

SUBSCRIBE NOW AND RECEIVE *CRISIS AND LEVIATHAN** FREE!



"*The Independent Review* does not accept pronouncements of government officials nor the conventional wisdom at face value."

—**JOHN R. MACARTHUR**, Publisher, *Harper's*

"*The Independent Review* is excellent."

—**GARY BECKER**, Noble Laureate in Economic Sciences

Subscribe to [*The Independent Review*](#) and receive a free book of your choice* such as the 25th Anniversary Edition of *Crisis and Leviathan: Critical Episodes in the Growth of American Government*, by Founding Editor Robert Higgs. This quarterly journal, guided by co-editors Christopher J. Coyne, and Michael C. Munger, and Robert M. Whaples offers leading-edge insights on today's most critical issues in economics, healthcare, education, law, history, political science, philosophy, and sociology.

Thought-provoking and educational, [*The Independent Review*](#) is blazing the way toward informed debate!

Student? Educator? Journalist? Business or civic leader? Engaged citizen? This journal is for YOU!



*Order today for more **FREE** book options

SUBSCRIBE

Perfect for students or anyone on the go! *The Independent Review* is available on mobile devices or tablets: iOS devices, Amazon Kindle Fire, or Android through Magzter.



Sustainable Development and Institutional Failure

The Case of Ecuador

— ◆ —

FRANKLIN LOPEZ

The conservation of resources and the abatement of pollution are among the most important challenges that humankind faces. *Sustainable development* is defined broadly as resource use that will leave future generations at least as well off as current generations. Clearly, sustainable development will not take place if resources are depleted or exhausted or if the quality of the environment tends to deteriorate. A growing number of environmentalists believe, in opposition to those who believe in a command-and-control approach, that the market is the environment's best ally; hence, they oppose the heavy hand of government regulation and control of resource use. A substantial literature has appeared recently that focuses on property rights as a solution to ecological problems (Hana, Folke, and Mäler 1996; Anderson and Higgins 2003; Raymond 2003). As Kenneth Arrow points out, "When private property fails, economists usually think of state intervention, in the form of regulations or substitutes for prices (taxes or subsidies, for example). But human societies have long faced the problems of free access and frequently have created social institutions to regulate them" (qtd. in Hana, Folke, and Mäler 1996, xiv). Much research still needs to be done on alternative collective arrangements—those not involving government coercion—to ameliorate environmental problems. Nevertheless, in order to avoid the application of inappropriate remedies, it is important to identify the true sources of the problems before turning to alternative policies.

My purpose in this article is to demonstrate that the sustainable-development problems of Ecuador arise not from market failures but from institutional failures—that is, from dysfunctional institutions and ill-conceived rules and regulations that limit or impede the capacity of market forces to reach optimal solutions.¹

Franklin Lopez is an adjunct professor of economics at the University of New Orleans and Tulane University. *The Independent Review*, v. IX, n. 3, Winter 2005, ISSN 1086-1653, Copyright © 2005, pp. 339–351.

Table 1
Comparative Representation of Biodiversity

	Number of Species		
	Ecuador	World	Percentage
Birds	1,559	9,064	17.2%
Mammals	324	4,320	7.5%
Reptiles	381	5,067	7.5%
Plants	25	250	10.0%

Source: Manosalvas, Mariaca, and Estrella 2002, 66.¹

An Ecological Crisis: The Case of Ecuador

Ecuador is typical of many developing countries. Although it is rich in natural resources, it has a low standard of living, among the poorest in Latin America. It produces approximately four hundred thousand to five hundred thousand barrels of oil per day (until 1994, it was a member of the Organization of Petroleum Exporting Countries [OPEC]), and its estimated gold reserves place it fourth among gold producers. It is the world's largest exporter of bananas and the largest exporter of tuna fish in the Americas.

According to the World Resources Institute (1995), Ecuador is one of the few countries on earth categorized as “megadiverse,” owing to the variety of its ecosystems and species. Table 1 shows a comparative representation of the number of species living in Ecuador, as reported by Manosalvas, Mariaca, and Estrella (2002). Considering the size of the country (283,560 square kilometers, or slightly smaller than Nevada), the percentage of species is extremely high.

