal farm chemicals to manufacture meth.[47] Anhydrous ammonia, a fertilizer used to grow corn and other crops, is used to produce meth.[48] It is a toxic, flammable, and corrosive gas.[49] The gas can be unintentionally released.[50] The leaks have resulted in fires, death and injury to humans and livestock, and destroyed farms.[51]

Iodine is a chemical used by ranchers to treat horse hooves.[52] It is often stolen by meth cookers to use during the initial cooking stages.[53] Alone, iodine is not hazardous, but it is incompatible with gaseous ammonia.[54] It becomes combustible when mixed with the gas.[55] This increases the risks for injury, death, and property destruction.

The financial effect on farmers is three-fold. First, the property owner is responsible for the meth waste clean up and may also be liable for individuals who are exposed to the waste and become ill.[56] Clean up includes the property, disposing of chemicals and containers, environmental testing of soil and water, and removing contaminated soil.[57] This process can be very expensive, costing anywhere from $3,000 to $100,000.[58] It is difficult and can take days to months to complete.[59]

Farmers are further affected because property insurance contains a pollution exclusion clause, which does not reimburse them for the expenses

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[44] *Id.*

[45] Glenna Jarvis, Zeroing In On Meth Labs, The Madera Tribune, June 06, 2003.

[46] *Id.*

[47] Oregon Narcotics Enforcement Association, Methamphetamine, www.onea.org/methamphetamine.htm (last visited Nov. 1, 2007).

[48] John M. Shutske, Farmers' Responsibilities in the War Against Methamphetamine, 2, March 2006.

[49] Robert Burke, Handling Anhydrous Ammonia Emergencies, March 2002.

[50] Emergency Planning For The Farm, www.Michigan.gov (last visited Sept. 20, 2007).

[51] Robert Burke, Handling Anhydrous Ammonia Emergencies, March 2002.

[52] Marilyn Berlin Snell, Welcome to Meth Country, Sierra Magazine, Jan/Feb. 2001.

[53] *Id.*

[54] Recognizing Iodine, www.OEHHA.CA.GOV (last visited Sept. 25, 2007).

[55] *Id.*

[56] Environmental Health Fact Sheet, www.idph.state.il.us (last visited Sept 20, 2007).

[57] Christine Souza, Illegal and Hazardous, California Farm Bureau Federation, April 27, 2005

[58] DEA: Demand Reduction, Street Smart Prevention, http://www.dea.com (last visited Sept. 15, 2007).

[59] *Id.*

incurred.[60] However, courts apply the exclusion liberally and often in favor of the insured. In *Montrose Chem. Corp v. Superior Court*, the court held "the insured need only show that the underlying claim may fall within policy coverage and the insurer must prove it cannot."[61] Furthermore, the court in *Horace Mann Ins. Co. v. Barbara B.* held "any doubt as to whether the acts give rise to a duty to defend is resolved in the insured's favor."[62] In *Manus v. Ranger Insurance Company*, the court held "the insurer is required to defend its insured if the underlying claim against the insured is potentially covered by the policy."[63] In *Manus*, contaminants were dumped on the plaintiff's property, where they exploded.[64] The plaintiff's property was destroyed by the fire and the insurance company would not honor the claim because of the pollution exclusion clause.[65] The court held "the exclusion is interpreted broadly to afford the greatest protection to the insured" and did not excuse the insurance company's duty to honor the claim.[66] Therefore, farmers may have a valid insurance claim when contaminants are dumped on their land, and the resulting damage would have been covered by their insurance policy under other circumstances. For example, the farmer may be entitled to compensation when an orchard is destroyed by an exploding meth lab if the property policy includes fire coverage.

The second financial effect is the farmer is required to vacate the property immediately after notification of meth lab contamination.[67] The property may not be re-occupied until the meth content indoors has decreased to 0.1 micrograms per 100 square centimeters.[68] While this does not apply to farmland, growing crops, or livestock pastures because they

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[60] Telephone interview with Ray Rezendez, owner of State Farm Insurance in Madera, Cal. (Aug. 20, 2007).

