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# People and Ecosystems in Colombia

## *Casualties of the Drug War*

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Opposition to the “war on drugs” comes from numerous disparate camps, from libertarian scholars to moderate public-health officials to liberal activists for social justice. Concerns expressed by those seeking to change the way this “war” is waged are various and include criticisms of the inadequate resources devoted to treating drug addicts, the erosion of civil liberties at the hands of an increasingly powerful narcoenforcement complex, the disproportionate effect of drug-law enforcement on certain ethnic groups and economic classes, and the monumental wastefulness of a criminal justice system consumed with punishing nonviolent drug offenders. In this article, I discuss yet another reason to reevaluate the contemporary U.S. antidrug strategy: it directly threatens the health of people and ecosystems outside U.S. borders. My objective here is specifically to illustrate some of the negative effects that contemporary U.S. antidrug policy has on people and the environment in the Andean/Amazonian region of northwest South America. I begin with a brief look at the extent of coca production in the region, then consider some of the concerns that advocates of environmental protection and social justice have voiced with regard to antidrug efforts in this region. I then examine some social and environmental consequences of aerial chemical-herbicide spraying in Colombia, a primary component of a \$1.3 billion congressional aid package intended to support Bogotá’s antidrug Plan Colombia.

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## Background: Coca Production

A perennial shrub of the genus *Erythroxylum*, the coca plant thrives in poor, acidic soils that can support few other commercially cultivated crops. Most cultivated coca comprises only two species, *Erythroxylum coca* and *E. novogranatense*, although other related species exist in the wild and are cultivated sparsely for local use (Plowman 1986, 9). According to Patrick Clawson and Rensselaer Lee, “[coca] is currently grown almost exclusively in the Andean countries of Peru, Bolivia and Colombia . . . [but] can grow almost anywhere in tropical South America and in tropical regions of the world generally” (1996, 131). A coca bush begins to produce harvestable leaves within a year to a year and half of planting; its leaves can be harvested two to four times a year; and each plant can remain productive for up to twenty-five years (Clawson and Lee 1996, 132; Gardner 2001).

Although recent alternative-development programs have met with some success in reducing the production of coca in Bolivia and Peru, these reductions have been offset by skyrocketing production in Colombia (Clawson and Lee 1996, 18, 160; U.S. Office of National Drug Control Policy [ONDCP] 2001, 97). In fact, the area of land planted with coca in Colombia increased from approximately 41,000 hectares in 1992 to nearly 123,000 hectares in 1999 (Vargas 2000). The currently planted area is approximately 120,000 hectares (Will 2001).

Though the vast majority of coca goes to processors to be converted to coca paste and eventually to cocaine, some is marketed and used legally for medical and cultural purposes.<sup>1</sup> Legal consumption occurs primarily at the level of household use, as tea or various medical remedies. A far smaller amount goes to overseas pharmaceutical or other commercial interests, such as Coca-Cola, which derives some of its beverages’ “natural flavors” from coca leaves that have been stripped of their psychotropic chemicals (Clawson and Lee 1996, 136).

## Regional Environmental and Social Concerns

The Andean/Amazonian region where most of the world’s coca is grown, the main area targeted by drug eradication campaigns, is the subject of concern among environmental and social activists alike. This region contains diverse ecosystems (ranging from the Andean altiplano to the Amazon rain forest), innumerable species, and threatened indigenous peoples, so the preservation of its environmental integrity has tremendous instrumental and intrinsic value. Biological and chemical eradication programs threaten the region by degrading the environment, exposing people to toxic compounds, and involving local residents—whether active in the drug trade or not—in the war on drugs.

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1. For a thorough discussion of traditional uses of the plant in coca-producing regions, see Pacini and Franquemont 1986. Also see the United Nations Drug Control Program (UNDCP) 1997, 34–37.