Manosalvas, Mariaca, and Estrella also report that in comparison with other countries in the Americas, only Brazil has a larger number of species in all categories. Nevertheless, in view of the much smaller size of Ecuador, it is certainly one of the most biodiverse countries in the world.

Within three hours, one can drive in Ecuador from arctic tundra to sweltering beaches, from a temperate pine forest to a tropical wet forest, from a desert landscape to wetlands filled with mangroves. Ecuador is also the most ethnically diversified country in Latin America, a home to large Arab, Asian, Caucasian, African, and Jewish populations. In the Native Indian population, one can find tribes living in very primitive conditions, from those who were recently headshrinkers to the most entrepreneurial *otavaleños*, known around the globe for the quality of their textiles.

1. The *institutional failure* concept employed here follows that defined by the Neoinstitutional School of Economics (Mercurio and Medema 1997, 130–56).

Table 2
Comparative Biodiversity

	Number of Species				Total Species
	Amphibians	Reptiles	Birds	Mammals	
Ecuador	402	381	1,559	324	2,666
Colombia	407	383	1,721	359	2,870
Peru	251	297	1,703	361	2,612
Brazil	516	467	1,622	428	3,033
United States	205	263	700	234	1,402

Source: Manosalvas, Mariaca, and Estrella 2002, 64.

Despite Ecuador's richness and diversity, its gross domestic product (GDP) per capita in 2002 was the same as it had been in 1979; thus, in more than two decades, no improvement took place in the standard of living, at least as measured by this conventional statistic. The government controls directly 71 percent of GDP,² a larger percentage than in mainland China at the outset of its reforms. The *Index of Economic Freedom* published by the Heritage Foundation (2004) classifies Ecuador as "mostly unfree," with a rank of 126, just two places ahead of China. And, of course, Ecuador suffers serious ecological problems, too.

Ecuador's Ecological Crisis, According to Certain Environmentalists

According to the Natura Foundation, an environmental nongovernmental organization (NGO), approximately 50 percent of Ecuador is suffering from various degrees of soil erosion, and deforestation is 45 percent in the lowlands, 48 percent in the highlands, and 8 percent in the Amazon basin. Thousands of acres of forest disappear daily, despite laws that prohibit the cutting down of trees and the exportation of wood. It has been calculated that deforestation amounts to 680,000 acres per year (approximately 2,000 per day), and in less than forty years not a single forest will remain. The Catholic University of Quito (Valencia et al. 2000) has conducted extensive research on the disappearance of endemic species. A summary of its findings is shown in table 3.

According to the same source, the quality of the environment is disastrous. All the soils of Ecuador have suffered the adverse effects of chemical products used in

2. The author has estimated this figure, considering the central, provincial, and municipal governments as well as government-owned and government-controlled enterprises such as banks, telecommunications, energy, and armed forces enterprises.

Table 3
Forest Cover Plant Species (Original and Remaining)
and Endemic Percentage

Type of Forest	Original	1988	Percentage Remaining	Number of Species Sampled	Endemic Species	Endemic Percentage
<i>Western Ecuador</i>						
Dry	20,000	200	1%	100	19	19%
Semidry	40,000	1,500	4%	100	14	14%
Wet	12,000	90	1%	170	34	20%
Rainforest	8,000	3,200	40%	230	59	26%
Subtotal	80,000	4,990	6%	600	126	21%
<i>Andean Region</i>						
Sidelands	61,000	18,000	30%	850	213	25%
Highlands	41,000	8,000	20%	200	50	25%
Subtotal	102,000	26,000	25%	1,050	263	25%
<i>Amazon Basin (Eastern Ecuador)</i>						
Andean Lowlands	39,000	11,700	30%	600	100	17%
Amazon Basin	42,000	30,000	71%	220	23	10%
Subtotal	81,000	41,700	51%	820	123	15%
TOTAL	263,000	72,690	28%	2,470	512	21%

Source: Valencia et al. 2000, 35.

agriculture, from pesticides to fertilizers. Almost all the rivers are contaminated with organic or inorganic material. All the large cities suffer smog problems, and still another type of pollution, city noise, exceeds the seventy-five-decibels level generally considered dangerous to human health.