[61] Montrose Chemical Corporation of California v. The Superior Court of Los Angeles County, 6 Cal. 4th 287 (861 P.2d 1153, 24 Cal. Rptr. 2d 467, 1993 Cal. LEXIS 5812).

[62] Horace Mann Insurance Company v. Barbara B., 4 Cal 4th 1076 (17 Cal. Rptr. 2d 210, 1993 Cal. LEXIS 871).

[63] Manus v. Ranger Insurance Company, 142 Fed. Appx. 280 (2005 U.S. App., LEXIS 13524).

[64] *Id.*

[65] *Id.*

[66] *Id.*

[67] Property owners who receive an order issued pursuant to Section 25400.22 that property owned by that person is contaminated by a methamphetamine laboratory activity, a property owner who owns property that is the subject of the order, shall immediately vacate the affected unit. Cal. Health & Safety Code sec 25400.25(a) (2007).

[68] Property contaminated by methamphetamine laboratory activity is safe for human occupancy for purposes of this chapter only if the level of methamphetamine on any indoor surface is less than, or equal to. 0.1 micrograms per 100 square centimeters. Cal. Health and Saf. Code sec. 25400.16(a) (2007).

are outdoor spaces, it may pertain to barns, chicken coups, and greenhouses, as they are indoor areas. This increases the financial burden on farmers and property owners due to moving out of their home or off the land immediately during the clean up stages. A safe meth level is required for human occupancy, but a safe contamination level of soil or water remains unspecified, as is a level to ensure safety for crops or livestock.[69] The law does not specify whether the property owner is required to move their livestock, though leaving the livestock would be fatal. Losing the livestock would result in losing current profits and future births; however, additional costs would accrue for transporting and boarding the animals.

Finally, meth lab dumpsites adversely affect the property value and ability to sell the property.[70] It cannot be sold immediately and there are no guarantees that the land will ever be fit to re-inhabit.[71] The property owners must have the property certified, at their own expense, to verify that the land was cleaned properly and is free of contaminants.[72] The owner must also disclose the prior toxic waste dump to possible future owners, further inhibiting the owner's ability to sell the property.[73]

Law enforcement is required to report any substance that appears to be hazardous and illegal, and have the substance removed to prevent or minimize damages.[74] This directly affects farmers due to the prevalence of meth labs being dumped on farms. It is easily understood that the substances should be removed and identified, but the question is whether farmers and property owners should bear the cost and responsibility. While there are federal and state programs that assist with chemical spills and public hazards, few deal with meth dumpsites.[75]

III. FINANCIAL ASSISTANCE FOR THE REMOVAL OF METHAMPHETAMINE WASTE

Individual states are responsible for creating programs assisting farmers and property owners for damages due to meth labs and waste dumpsites.[76] In California, possessing meth chemicals[77] and manufacturing

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[69] Cal. Health & Safety Code sec 25400.16(a) (2007).

[70] Telephone interview with John Mitchell, Valley Wide Realtor in Fresno, Cal. (July 17, 2007).

[71] *Id.*

[72] *Id.*

[73] *Id.*

[74] Cal. Health & Safety Code sec 25354.5(a) (2007).

[75] Superfund, http://www.epa.gov/region09 (last visited Oct. 12, 2007).

[76] Telephone interview with Sharon Linn, Representative of the Environmental Protection Agency (Oct. 25, 2007).

meth are illegal and punishable by a fine and imprisonment.[78] Farmers affected by meth dumped on their land are arguably victims of crime, but are unable to receive assistance from the Victims of Crime Compensation program, a state-funded agency that provides financial assistance to crime victims.[79] Unless it involves a murder, property damage is not replaced or cleaned, as farmers are not considered crime victims.[80]