Conservation of the natural environment of the Andean/Amazonian countries is of paramount importance to environmentalists because of that environment's vast biodiversity. Biological diversity, or *biodiversity*, is recognized by the United Nations Convention on Biological Diversity (UNCBD) to mean "the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems" (United Nations 1992, Article 2: Use of Terms). Colombia and its neighboring countries of the Amazonian/Andean region are extremely biodiverse. By some estimates, 10 percent of the world's terrestrial plant and animal species exist only in Colombia (Amazon Alliance and Washington Office on Latin America 2000). Luis Naranjo, director of international programs for the American Bird Conservatory, notes that "Colombia is recognized worldwide for having more species of wild birds than any other country . . . and seventy-five percent of [them] are considered . . . threatened" (Naranjo 2000). This biodiversity has both intrinsic and instrumental value for Western environmentalists and local indigenous peoples.

The value of biodiversity is immense. The UNCBD recognizes this value in the opening clause of its preamble: the members of the treaty are "Conscious of the intrinsic value of biological diversity and of the ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its components, [c]onscious also of the importance of biological diversity for evolution and for maintaining life sustaining systems of the biosphere, [and] that the conservation of biological diversity is a common concern of humankind" (1992).

As for the instrumental value of biodiversity, ecosystems provide humans with such goods and services as

food, fuel and fibre . . . shelter and building materials, purification of air and water, detoxification and decomposition of wastes, stabilization and moderation of the Earth's climates . . . generation and renewal of soil fertility . . . pollination of plants, including many crops, [and] control of pests and diseases. . . . Our personal health, and the health of our economy and human society, depends [*sic*] on the continuous supply of various ecological services that would be extremely costly or impossible to replace. (United Nations Environment Program 2000)

When biodiversity is threatened, as it is by some antidrug projects, the stability of ecosystems and their ability to continue to provide human societies with these vital goods and services are also threatened. This threat has implications for human populations far beyond the immediate ecologically imperiled region. In a global society, neither environmental nor economic isolation is possible. Natural resources are distributed widely from their points of origin, so changes in their availability have worldwide effects.

Biodiversity also has intrinsic value for people. Most cultures and societies identify closely in some way with the natural environment in which they exist. We adopt

images and ideas from nature as symbols; we attribute human or supernatural powers to elements or places in nature; we worship nature as our spiritual creator or as that creator's creation. The importance of biodiversity to indigenous peoples is specifically highlighted by the UNCBD, which "recogniz[es] the close and traditional dependence of many indigenous and local communities embodying traditional lifestyles on biological resources" (1992, preamble). The preservation of biodiversity has particular importance for advocates of the rights of indigenous communities.

Environmental protection, then, is closely related to another important priority for social activists concerned with the Andean/Amazonian region: the preservation of local and indigenous cultures. Hundreds of distinct indigenous groups inhabit the region; specifically, fifty-eight tribes inhabit the area targeted by Plan Colombia's renewed glyphosate-spraying campaign (Amazon Alliance and Washington Office on Latin America 2000). Indiscriminate coca eradication is culturally destructive for a number of reasons. Indigenous societies have used coca for nutritional, medicinal, and spiritual purposes for centuries (Pacini and Franquemont 1986). It contains an abundance of certain vitamins and minerals, including calcium, and its mastication provides an important supplement to many local diets, which may be deficient of vital nutrients (Constantino 2000). Chewing the coca leaf also suppresses the appetite, which is important in societies with unstable food supplies, and helps to mitigate the deleterious effects of high altitude on the human body. These indigenous societies have also recognized and utilized its psychotropic qualities in medicinal and religious activities.

Besides threatening the environment and the cultural integrity of Andean/Amazonian peoples, some of the methods used to eradicate coca also violate the legal rights of these peoples. Article 79 of the Colombian Constitution states that "all people have the right to enjoy a healthy environment." Antidrug activities that degrade the environment flagrantly violate this constitutionally guaranteed right. They also contradict international agreements, such as the UN High Commissioner for Human Rights (UNHCHR) Declaration of the Principles of International Cultural Co-operation, which affirms in Article 1 that "each culture has a dignity and value which must be respected and preserved" (1966), and the Inter-American Program of Action of Rio de Janeiro against the Illicit Use and Production of Narcotic Drugs and Psychotropic Substances, which states that "policies to reduce the demand for drugs, prevent drug abuse, and combat unlawful trafficking in drugs must . . . be consistent with human rights, the basic claims to nationally and internationally recognized individual liberties and rights, respect for the traditions and customs of national and regional groups, and environmental protection" (Organization of American States [OAS] [1987] 1992, Principles and Objectives, #4). The Inter-American Program also stipulates that eradication of illicit crops should be undertaken by "biologically and environmentally sound methods" (OAS [1987] 1992, Chapter II, #6).