So goes the litany of Ecuador's ecological problems. Unfortunately, when remedies are proposed, both the diagnosis and the cures are mistaken.

The Standard Diagnosis

According to many Ecuadorian environmentalists, deforestation results from the abandonment of "traditional agricultural techniques and the adoption of foreign techniques" (Santos Ditto 1997).³ These environmentalists also assert that deforestation springs from the use of timber as fuel, the opening of the frontier for agriculture and cattle grazing, the construction of highways, and similar activities.

3. All translations from Spanish-language sources are mine.

These environmentalists affirm that the poor quality of water stems from the indiscriminate use of chemical products, the ill distribution of water property (though the law says that all sources of water belong to the state), and the discharge of industrial and domestic wastes into the water. The air is polluted by automobile exhausts and industrial gas emissions; the noise arises from irresponsible drivers who care more about their own personal safety than they do about the damage they cause to society. Such claims exemplify an inability to identify correctly the root causes of these problems, and the proposed remedies seem always to be the same: more government control—an ecologically conscious bureaucracy or an environmental Gestapo.

The Standard Remedy

The standard diagnosis encourages efforts to educate the public about its responsibility for the problem—everybody ought to feel guilty about the damage done to the earth—and to demonize the profit seeking of businessmen, farmers, colonizers, developers, and others. Moreover, the standard diagnosis stimulates calls for the government to establish laws to protect the “rights of nature.”

The result is a proliferation of laws, regulations, and ordinances to safeguard the environment. In a volume of more than 450 pages, the Natura Foundation has compiled the Ecuadorian legislation created to remedy these problems. More than one hundred legal bodies now exist to regulate the environment, from the Constitution itself to the Ministry of Environmental Protection to municipal and local regulators.

A plethora of environmental “institutes” compose a confusing alphabet soup that includes the Instituto Nacional Ecuatoriano de Recursos Hidráulicos (INERHI), established to monitor water resources, and subsequently replaced by the Consejo Nacional de Recursos Hídricos (CNRH), the Instituto Nacional Ecuatoriano de Minería (INEMIN, mining), the Instituto Nacional de Hidrología y Meteorología (INAMHI, hydrology and meteorology), and many more. Few people know what these institutes do, how they are financed, or how they spend the money they receive.

The True Root of the Problems: Institutional Failure

A closer look at the crisis makes clear that Ecuador’s environmental problems arise from a number of failures in the institutional matrix: from rules that generate perverse incentives to a serious lack of enforcement and even to cultural idiosyncrasies. A major contributor to all of these problems is the country’s own Constitution.

The Constitution: The Main Source of the Problem

In Ecuador’s almost two hundred years as a republic, it has had eighteen constitutions. The most recent one took effect in 1998. According to that document, the

state has an obligation to maintain ecological equilibrium and to provide pollution-free air, abundant and pure water, and so forth. The following clauses illustrate the government's powers to enforce environmental policies:

- Article 3. Duties of the Government. Item 3. To defend the natural and cultural worth of the country and to protect the environment.
- Chapter 2. Of Civil Rights. Article 24, Item 6. The right to live in a healthy, ecologically balanced environment, free of pollution. The law will establish the restrictions to the exercise of certain rights and freedoms to protect the environment.
- Article 32. In order to make effective the right to housing and the conservation of the environment, the municipalities will be able to expropriate, reserve, and control the areas so deemed by the law.

The Constitution has a full chapter dedicated to the environment. According to this chapter, the state assumes responsibility for the population's right to live in a healthy, ecologically equilibrated environment that enjoys sustainable development. (It never defines precisely what is meant by these phrases.) Moreover, it declares that environmental quality is of public interest and that the law will regulate the preservation of the environment, the conservation of ecosystems, biodiversity, and the integrity of the genetic worth of the country. To meet these objectives, the state will promote the development of clean technologies and alternative nonpolluting sources of energy in both the public and the private sectors.

The state will also "regulate, under strict norms of biosecurity, the propagation in the environment, the experimentation, use, commercialization, and importation of genetically modified organisms."⁴

Moreover, the central government delegates to the provinces the power to promote or execute road construction, environmental protection, irrigation, and management of all hydrological sources within their jurisdiction. The province of Galapagos is to have special legislation.