Another program, Victim-Offender Reconciliation Program ("VORP") is a restorative justice approach providing mediation services for victims and offenders to repair the harm done.[81] This may be a viable solution for this crime because meth manufacturers would be offered support and rehabilitation services for drug use and the victim would be offered compensation including money to repair the property.[82] A VORP representative stated she believed it could work for this type of crime.[83] Another expressed concerns regarding the farmer not receiving full compensation, but admitted something was better than nothing.[84]

In 2007, California established the Illegal Drug Lab Cleanup Account in the General Fund.[85] The account allows law enforcement to enter into oral contracts, not to exceed $10,000 per incident, for immediate clean up of hazardous materials that are deemed an emergency, including meth waste.[86] This law directly assists farmers by reducing the financial burden caused when meth manufacturers dump the toxic waste on their land.

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[77] Penalties of imprisonment for two, four, or six years are imposed for possession of methylamine and phenyl-2-propanone and intends on manufacturing methamphetamines. A prison sentence for 16 months, two, or three years for possession of methylamine and phenyl-2-propanone is imposed when the party has an intent to sell the product for the manufacturing of methamphetamines. Cal. Health & Safety Code sec 11383.7 (2007).

[78] Except as otherwise provided by law, every person who manufactures, compounds, converts, produces, derives, processes, or prepares, either directly or indirectly by chemical extraction or independently by means of chemical synthesis any controlled substance specified in Section 11054, 11055, 11056, 11057, and 11058 shall be punished by imprisonment in the state prison for three, five, or seven years and by a fine not exceeding fifty thousand dollars ($50,000). Cal. Health & Safety Code sec. 11379.6(a) (2007).

[79] California Victim Compensation, http://www.boc.ca.gov/Victims.htm (last visited Oct. 20,2007).

[80] Telephone interview with Robin Halloway, Representative of California Victims of Crime Compensation in Sacramento, Cal. (Nov. 3, 2007).

[81] Victim-Offender Reconciliation Program, www.vorp.com (last visited Oct. 20, 2007).

[82] *Id.*

[83] Telephone interview with Noelle, VORP representative in Fresno, Cal. (Oct. 7, 2007).

[84] Email from Doug Noll, VORP representative, to Cheri-Lynn Wortham (Oct. 5, 2007, 10:29 PAC).

[85] Cal. Health & Safety Code sec 25354.5(f) (2007).

[86] Cal. Health & Safety Code sec 25354.5(b)(1) (2007).

It will decrease or eliminate clean up costs and environmental testing fees; however it will not compensate farmers for lost livestock, crops, or farm chemicals. It may reduce the damage caused by meth waste because the chemicals are so toxic, and dumpsites may be deemed an emergency to which law enforcement can react immediately, thus reducing the crop and livestock destruction.

There are no federal statutes assisting U.S. farmers with land, crop, or livestock restoration. The federal government funds two programs designed to clean up hazardous chemical spills. The first program, the Governments Reimbursement Program, compensates local governments for costs related to the emergency clean up of hazardous substances.[87] The Environmental Protection Agency ("EPA") reported that the fund was designed for oil spills and asbestos, and does not include meth waste.[88]

The other program is Superfund, which assists with the clean up of abandoned hazardous waste sites.[89] It was enacted due to toxic waste dumps and allows the EPA to clean up the sites or force responsible parties to clean up the waste.[90] It focuses on asbestos, lead, mercury, and radiation.[91] Although meth has been described as a Superfund problem due to its agricultural and environmental costs,[92] Superfund does not provide assistance with waste, labs, or clean up.[93]

Ironically, in 2000, the U.S. federal government gave Colombia over nine billion dollars in foreign aid to eradicate coca bushes through a program titled Plan Colombia.[94] The purpose is to destroy the coca plants by aerially fumigating the crops with the herbicides glyphosate and fusarium-oxysporum.[95] In 2001, President Bush expanded the program and gave $676 million to South America.[96] South America was then given an additional $727 million, of which $463 million was for Colombia in

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[87] Emergency Response Program, http://www.epa.gov/superfund/programs (last visited Oct. 20, 2007).