Clearly, there are many reasons to protect the environment in the Andean/Amazonian region. Biodiverse ecosystems have instrumental and intrinsic value for people locally and globally. People not only value but in fact have a legal right to a

safe environment. In the case study that follows, I examine how some contemporary coca-eradication policies threaten the integrity of the environment and the safety of human beings in Colombia.

## Plan Colombia and Glyphosate Fumigation

With financial support from the United States, the Colombian government has recently renewed its aerial herbicide-application program designed to eradicate coca and other narcotic crops. Colombia has relied on aerial spraying of herbicides as part of its efforts to eradicate drug crops since the late 1970s, but such efforts have had measurable success against coca only in recent years with the addition of Round-Up or other glyphosate-based herbicides to the arsenal (Clawson and Lee 1996, 219). After a decade of scant success, the Colombian government in 1994 decided to get serious about coca eradication. The result was an intense spraying campaign that eradicated between one-third and one-half of Colombia's coca crop in each of the following five years (Clawson and Lee 1996, 219; Vargas 2000). Notwithstanding the campaign's apparent success, the total area under coca cultivation and the amount of this area that escaped eradication have actually increased during the past decade (Vargas 2000).

Plan Colombia, Bogota's \$7.5 billion antidrug and government-strengthening program, represents a continuation and escalation of this ineffective eradication strategy. In its final form, U.S. support for Plan Colombia for fiscal year 2001 allocated \$1.018 billion for bilateral economic assistance to Colombia and \$184 million for Department of Defense operations in support of regional antinarcotics efforts. Of the bilateral aid package, \$180 million was earmarked for assistance (for interdiction and alternative development) to Peru, Bolivia, Ecuador, and other Latin American and Caribbean countries, and \$70 million for Treasury Department and U.S. Customs regional operations (see H.R. 4425 2000). Approximately three-fourths of the remaining bilateral aid was directed toward Colombian military and National Police programs—in addition to \$330 million in ongoing aid allocations, most of which was also dedicated to military and police programs (Center for International Policy [CIP] 2001a; H.R. 4425 2000). The remaining one-fourth of the U.S. aid package to Colombia was designated for alternative-development programs (\$68.5 million), refugee aid (\$37.5 million), human rights protection (\$51 million), judicial reform (\$13 million), law enforcement (\$45 million), and the peace process (\$3 million) (CIP 2001a; H.R. 4425 2000).

A primary focus of Plan Colombia is the "Push into Southern Colombia," to which the U.S. aid package allocated \$390.5 million "to support the Government of Colombia's objective to gain control of the drug producing regions of southern Colombia" (H.R. 4425 2000). The southern provinces of Putumayo and Caqueta produce more than half of Colombia's coca, and they have been targeted for intense fumigation (Forero 2000, Marquis 2001b). Of the \$390.5 million allocated for the "Push into Southern Colombia," \$10 million was earmarked for alternative development in the

region and \$15 million for the “temporary resettlement and employment” of the anticipated flood of internal refugees—residents of Putumayo and Caqueta driven from their homes and lands as a result of the spraying campaign (H.R. 4425 2000). The remaining \$365.5 million was for military and police activities in southern Colombia.

Six conditions were placed on the disbursement of this aid package to Colombia. These conditions primarily required certification that Colombia’s military and government were adequately protecting human rights. Subsequent to congressional passage of the legislation and in anticipation of Colombia’s being unable to meet these human rights requirements, President Clinton exercised his option to waive, for reasons of “national security,” the certification requirement for all but one of the conditions (CIP 2001a). The net result of the plan, as currently implemented, is that Colombia is now the third largest recipient of U.S. military aid, yet its human-rights record, which historically has been deplorable, is subject to very limited scrutiny (J. Wilson 2001).