Regarding the agricultural sector, the Constitution says that the state will guarantee the property of the land for production, but it will take all necessary measures to eradicate rural poverty, guaranteeing that objective through redistributive measures and access to resources by the poor. It will forbid *latifundios* (large, privately owned land units), and it will stimulate communal and cooperative production by means of integrating units of production. The state will also regulate colonization, both intended and spontaneous, with the purpose of preserving the environment and natural resources.

4. Under this provision, Ecuador should not be able to produce or import corn because all corn at present is man-made.

With respect to property rights, the Constitution declares:

- Article 30. Property, in any of its forms and as long as it carries out its social function, is a right that the State will recognize and guarantee for the organization of the economy. [Property] should foster the growth and redistribution of income, and should allow the population access to the benefits of wealth and development.
- Article 84. Item 2. [The State] will recognize the property of communal lands as imprescriptable, land not subject to embargo,⁵ inalienable, and indivisible, except for the faculty of the State to declare them for public utility.
- Article 247. Nonrenewable resources and, in general, underground products, minerals, and substances whose nature is different from the soil, even those areas covered by territorial waters, are inalienable and imprescriptable property of the State.

In summary, the Constitution is a litany of good intentions, but, as noted, it is ambiguous and clearly not a catalyst for the securing of private-property rights. Unless the true causes of Ecuador's ecological problems, such as ambiguous and erroneous legislation, are recognized, those problems are bound to continue and even to become worse.

Other Sources of Institutional Failures

The following statement by Morris Whitaker illustrates how the true source of ecological problems lies in an institutional matrix that generates perverse incentives:

The [Ecuadorian] State attempted to administer the renewable natural resources as public property in a larger proportion than in any other country of the world. The government owned all water resources in the continental region, all the mangroves in the Coast and swamp areas, and the majority of the forests. Approximately 40 percent of the surface of the country has been placed under a national park or reserves, more than twice that of Austria. Because these renewable resources were extensively used for agricultural production, the government was continuously trying to “protect” its interests against the exploitation of unauthorized land. The political structure essentially attempted to administer the natural resources according to an intense intervention of the State to control their access and use. (1996, 4)

Thus, the Ecuadorian government can expropriate, obligate, regulate, coerce, punish, and penalize anybody who violates the law. For example, Article 47 of the health code says that “all housing units must have a hygienic receiver for garbage disposal according to appropriate design.” In other words, a government official—from some unknown

5. This provision has the consequence that land cannot be used as collateral for loans because it cannot be repossessed.

agency—has the power to determine that a garbage can is not “appropriate,” and in that event a resident must pay a fine or go to jail.

The Biodiversity Law is also a perfect illustration that the root of institutional failure is in the design of the rule: “Article No. 1: All national goods of public use, the species that are part of the biological diversity of the country—that is, all living organisms of any source, the land and marine ecosystems, the aquatic ecosystems, and the ecological complexes of which they are part—belong to the nation.” According to constitutionalist Rafael Guerra Brigante, this provision means that “all citizens, streets, bridges, animals, plants, soil, weather—anything that exists within the territorial boundaries of Ecuador, be it land, water, or air—belongs to the State, and the President of the Republic has omnipotent rights to regulate this property” (1997). This condition is the judicial insecurity under which Ecuador operates and the reason why resources are disappearing rapidly.

Nonrenewable-Resources Problems

Ecuador has three main mining activities: for oil, construction materials, and precious metals. In each industry, problems arise from lack of private-property rights or from excessive government intervention.

The Petroleum Industry

Oil is the main economic resource of Ecuador, but it has been the source of many problems. Oil was discovered in the early 1970s by a Texaco-Gulf consortium in charge of exploring, producing, and pumping the oil. In the late 1970s, oil was nationalized under one company, Corporación Estatal Petrolera Ecuatoriana (CEPE). In the late 1980s, CEPE became PETROECUADOR, which currently manages the exploration, production, and distribution of petroleum. The environmental damages that have now surfaced began after CEPE acquired the Texaco-Gulf consortium.⁶

The root of all the oil problems in Ecuador is the country’s Constitution, which declares any underground resource to be the property of the state. Even if the oil industry were to be denationalized, the owners will never feel secure. Investment will always be short term, and the rate of exploitation will always be faster than it would be if property rights were not attenuated.