[88] Telephone interview with Sharon Linn, Representative of the Environmental Protection Agency (Oct. 25, 2007).

[89] Superfund, http://www.epa.gov/region09 (last visited Oct. 12, 2007).

[90] *Id.*

[91] *Id.*

[92] Marilyn Berlin Snell, Welcome to Meth Country, Sierra Magazine,

[93] Telephone interview with Sharon Linn, Representative of the Environmental Protection Agency (Oct. 25, 2007).

[94] Plan Columbia, www.Wikipedia.org (last visited Oct. 20, 2007).

[95] Press Release, Bureau for International Narcotics and Law Enforcement Affairs, Aerial Eradication of Illicit Crops: Frequently Asked Questions (March 24, 2003).

[96] Plan Columbia, www.Wikipedia.org (last visited Oct. 20, 2007).

2004.[97] The U.S. pays $174 million per year to DynCorp to carry out the fumigation.[98] Today, the U.S. provides technical and scientific advice, herbicide, fuel, spray aircraft, and helicopters to assist with the fumigation.[99] The U.S. foreign aid agency promotes a policy of crop substitutions, by substituting coca bushes with bananas, coffee, pineapple, and palm heart.[100]

Fusarium oxysporum has been called a biological warfare weapon and compared with Agent Orange, used during the Vietnam War.[101] Glyphosate is listed third of twenty-five injury-causing pesticides.[102] The fumigation kills the coca plants, but the herbicides are hazardous to the environment and agriculture. The sprays contaminate and wilt the forests' leaves, destroying habitats for thousands of species.[103] It also reduces the forests' ability to grow back because the soil's nutrients are depleted.[104] The sprays contaminate local water supplies and the Amazon River, directly affecting aquatic animals.[105] They also kill beneficial insects, frogs, birds, earthworms, and genetically damage fish.[106]

The herbicides are also unintentionally sprayed on food crops and livestock.[107] The damage is devastating for Colombian farmers,[108] burning crops and diminishing productivity.[109] The plants cannot bear fruit and the fruit's flavors have changed.[110] Watermelons, chickpeas, basil, bananas, yucca, sugarcane, barley, and hundreds of other crops have

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[97] *Id.*

[98] Press Release, Dyncorp International, Dyncorp International Again Wins State Department Contract for Narcotics Eradication and Interdiction (May 19, 2005).

[99] Press Release, Bureau for International Narcotics and Law Enforcement Affairs, Aerial Eradication of Illicit Crops: Frequently Asked Questions (March 24, 2003).

[100] *Id.*

[101] Danielle Knight, Coca Fumigation Threatens the Amazon, Terramerica, Nov. 26, 2001.

[102] *Id.*

[103] *Id.*

[104] Chris Lang, Glyphosate Herbicide, the Poison From the Skies, WRM's bulletin, 97, Aug. 2005.

[105] Abraham Lama, Cocaine Production Poisons Peru's Rivers, Terramerica, Feb. 25, 2001.

[106] Chris Lang, Glyphosate Herbicide, the Poison From the Skies, WRM's bulletin, 97, Aug. 2005.

[107] Press Release, Bureau for International Narcotics and Law Enforcement Affairs, Aerial Eradication of Illicit Crops: Frequently Asked Questions (March 24, 2003).

[108] *Id.*

[109] Luis Angel Saavedra, Studies Show Coca Spraying Harms Health and Environment, Columbia Journal, Aug. 20, 2001.

[110] *Id.*

been destroyed.[111] Wilt disease can lie dormant for years in the soil and then return, endangering future crops,[112] adversely affecting farmers who rely on the crops for support.[113]

Livestock have been poisoned directly by the chemicals and indirectly via their water supply.[114] Pastures and grazing areas have been destroyed by the fumigation.[115] The livestock starve due to the grass being contaminated and ultimately turning brown and dying.[116]