Colombian and U.S. government officials are cautiously declaring victory in the campaign so far. The first six weeks of intense spraying occurred late in 2000 and early in 2001, with most of the effort focused in Putumayo and Caqueta (Contreras 2001; Forero 2001; Marquis 2001a, 2001b). Officials estimate that this initial phase of the campaign destroyed more than a fourth of the coca crop in the southern provinces and as much as 36,000 hectares nationwide (Hodgson 2001; Marquis 2001a, 2001b; Peña 2001).

The social and environmental consequences of Plan Colombia are already apparent. The chemical-herbicide eradication strategy, facilitated by the U.S. government’s billion-dollar aid package, is highly deleterious to the environment and to the people residing in or near target spray zones. Glyphosate is a nonselective herbicide; any plant sufficiently dosed with it will die (Naranjo 2000). In Colombia, nontarget crops killed by the aerial spraying campaign have included food staples such as plantains, yucca, and corn (Hansen 2000). Ivan Gerardo Guerrero, governor of Putumayo, claimed in mid-March 2001 that of the roughly 30,000 hectares affected by the previous six weeks’ spraying, approximately half was planted with basic food crops instead of or in addition to coca (“Colombian Politicians Decry” 2001). In Putumayo, government officials have already recorded more than eight hundred cases in which legal crops have been destroyed by the spraying (Hodgson 2001). In the Putumayo town of La Hormiga alone, officials have registered hundreds of individual complaints of crop damage, livestock illness, and human illness caused by exposure to the herbicide, which some say was dropped within the town proper on several occasions (S. Wilson 2001a; Williams 2001). Edmundo Meza, mayor of La Hormiga, joined eight provincial governors in denouncing the glyphosate spraying, which he claims “has plunged [the region] into a crisis. . . . Even the cattle are going hungry because the herbicide dries out the pasture” (Contreras 2001, 22).

Although the direct toxicity of glyphosate-based herbicides is itself environmentally destructive, the unintended destruction of food crops has the secondary effect of increasing deforestation. When food crops are eradicated, the farmers are often forced to clear an

area of forest equal to the destroyed cropland to replant. Other problems with glyphosate spraying are the inaccuracy of its application and the consequent unintended contamination of nontarget areas. In terrestrial application of glyphosate, 14 to 78 percent of the chemical never reaches the target site. Helicopter applications usually result in 41 to 82 percent off-site drift, and airplane application (the prevailing method in Colombia) involves even higher rates of drift, as far as eight hundred meters from the boundaries of target areas (Nivia 2000). Although, according to U.S. embassy officials in Colombia, spraying follows computer-designed low-altitude flight paths, some campesinos have reported seeing planes spraying from high altitudes as well (Hotakainen 2000a, S. Wilson 2001a). David Olsen, director of the World Wildlife Fund conservation science program, estimates that “for every hectare of forest sprayed, another is lost to [pesticide] drift and another to additional clearing [to compensate for] displaced crops” (qtd. in Hansen 2000).

Glyphosate spraying not only poses a danger to plants, but has “well-documented deleterious effects on soil micro-organisms, mammalian life (including humans), invertebrates, and aquatic organisms, especially fish” (Amazon Alliance and Washington Office on Latin America 2000). Residents of sprayed zones have reported headaches and dizziness as well as eye, respiratory, skin, and digestive problems as a result of exposure to glyphosate (Amazon Alliance and Washington Office on Latin America 2000; Contreras 2001; Forero 2001). In the United States, where glyphosate is widely used in commercial and domestic herbicides, the chemical is classified by the Environmental Protection Agency (EPA) as a level III pesticide (USEPA 1993).<sup>2</sup> Because of its toxicity and widespread use, glyphosate has been the subject of numerous investigations involving occupational poisoning (Nivia 2000).<sup>3</sup> The International Chemical Safety Card designed by the International Program on Chemical Safety and the Commission of the European Communities warns that glyphosate “can be absorbed into the body by inhalation of its aerosol and by ingestion . . . [and that] a harmful concentration of airborne particles can . . . be reached quickly on spraying or when dispersed” (1993). This document cautions that exposure “irritates the eyes and respiratory tract,” and ingestion may cause diarrhea, shortness of breath, vomiting, and weakness. It advises preventing the dispersion of glyphosate dust, using local exhaust or breathing protection to avoid inhalation of fine dust and mist, and wearing protective gloves and safety goggles when working with glyphosate. Taking such precautions is hardly universally feasible in the Putumayo campesino community.