When a depletable resource is owned privately, it lasts according to the interest rate. When the interest rate is high, the rate of exploitation is faster than it is when the interest rate is lower. This relationship is called the Hotelling principle. When the resource is state owned, there is no clear basis for determining the rate of exploitation

6. However, ecologists sued Texaco-Gulf in a U.S. court for environmental damages. This suit is still under litigation in Ecuadorian courts because the U.S. court refused to hear the case.

or how long the resource should last. Political considerations and rent seeking dominate the decision-making process.

One of the reasons given for the nationalization of oil was the idea of “planting” the revenue or using it as “seed” for the future. The industry’s proceeds were supposed to go for education, highways, irrigation, and so forth. Instead, the money went to enlarge the public sector. Little of it was spent properly, and much of it was simply wasted. Hugo Carrillo calculates that from 1972 to 1989 the government should have received \$10.8 billion in taxes and royalties from Texaco-Gulf and CEPE, yet the proceeds from CEPE amounted to only \$6 billion (1993, 121–27). Hence, approximately \$4.8 billion was wasted (not shown in CEPE’s accounting books). Apart from this dissipation of wealth, Ecuador acquired a great deal of external debt because the country had oil.

Mineral Resource Problems

Next to oil, construction-materials mining and gold mining are the largest mining activities. The most serious problem with regard to mining mineral deposits for construction is that of price controls. The objective of these controls, supposedly, is to keep the prices of construction materials low in order to foster the construction of inexpensive houses. As economics textbooks show, however, price controls create artificial shortages and black markets. Furthermore, all the cement factories but one are government owned in Ecuador. Because of the oligopolistic structure of this industry, which has only four factories, shortages of cement occur from time to time, leading to rationing, with the usual consequence of political patronage, corruption, and special privileges obtained by labor through collective agreements. No wonder that housing shortages persist in Ecuador, along with the pervasive “informal” mining usually done under precarious conditions, resulting in several serious landslides.

The mining of gold and other minerals suffers from similar problems. No one can sell gold in the free market. The government pays gold miners an official price, usually below the free-market price. Foreign investment in the mining of gold or other precious metals is not allowed. The lack of property rights creates an “informal” market; miners use poor techniques and smuggle production.

Solid-Waste Treatment Problems

Ecuador’s interprovincial buses carry a sign that reads, “Be educated, throw your trash through the window.” As long as it is cheaper to throw garbage on “nobody’s land,” waste collection or recycling will be less attractive. A solution has been found, however, in Ecuador’s largest city, Guayaquil. There, garbage belongs to a cooperative called Los Chamberos, uniformed individuals who collect the garbage and “own it”—that is, they can do with it whatever is profitable.

Nevertheless, even their property rights are somewhat attenuated. If they leave the co-op, they forfeit their right. They can exclude others, but their rights are not transferable. If the municipal government registered them as proprietors, so that the state could give them full rights, they can use those rights as collateral—for example, to finance a garbage-processing plant.

Renewable-Resources Problems

As the Natura Foundation asserts, Ecuador has serious deforestation problems. Agricultural lands are eroding fast, and some fish species, such as *pepinos del mar*, are in danger of extinction. In each of these cases, the government intervenes in many ways, most often providing perverse incentives or placing obstacles in the way of efficient solutions.

The Deforestation Problem

In Ecuador, 43.5 percent of the land is covered by forests, with 30 percent of these forests consisting of mangroves and dry forests. Only six hundred square kilometers consist of fully developed permanent plantations.

The rate of deforestation has been estimated at 400,000 to 600,000 acres per year. Again, the problem arises because the state officially owns 10 percent of the national territory (Ampuero 1994, 5). The valuation of the land is distorted by perverse incentives such as price controls or those created by the agrarian reform laws and by inflationary policies (Ampuero 2002, 23–25). According to Article 48 of the Constitution, any uncultivated land (after more than two years) may be declared “unproductive” and subject to confiscation. Private forest owners, fearing that they may fall into this category, have proceeded to convert the land for agricultural purposes rather than run the risk of litigation. “Unused” land has been defined as land covered by some vegetation that is not commercially valuable and hence supposedly owned for speculative purposes only. This definition has meant that *paramo* land (a tundra-like land in the highlands) is subject to expropriation.