As a result of the herbicide's adverse environmental effects, the U.S. enacted Public Law 107-115 to monitor the fumigation and oversee its being carried out per the EPA's regulations and Colombian laws.[117] It ensures that the sprays pose no risks to humans or the environment, evaluates claims of Colombian citizens, and compensates them for lost crops.[118] Citizens are reimbursed for damaged crops; however, they are not offered compensation for future crops lost due to the soil damage or dormant herbicide.[119] The law states that "fair compensation" is provided,[120] but "fair" does not mean adequate. There is no guarantee that the farmers are adequately paid for their crops, and poverty may increase the illicit crop production. The law ensures the sprays do not affect humans or the environment,[121] but it does not ensure the safety of livestock or preservation of farmland. It does not compensate farmers for livestock that have been poisoned or killed, contaminated water supplies, destroyed farmland, or soil restoration. Coca production thus has negative financial effects on the Colombian government and farmers of licit crops. It also negatively affects Colombian agriculture and global climate change.

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[111] Steve Young, The Drug War's Fungal Solution?, Covert Action Quarterly, Spring 1998.

[112] *Id.*

[113] *Id.*

[114] Danielle Knight, Coca Fumigation Threatens the Amazon, Terramerica, Nov. 26, 2001.

[115] *Id.*

[116] Plan Columbia: the Program of Destruction, *http://www.college.holycross.edu* (last visited Oct. 12, 2007).

[117] Pub. L. No. 107-115, Foreign Operations Appropriations Bills, Foreign Policy (2002).

[118] *Id.*

[119] *Id.*

[120] *Id.*

[121] *Id.*

IV. COCAINE'S EFFECTS ON AGRICULTURE AND THE ENVIRONMENT

The process of turning coca into cocaine affects South American agriculture and the environment by destroying forests, contaminating rivers, endangering wildlife habitats, and contributing to atmospheric pollution.[122]

Tropical forests are extremely fragile eco-systems and their disruption leads to global damage.[123] Coca cultivation has contributed to deforestation by destroying over six million acres of tropical rain forest.[124] Coca farmers are cutting down forests and burning national parks to clear the land for coca plant cultivation.[125] After a few growing seasons or when the fields become sterile, the farmers leave that site and clear more forest area for new plants.[126] Forests are also cleared to build landing strips and processing labs.[127] It is estimated that Colombia will lose one-third of its forests by the end of the century.[128]

Deforestation is a prime cause of the greenhouse effect and global warming.[129] Trees and plants grow and take in carbon dioxide, which is the main warming pollutant.[130] Upon the trees' natural death, an appropriate amount of carbon dioxide is released.[131] When coca farmers burn the rain forests, they release excessive amounts of methane, carbon dioxide, carbon monoxide, and nitrogen oxide, which are all greenhouse gases.[132] These gases normally warm the Earth to a habitable level.[133] However, an increase in the release of the gases heats the Earth too

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[122] Press Release, Bureau for International Narcotics and Law Enforcement Affairs, Environmental Consequences of the Illicit Coca Trade (March 17, 2003).

[123] Coca and the Colombian Environment, www.colcocacase.com (last visited Oct. 10, 2007).

[124] Press Release, Bureau for International Narcotics and Law Enforcement Affairs, Environmental Consequences of the Illicit Coca Trade (March 17, 2003).

[125] Environmental Consequences of the Drug Trade, www.megalink.com (last visited Oct. 20 2007).; Kim Housego, Cocaine Blight Spreads in Colombia, USA Today, Sept, 27, 2005.

[126] John P. Walters, The Other Drug War: (Drug Production and the Environment), The Oregonian, Apr. 22, 2002.

[127] Press Release, Bureau for International Narcotics and Law Enforcement Affairs, Environmental Consequences of the Illicit Coca Trade (March 17, 2003).

[128] Coca and the Colombian Environment, www.colcocacase.com (last visited Oct. 10, 2007).

[129] Deforestation, www.wikipedia.org (last visited Oct. 10, 2007).

[130] Doomsday or Arbor Day, www.strategies.org (last visited Dec. 28, 2007).

[131] Greenhouse effect, www.globalwarming.com (last visited Nov. 1, 2007).