Exacerbating the harmful effects of glyphosate itself is the chemical brew in which it is most often used. Glyphosate is the active ingredient in a number of domestically and internationally used commercial herbicides, the best-known of which is Monsanto's Round-Up. Ironically, some of the “inert” ingredients in Round-Up actually

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2. Toxicity is based on the extent of damage to human health as a result of different levels of oral, respiratory, and ocular exposure to a chemical.

3. Studies by researchers from the University of California at Berkeley found glyphosate to be the number one cause of pesticide-related illness among landscape workers and the number three cause among agricultural workers (Pease et al. 1993; Robinson et al. 1994).

pose more risk to humans than glyphosate itself (Cox 1995a, 1995b). Polyoxyethylamine (POEA), which is more toxic to humans than glyphosate, and certain dioxins, which are strongly suspected to be carcinogens, are sometimes included among these “inert” ingredients (Nivia 2000). Round-Up is classified in the United States as a level II chemical—highly toxic—but in Colombia it is identified as only a level IV toxin (Nivia 2000). According to the U.S. Department of State’s *Report on the Effects on Human Health and Safety of Herbicides Used in the Colombian Aerial Spray Program* (2001), the chemical formulation currently in use in Colombia is composed of a glyphosate compound with unnamed “inert” ingredients and two identified additives: Cosmoflux-411F, a surfactant, and Cosmo-In-D, an antifoaming chemical. Critics of the spraying charge that insufficient research has been conducted to verify the safety of this chemical mixture, given that the synergistic effects of multiple chemicals acting in concert are often more significant than the effects of each chemical alone (Acción Andina, Transnational Institute, and Rapalmira 2001). The risks that aerial spraying of Round-Up and other glyphosate formations pose to humans and the environment are clear and present enough to warrant more investigation.<sup>4</sup>

### Militarization and Civil War

Plan Colombia also threatens Colombians by supporting militarization of antidrug efforts. Militarization of the drug war undermines democracy in producer nations by encouraging militaries and police forces to target their own citizenry as enemies (Mabry 1994, 51). U.S. military antidrug aid plays a key role in regional conflicts that endanger human rights, including the ongoing civil war between the government, the Marxist Revolutionary Armed Forces of Colombia (known by its Spanish acronym FARC), and other paramilitary forces in Colombia.

For more than thirty years, guerrilla groups (most notably the 17,000-member FARC and the 5,000-member Castroite National Liberation Army [known by its Spanish acronym ELN]) have engaged the Colombian government in an armed struggle (Jenkins 2000–2001). Also involved in the armed conflict are right-wing paramilitary armies, some of which are the private forces of large landowners and others of which operate independently (Jenkins 2000–2001). Both extragovernmental parties are deeply involved in the drug trade. By some estimates, the FARC receives as much as \$1 million a day in drug profits, principally by taxing the sale of coca crops in the areas it controls (Contreras 2001; Jenkins 2000–2001). Some paramilitary groups similarly have a vested interest in the drug trade for purely economic reasons. Recognition of such interest carries with it, however, the responsibility to acknowledge the legitimate political objectives of the FARC and other revolutionary forces.

The social and political issues raised by the intersection of Marxist insurgency, rural poverty, U.S. intervention, and drug-crop cultivation are complex. Of particular

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4. For an excellent summary of the environmental and human health dangers associated with glyphosate and the commercial formulations in which it is used, see Cox 1995a, 1995b.

importance is the exploitation of drug war rationale and resources to justify involvement in an ideological conflict. In other words, U.S. intervention in Colombia is accepted because of its ostensible antidrug objectives, but its effects extend beyond the sphere of drug control. The FARC's involvement in the drug trade invites a conflation of U.S. antidrug and counterinsurgency interests. Whether intentionally or incidentally, labeling guerrillas as "narcoterrorists" justifies U.S. involvement in Colombia's civil war.