Colonization and migration laws also require that land be “used” profitably. The government admits the right to colonize the Amazon region, according to a law passed to help residents of a province that was suffering a severe drought. Under this provision, colonizers were allotted fifty hectares, but they had to clear at least 50 percent of the land. The armed forces were urged to help the colonizers, and they did so by constructing roads, by providing medicines and first aid, by building schools, and by providing other subsidies that accelerated the deforestation of the tropical forests.

Agricultural production, especially for exports, is subsidized, and this subsidy, of course, reduces the value of land as forest. The government fixes the price of bananas, usually above the international price, thereby encouraging their production at the expense of tropical forests. Although there are no price controls on rice or maize, the Ministry of Agriculture keeps an “informal” price list known as referential prices, which it uses to prevent “speculation.” Government agents regularly check the prices of agri-

cultural goods, and if they are out of line with these “referential” prices, speculators are harassed and frequently fined or put in jail. A recent minister of agriculture, Luis Macas, declared that “the laws of demand and supply cannot be applied to the agricultural sector, and that a Ministry would decree laws more in line with the domestic structure” (qtd. in Lopez 2003). Declarations of this kind make property rights less secure.

The state grants lumber concessions at low prices and for short periods of time (five to ten years), but it restricts the importation and exportation of wood. This restriction lowers the value of wood, limits plantation production, and stimulates “informal” markets. Any restriction diminishes the value of an asset. The structure of regulations lowers the value of land for forest use while it increases its value for agricultural use or cattle raising. In a promising move, a recent arrangement has been made between a private company (GIOBRE Inc.) and a university (Escuela Superior Politécnica del Litoral) to create a trust company to manage tropical forests. This project is still in its infancy, however, and it is too early to make predictions about its success, owing to the precarious nature of the property-rights agreement with the Ecuadorian government.

Land invasions are common in Ecuador. Politicians promote and encourage them because land invaders later become the constituents of those same politicians.

A quasi-market solution has been found in the definition of a *sanctuary* and the concession of its administration to NGOs. That solution was employed for the management of the sanctuary Pasochoa (a highland area), which was granted to the Natura Foundation. The Pasochoa highland is a desertlike area where only high grasses grow. The Natura Foundation has found native trees and is also developing an ecotourism niche. However, because the foundation was given only “custodial” rights, a minister revoked the concession and placed it under bureaucratic control. Fortunately, that decision has been reversed, but the danger continues because the property right has not been given in perpetuity.

In the highlands, land productivity has been falling, and erosion is a continuous problem. Once again the problem is that three-fourths of the agricultural land is communally owned, titles are not registered, and boundaries are not defined clearly. In most rural areas, no register of properties exists, which increases the insecurity of ownership.

Water is owned completely by the government. The CNRH, a government agency, operates and manages rivers, irrigation, and any water resource. Prices are set below marginal cost, which leads to excessive use, and there are no mechanisms to transfer water.

The Marine Resources Problem

The fishing industry in Ecuador suffers from the same tragic problems that plague it in many other parts of the world. Fishing is hurt by quotas, restrictions, and prohibitions. Restrictions increase the price of the resource, which creates an incentive to cheat, and black markets soon develop. Lobsters, crabs, *pepinos del mar*, and oysters are subject to seasonal bans; however, the bans are poorly enforced. Unscrupulous operators dominate black markets, where the law of the jungle dominates.

Shrimp farming is one of Ecuador's most important economic activities. However, shrimp farms are not completely privately owned. The Ecuadorian navy, which administers the coastline, has sold, given in concession, and operated shrimp farms. These farms have replaced many mangroves and have displaced some native fishermen from their traditional activities.

In 1996, the government granted "custody" rights to a fishing community in Jambeli (Altamirano et al. 1998), an island off the coast of Ecuador. There, 240 acres of mangroves were placed under the management of the local people. Although the area does not have all the attributes of private property (because the government kept ownership of it), the results have been dramatic. The area has been reforested. The marketing of seafood has improved, and new species have been introduced. The cutting of the mangroves has slowed, and the area's economic activity has diversified to other activities, including ecotourism. The main obstacle to the full concession of rights comes from the navy.