[132] Environmental Consequences of the Drug Trade, www.megalink.com (last visited Oct. 20 2007).

[133] Greenhouse effect, www.globalwarming.com (last visited Nov. 1, 2007).

quickly and causes irreversible damage.[134] Methane causes four to nine percent and carbon dioxide causes nine to twenty-six percent of the greenhouse effect; both gases absorb infrared radiation, causing the earth's temperature to rise.[135] This affects the weather, the sea, nature cycles,[136] leads to the extinction of tropical species (including 8,750 terrestrial birds) and contributes to global climate change.[137]

Coca cultivation and the destruction of forests also directly affect agriculture. The chemicals used during cocaine processing are rotting and killing trees.[138] This destroys timber and eliminates tropical crops, such as bananas and plantain.[139]

Soil erosion and the deforestation caused by coca farmers are directly related.[140] The soil in the forests is poor; without the trees essential nutrients are lost.[141] This increases the soil infertility and soil loss, which increases deforestation as coca farmers move their crop and destroy more trees, creating a soil erosion and deforestation cycle.[142]

In an attempt to evade the law, coca farmers place their crops on hillsides.[143] This is another problem because the soil is bound together by tree roots.[144] The trees keep the soil in place, but coca farmers depleting the soil and removing trees increase the risk of landslides.[145]

Tropical forests receive "as much rain in an hour as London receives during a wet month."[146] Deforestation reduces the forest cover that protects the land from excessive rainfall and results in the rivers and streams flooding.[147] Flood frequency also increases, losing excessive amounts of

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[134] *Id.*

[135] *Id.*

[136] *Id.*

[137] Kim McDonald, Study Warns Global Climate Change and Deforestation Will Lead to Declines in Global Bird Diversity, University of San Diego, June 5, 2007.

[138] John P. Walters, The Other Drug War: (Drug Production and the Environment), The Oregonian, Apr. 22, 2002.

[139] Environmental Consequences of the Drug Trade, www.megalink.com (last visited Oct. 20 2007).

[140] Common Sense for Drug Policy, Drug War Facts, May 21, 2007.

[141] Doomsday or Arbor Day, www.strategies.org (last visited Dec. 28, 2007).

[142] Coca, Trade, and Environment, www.ted.com (last visited Oct. 10, 2007).

[143] Coca and the Colombian Environment, www.colcocacase.com (last visited Oct. 10, 2007).

[144] Deforestation, www.wikipedia.org (last visited Oct. 10, 2007).

[145] *Id.*

[146] Doomsday or Arbor Day, www.strategies.org (last visited Dec. 28, 2007).

[147] *Id.*

topsoil due to this deforestation,[148] resulting in water downstream and creating droughts.[149]

Soil erosion and flooding also affect agriculture. The sun dries and cracks the soil, causing it to be incapable of growing "legal" crops, such as fruits and vegetables.[150] Livestock are not able to graze in eroded soil; therefore they can not be raised for food and income.[151] The floods destroy the crops by eliminating the soil, and the droughts deny vegetation the water it needs to grow.[152] Droughts also deny livestock the necessary water required for survival, and flooding injures or kills them.[153]

Coca farmers dump millions of liters of coca processing waste in streams and rivers.[154] The rivers and streams are literally flooded due to this excessive waste,[155] and have turned from blue to a reddish color.[156] Several species of fish have died out, while others have mutated, showing signs of genetic deterioration.[157] Chemicals dumped in the Amazon and Orinoco River had endangered 210 mammal species, 600 bird species, 170 reptile species, 100 amphibian species, and 600 fish species.[158]

The toxic pesticides and fertilizers used by coca farmers get into the groundwater and rivers through the soil and vegetation.[159] The pesticides are harmful to insects and animals.[160] The fertilizer increases algae growth, resulting in the deaths of aquatic animals and plants, and restricting water flow.[161]

The contaminated rivers also have a direct and negative affect on agriculture. Livestock become sick after drinking from the polluted rivers

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[148] *Id.*

[149] Environmental Consequences of the Drug Trade, www.megalink.com (last visited Oct. 20 2007).