Under Plan Colombia, the greater part of \$1.3 billion in U.S. aid goes to military and police forces, and may very well be used in Colombia's civil war. This ongoing civil war has been rife with human rights abuses, committed as frequently by the government's military as by guerrilla and paramilitary forces, and it has forced some two million people to flee their homes (Hotakainen 2000b). U.S. "antidrug" aid that supports the Colombian military must be implicated in these human rights abuses and in the expected increase in refugee numbers as a result of Plan Colombia's fumigation campaign (Chalk 2000). Destabilization of Colombian society and culture through the escalation of civil war and the inflation of an already enormous internal refugee population are further consequences of drug war policy.

## Critical Response

The social and environmental costs of Plan Colombia have been duly recognized by much of the international community, notably by the European Union, whose Parliament voted 474 to 1 to condemn the plan (Carrigan 2001). In its *Resolution on Plan Colombia and Support for the Peace Process in Colombia*, passed in January 2001, the Parliament expressed concerns about Plan Colombia's implications for the environment, human rights, and Colombia's civil war. The text of the resolution warrants quotation at length because it demonstrates that an international governing body shares many concerns about Plan Colombia with private-sector social and environmental activists:

whereas one of the objectives of Plan Colombia lies in stamping out drug trafficking and the spread of illegal crops by means of a strategy which favours aerial crop-spraying and the use of biological agents, methods which are leading to the forced displacement of families and communities and are seriously affecting Colombia's rich biodiversity . . . [the European Parliament] [b]elieves that stepping up military involvement in the fight against drugs involves the risk of sparking off an escalation of the conflict in the region, and that military solutions cannot bring about lasting peace. . . . [The Parliament] expresses particular concern at the current situation in the Putumayo region . . . [and is] convinced that, in the fight against illegal crops, negotiated and agreed solutions, agrarian reform and alternative crops, together with criminal proceedings against traffickers and money launderers, should take precedence over crop-spraying campaigns; [it] believes in this regard that the Union must take the necessary steps to secure

an end to the large-scale use of chemical herbicides . . . given the dangers of their use to human health and the environment alike; [and] [h]ighlights the importance of strengthening regional cooperation and dialogue on the basis of the principle of international coresponsibility, given that past experience in the fight against illegal crops has shown that tackling this problem in one country alone merely serves to transfer it to neighbouring countries. (European Parliament 2001, ¶¶ 4, 8, 9, 10 of Preamble, ¶ 1 of Declaration)

Government officials, nongovernmental organization (NGO) representatives, and community leaders in Putumayo expressed similar concerns in their June 2000 rejection of Plan Colombia's spraying campaign:

Whereas . . . fumigation . . . is considered an attack against human life, the community and the environment . . . [t]he problem of coca and poppy cultivation includes social, economic and environmental dimensions that should be addressed in policy formulation, [t]he policy of eradication of coca and poppy in Colombia should be the result of a consultation process with affected communities and democratically elected leaders, [and] [s]trengthening the social fabric should be a priority, and any actions undermining this process should be rejected. . . . We declare . . . [o]verwhelming and unanimous rejection of the national government's policy of coca and poppy eradication by aerial fumigation using chemical or biological substances. ("Putumayo without Coca" 2000)

Thus, criticism of Plan Colombia clearly has not been limited to a handful of environmental or social activists. Local and international governing bodies have given due attention to the plan's consequences for Colombia's people and environment, and have roundly condemned its severe shortcomings.

### **An Alternative Strategy**

Alternative-development and crop-substitution programs are included in Plan Colombia, although they are given minimal attention. Their inclusion reflects a growing awareness of the necessity of supplementing coca eradication with economically viable alternatives to coca production, and it is worth noting some of the successes and challenges of alternative-development efforts so far.

In Colombia, the alternative-development program overseen by Colombia's government agency for alternative development (PLANTE) and financed by Plan Colombia offers small coca producers—those cultivating less than eight acres of the illicit crop—the resources to replant their land with legal crops or to invest in alternate business ventures in exchange for voluntarily eradicating their coca crops (DeYoung 2000; Forero 2000). By some accounts, the agreement originally promised \$4,000 or its equivalent in agricultural resources to each participating farmer (S. Wilson 2001b).