Conclusions and Recommendations

The case of Ecuador clearly demonstrates that command-and-control measures are ineffective in bringing about the preservation of resources or the maintenance of environmental quality consistent with sustainable development. In Ecuador, laws and regulations abound. What the country lacks, however, is a well-structured system of private-property rights. The solutions to the problems of resource conservation, environmental protection, and sustainable development must begin with an evaluation of the scope and penetration of private-property rights. These rights must be strengthened, deepened, and divulged in such a way as to make them "cultural" traits of the people.

To the extent that people become aware that private-property rights are the best means of safeguarding the environment, we will already have gone a long way toward promoting sustainable development. Where privatization (well defined and enforced private-property rights) proves impossible, second-best solutions, such as tradable fishing rights or pollution-emission quotas, may be adopted.

Emission taxes and subsidies may also be used, but only with a large caveat. They should be employed only as a last resort. Only when transaction costs are very high can this type of coercion be justified. Today, unfortunately, the command-and-control approach serves as the first resort, even though it is the method least likely to bring sustainable development to Ecuador.

References

- Altamirano, Manfred, Manuel Bravo, Rafael Elao, Ricardo Noboa, and Javier Rosero. 1998. *Otorgación en custodia, de un área de Manglar a un grupo de usuarios en el Estero Saca Mana*. Guayaquil, Ecuador: Programa de Manejo de Recursos Costeros (Convenio PMRC-ESPOL), November.

- Ampuero Pareja, Enrique. 1994. La conservación de los recursos naturales renovables y los derechos a la propiedad privada. *Ideas de Libertad* 13: 1–24. Guayaquil, Ecuador: Instituto Ecuatoriano de Economía Política.
- . 2002. Los nuevos desafíos de la agricultura ecuatoriana. *Ideas de Libertad* 74: 22–27. Guayaquil, Ecuador: Instituto Ecuatoriano de Economía Política.
- Anderson, Terry L., and Laura Higgins. 2003. *Property Rights: A Practical Guide to Freedom and Prosperity*. Stanford, Calif.: Hoover Institution Press.
- Carrillo, Hugo. 1993. *Las falacias del estatismo: El caso del petróleo*. Quito, Ecuador: Centro de Estudios y Análisis.
- Guerra Brigante, Rafael. 1997. La ley de Biodiversidad. *El Universo* (Guayaquil, Ecuador), June 19.
- Hana, Susan S., Carl Folke, and Karl-Göran Mäler, eds. 1996. *Rights to Nature: Ecological, Cultural, and Political Principles of Institutions for the Environment*. Washington, D.C.: Island Press.
- Heritage Foundation. 2004. *Index of Economic Freedom*. Washington, D.C.: Heritage Foundation.
- Lopez, Franklin. 2003. La economía no se maneja con decretos. *El Telegrafo*, February 17.
- Manosalvas, Rossana, Jorge Mariaca, and Jaime Estrella. 2002. Guia metodologica para el acceso de recursos genericos. In *La biodiversidad del Ecuador: Informe 2002*, edited by Carmen Josse, 60–78. Quito: Ministerio del Medio Ambiente, UICN.
- Mercurio, Nicolas, and Steven G. Medema. 1997. *Economics and the Law: From Posner to Post-Modernism*. Princeton, N.J.: Princeton University Press..
- Raymond, Leigh. 2003. *Private Rights in Public Resources*. Washington D.C.: Resources for the Future Press.
- Santos Ditto, José. 1997. Se quiere jugar a la gallina ciega. *El Financiero* (Guayaquil, Ecuador), June 23.
- Valencia, Renato, Nigel Pitman, Leon Yáñez, and Susana Jorgense. 2000. *Libro rojo de las plantas endémicas del Ecuador*. Pontificia Universidad Católica del Ecuador. Quito: Editorial Hojas y Signos.
- Whitaker, Morris D. 1996. *Evaluación de las reformas políticas agrícolas en el Ecuador*. Vol. 2. Quito, Ecuador: Instituto de Estrategias Agropecuarias (IDEA).
- World Resources Institute. 1995. National Biodiversity Reports. Available at: www.wri.org/wri/data/dces-642.html.