[150] Doomsday or Arbor Day, www.strategies.org (last visited Dec. 28, 2007).

[151] *Id.*

[152] Environmental Consequences of the Drug Trade, www.megalink.com (last visited Oct. 20 2007).

[153] *Id.*

[154] *Id.*

[155] John P. Walters, The Other Drug War: (Drug Production and the Environment), The Oregonian, Apr. 22, 2002.

[156] Abraham Lama, Cocaine Production Poisons Peru's Rivers, Terramerica, Feb. 25, 2001.

[157] *Id.*

[158] DEA: Demand Reduction, Street Smart Prevention, http://www.dea.com (last visited Sept. 15, 2007).

[159] Coca and the Colombian Environment, www.colcocacase.com (last visited Oct. 10, 2007).

[160] *Id.*

[161] *Id.*

and streams.[162] The animals can also become sick indirectly, through the food chain by eating contaminated plants or insects.[163] Food crops die off due to the chemical waste in the surrounding soil, vegetation, and ground water.[164]

The tropical forests in Colombia and Brazil contain a majority of the Earth's biodiversity.[165] "Biodiversity is the variation of taxonomic life forms within a given ecosystem, biome or for the entire Earth. Biodiversity is often a measure of the health of biological systems."[166] Coca farmers are contributing to a loss of the biological diversity by destroying the forests and habitats of seventy to ninety percent of the world's species.[167] This has lasting and detrimental effects on climate change, loss of land cover, and species extinction.[168]

Climate changes affect the length of growing seasons, planting and harvesting dates, and require changing the crops in various areas.[169] Crops could also be affected by weeds, insects, weather changes, heat waves, droughts, and floods.[170] The production of illegal drugs in the United States and Colombia has resulted in a downward spiral for agricultural communities, and it has endangered global welfare by contributing to the destruction of forests, poisoning rivers, and endangering wildlife.

Considering the financial aid the United States gives to Colombia and the devastating effects that coca production in Colombia has on the world, can the U.S. and the EPA impose regulations regarding the carbon dioxide emissions from deforestation in Colombia, based on *Massachusetts v. EPA*? There, the court held petitioners had standing to challenge the EPA's denial of their rulemaking petition due to having a concrete injury.[171] Additionally, the court held the EPA has the authority to regulate greenhouse gas emissions from motor vehicles because the gases are

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[162] *Id.*

[163] Environmental Consequences of the Drug Trade, www.megalink.com (last visited Oct. 20 2007).

[164] Coca and the Colombian Environment, www.colcocacase.com (last visited Oct. 10, 2007).

[165] Environmental Consequences of the Drug Trade, www.megalink.com (last visited Oct. 20 2007).

[166] Biodiversity, www.wikipedia.org (last visited Aug. 9, 2007).

[167] Doomsday or Arbor Day, www.strategies.org (last visited Dec. 28, 2007).

[168] Ecological Effects of Biodiversity, www.wikipedia.org (last visited Aug. 10, 2007).

[169] RCA Issue Brief #3, Agriculture and Climate Change, October 1995.

[170] *Id.*

[171] Massachusetts v. Supreme Court of the United States, 127 S. ct. 1438 (2007 U.S. LEXIS 3785, 75 U.S.L.W. 4149, 63 ERC 2057, 37 ELR 20075, 20 Fla. L. weekly Fed. S 128).

within the Clean Air Act's definition of air pollution.[172] The court examined the Clean Air Act and the EPA's authority on its formation of a judgment, and determined the judgment must relate to whether or not the air pollutant contributes to air pollution and endangers public welfare.[173] An air pollutant is any physical, chemical, biological, or radioactive substance that enters the air and welfare includes effects on weather and climate.[174] In *Massachusetts v. EPA*, man-made greenhouse gases, pollution, and deforestation are recognized as contributors to climate change.[175] Carbon dioxide, methane, and other greenhouse gases were classified as physical and chemical elements that enter the air, and therefore are air pollutants.[176] Harms resulting from climate change include rises in sea levels, increases in floods, changes to ecosystems, reduction in winter snowpack, spread of diseases, and weather changes[177] The EPA did not deny a causal connection between man-made greenhouse gas emissions and global warming, which the court found had contributed to the plaintiff's injuries.[178]