The current voluntary eradication social pacts offer resources valued at \$1,000 to each participant (CIP 2001b). This lesser amount has nonetheless sufficed to attract some Colombian coca growers. In the southern town of Puerto Asis alone, more than 500 farmers have signed up for the alternative-development program. These farmers pledge to destroy existing coca crops within a year, and some 150 farmers who currently do not grow coca promise not to begin cultivating it (S. Wilson 2001a). Many participating farmers have yet to see any aid, however, because alternative-development funding has been tied up in administrative battles within and among government agencies and NGOs contracted to implement alternative-development projects (CIP 2001b; Engel 2001; Hodgson 2001).

Farmers who want to switch from coca to alternative crops face a number of ecological, geographical, and economic barriers, however (Clawson and Lee 1996, 148–50). Ecological barriers generally pertain to the feasibility of cultivating other crops on land currently used for coca. Because coca is such a hardy plant, it may be grown in poor soils on steep, rocky slopes, where few other crops would thrive. Geographical barriers include remoteness from markets and lack of transportation infrastructure in many coca-growing regions. These factors, like economic barriers such as the lack of adequate or stable markets, reduce the profitability of alternative crops. Great incentives to grow coca constitute another barrier to alternative development: significant yields are produced within two years of planting, and the profits of coca cultivation are approximately double those of the next best legal crop (Clawson and Lee 1996, 145, 152).<sup>5</sup> Clawson and Lee argue that coca growers will embrace crop substitution when the price of coca drops or when the cost of its production increases so that profits are reduced (1996, 153–54).

To date, the economic incentives to switch to alternative crops have not been sufficient in Colombia to encourage coca producers to make the switch in significant numbers. Eduardo Gamarra, director of the Latin American and Caribbean Center at Florida International University in Miami, says generally of crop substitution: “when you cost in all the money you’re going to invest, this is not the most rational market-driven mechanism” (qtd. in Forero 2000, A8). This pessimism rings true to the 43 farmers participating in an organic coffee crop-substitution program in La Sierra, Colombia: they earn roughly a 36 percent return on their investment, whereas the rate of return for coca farmers in the area is 59 percent (DeYoung 2000). Analysts such as Gamarra and George Wachtenheim, director of USAID in Colombia, advocate strategies that combine economic incentives to eradicate illicit crops voluntarily and meaningful punishment for refusal to comply with eradication programs (Forero 2000).

Alternative-development efforts face serious challenges, but they have managed to engage some Colombians and continue to show promise. In light of the severe

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5. A 1993 study conducted in UNDCP development-project areas of Colombia found coca to be significantly more profitable per hectare than any licit crop included in the study, yielding nearly six times the net income per hectare as coffee, the next most profitable legal crop (Clawson and Lee 1993, 41).

social and environmental consequences of Plan Colombia's glyphosate spraying, crop substitution and other economic incentives should receive more attention as an alternative to compulsory eradication.

## Conclusion

More than ten years of aerial herbicide spraying have failed to curb a consistent increase in Colombia's coca production. In response to such frustrating failures, U.S. policymakers have opted to escalate eradication efforts rather than to invest seriously in alternative strategies. The consequences of Colombia's ongoing chemical-herbicide-based eradication campaign are manifold, including degradation of individual rights, environmental damage, and hazards to human health. Thus, both social justice and environmental values are being sacrificed in the design and implementation of drug-war policy in Colombia, as the zeal to eradicate narcotic crops assumes primacy over environmental and social concerns.

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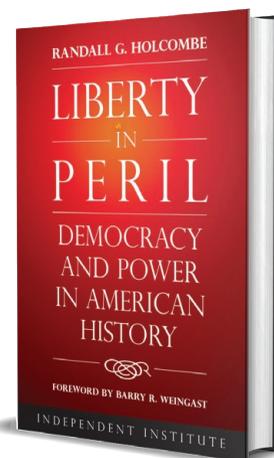
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