Deforestation has been identified as a contributor to climate change.[179] In Colombia, coca farmers are destroying tropical forests, a direct form of deforestation.[180] These ruined trees release excessive carbon dioxide and methane into the atmosphere.[181] The gases released are air pollutants because they are chemical and physical elements that are entering the air, as in *Massachusetts v. EPA*.[182] Public welfare has been affected in Colombia because of the temperature.[183] Excessive rain reaches the ground due to the protective forests being slashed and burned.[184] In Colombia, the deforestation has led to concrete injuries, such as flooding, changes in the tropical forests eco-systems, destruction of habitats, soil erosion, and contaminated waterways,[185] as in *Massachusetts*. The EPA cannot

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[172] *Id.*
[173] *Id.*
[174] *Id.*
[175] *Id.*
[176] *Id.*
[177] *Id.*
[178] *Id.*
[179] *Id.*
[180] Deforestation, www.wikipedia.com (last visited Oct. 10, 2007).
[181] Environmental Consequences of the Drug Trade, www.megalink.com (last visited Oct. 20 2007).
[182] Massachusetts v. Supreme Court of the United States, 127 S. ct. 1438 (2007 U.S. LEXIS 3785, 75 U.S.L.W. 4149, 63 ERC 2057, 37 ELR 20075, 20 Fla. L. weekly Fed. S 128).
[183] Earth Observatory, www.virtualcentre.org (last visited Nov. 10, 2007).
[184] Deforestation, www.wikipedia.com (last visited Oct. 10, 2007).
[185] Doomsday or Arbor Day, www.strategies.org (last visited Dec. 28, 2007).

justifiably deny the connection between deforestation in Colombia and global warming, which exacerbates the country's injuries, as in *Massachusetts*. The EPA regulates fumigation and herbicides in Colombia, so it can not deny the authority to regulate the emissions in Colombia just because it is another country.[186] It thus appears that the EPA has the right to regulate greenhouse gas emissions in Colombia.

V. CONCLUSION

The government has attempted to stop the manufacturing of meth through the criminal laws and penalties imposed for cooking meth. However, there has been minimal progress on the reduction on the drugs' production or its effects on the environment or agriculture. Society suffers because meth is poisoning waterways, ruining open land, harming wildlife, and contributing to air pollution. Farms are destroyed and farmers face financial ruin due to meth dump sites on their property. The government has done little to help farmers with the financial burden. The General Fund account was recently created to assist farmers with a portion of the fees for cleaning up the waste left behind by meth cookers. Unfortunately, they are not able to fully recovery for their losses, are often forced into bankruptcy, and their farms are shut down. Programs need to be implemented to help farmers with the excessive fees, which are out of their control and due to no fault of their own.

Like the American government, the Colombian government has been unable to stop the coca production. However the main difference is that they are relying on the U.S., financially and technologically, to assist in the disintegration of cocaine production. In attempting to fumigate the coca bushes, the herbicides created additional environmental and agricultural problems. Crops and livestock were destroyed, and Colombian farmers were financially devastated. The U.S. enacted Plan Colombia to ensure the herbicides were EPA-regulated and also compensated farmers for destroyed crops. Although Colombia is attempting to resolve the cocaine production problem, they are doing little to compensate their farmers for losses. Just as Colombia should be reimbursing their farmers for lost crops and farmland, the U.S. should be concentrating on cleaning up meth dumpsites and financially assisting innocent American farmers whose lives are being ruined by the illegal acts.

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[186] Pub. L. No. 107-115, Foreign Operations Appropriations Bills, Foreign Policy (2002).