

Environmental Regulation and Sustainable Development

Theodore Panayotou with David Lozano and Marco Boscolo

Background paper examining the state of the Andean region for the
Andean Competitiveness Project

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INTRODUCTION

The Andean region has an abundance of natural resources (Tables 1 and 2). Rich in oil, minerals, fossil fuels, and tropical forests, these natural resources and their products are the region's major exports (See Table 2 in Braun and Sachs Chapter). A study by the World Bank (1997)¹ that attempted to correct traditional measures of wealth for natural resources abundance concluded that wealth in the region based on natural resources alone ranges from \$4,630 per capita in Peru to \$20,820 per capita in Venezuela. These estimates are higher than for many Western European nations and, in the case of Venezuela, higher than that of the United States.

Table 1. Summary Statistics on Population, Natural Resources in the Andean Region plus Argentina and Chile

		South America *	Andean Total	Bolivia	Colombia	Ecuador	Peru	Venezuela	Argentina	Chile
Population (000 for 1996)	¹	331,889	103,336	7,588	37,451	11,698	24,288	22,311	35,220	14,419
Land (000 hectares for 1995)										
Area	¹	1,752,000	456,000	108,438	103,870	27,684	128,000	88,205	273,669	74,880
Cropland and pastureland	¹	608,457	135,000	28,921	45,783	7,846	30,850	22,145	169,400	17,692
Forest (FAO 1997)	²	870,000	223,000	48,310	52,988	11,137	67,562	43,995	33,942	7,892
Water (cubic km)	³	9,526	2,580	300	1,070	314	40	856	694	468
Coastline length (km)	³	55,000	10,700	0	3,208	2,237	2,414	2,800		
Reserves of fossil fuels (petajoules)	³			5,634	150,090	16,002	40,521	579,860		
Reserves of other minerals (MM\$)	³			1,899	2,729	N/A	31,289	42,744		
Biodiversity resources (No. of species)	³									
Mammal				316	359	302	344	305		
Plant				16,500	50,000	18,250	17,121	20,000		
Bird				1,274	1,695	1,559	1,678	1,296		
Reptile				208	584	374	298	259		
Amphibian				112	585	402	315	199		
Freshwater fish				389	N/A	706	N/A	N/A		
% of forest habitat remaining	³			85.6	96.6	96.3	88.4	90.0		
1 The World Development Indicators 1998)										
2 The State of the World's Forest 1997, FAO										
3 World Resources Institute 1998-99 data tables										
* World resources 1998-99										

¹ World Bank (1997), "Expanding the measure of wealth: indicators of environmentally sustainable development." Washington, D.C.

Table 2. Mineral Reserves and Fossil Fuel Reserves in Andean Countries plus Argentina and Chile

		Peru	Venezuela	Bolivia	Colombia	Ecuador	Chile	Argentina
Copper (1998)	(Million Short ton/ metric ton)	4					160	
Iron (1990)	(Billion long tons)		3.3					
Silver (1998)	Thousands (1 metric ton =32150.7 troy ounces)	37						
Zinc (1998)	Million Short tons/metric tons	12						
Tin (1998)	Thousand long tons/metric tons	400		900				
Coal (1993)	Million Short tons	1168			5003		1302	
Crude Oil (1994)	Million barrels (beginning of year)	380.9	72600*	108.3	2600*	2100*	300	2600 *
Natural Gas (1996)	Billion cubic feet	7046	139900	4460	10000	3800	3900	18583

* Year 1998.

Source for copper, iron, silver, zinc, tin: U.S. Geological Survey, Mineral commodity summaries, several years

Source for coal: Energy Information administration/Energy review 1989 to 1996

(<http://www.eia.doe.gov/emeu/iea/table21.html>)

Sources for oil data: www.bpamaco.com/worldenergy/oil/index.htm (for 1997-1998)

Oil and Gas Journal/International Energy statistics sourcebook 1996. (for 1952-1996)

Sources for natural gas data: <http://www.bpamoco.com/worldenergy/naturalgas/index.htm>

International Energy Statistics Sourcebook 1996 (1967-1996)

Yet, recent scholarly work questions the often held assumption that abundance of natural resources favors sustained economic growth. As Sachs and Warner (1997) note, an inverse relationship exists between resource dependence and economic growth. The Andean countries fit this trend. The reasons for such inverse relationship are many. Economically, resource commodity prices are highly unstable and the terms of trade have historically been moving against resource exporters. Technologically, resource sectors such as oil extraction and logging have little technological know-how and skill content that is transferable to other sectors; furthermore, they offer little scope for entrepreneurial activity, innovation, and technological advancement. To the extent that economic growth comes from productivity growth, and productivity growth comes from the accumulation of knowledge and technological innovation, resource sectors fail to generate sustainable economic growth. Environmentally, natural resources are vulnerable to over-harvesting, degradation, and depletion. Furthermore, resource extraction results in environmental damage, depletion of environmental capital and loss of ecological services and amenities that are not easily replaced by technological and economic activities. Socially, natural resource dependence leads to socioeconomic disparities and social tensions; income inequalities and social tensions are most pronounced in resource-dependent economies². Furthermore, resource booms result in unrealistic levels of consumption that cannot be sustained at times of resource busts. As a result, they tend to exacerbate social tensions and demand for public subsidies. Politically, natural resource dependence leads to rent-seeking and corruption of politics. Instead of competition for improved efficiency, innovation and productivity growth, firms, industries, and special interests compete for subsidies and a bigger share of resource rents. Finally, prolonged natural resource dependence leads to retardation of

² IADB (1998), "Economic and Social Progress in Latin America: Facing up to Inequalities in Latin America". Available at http://www.iadb.org/oce/IPES98_eng/.

institutional development. Countries that rely on resource revenues to finance government expenditures often fail to develop efficient systems of tax collection, administration, and resource allocation. They have also failed to develop public institutions that are transparent and accountable, legal system that are not easily corruptible, and social institutions that are consensus-building and inclusive. In other words, prolonged dependence on natural resources for foreign exchange earning, governmental revenues and economic growth is likely to lead to economic stagnation, social tension, and environmental degradation.

It is clear that the region's reliance on natural resource extraction, particularly if poorly regulated, may impair competitiveness and to sustainable economic growth. A key element of a competitive and sustainable economy is the reinvestment of rents from natural resource exploitation (by the public and private sector) into other forms of capital. Only such reinvestment (outside the resource sector or within in, for example by exploiting emerging environmental markets) will enable the Andean countries to diversify their economy away from its current natural resource dependence. Another key element is the proper regulation of resources exploitation, use, and management so as to reduce economic vulnerability, resource degradation, and generation of negative externalities.

THE INSTITUTIONAL AND REGULATORY ENVIRONMENT

Instruments, Environmental Standards, and Enforcement

For several decades, the modernization of the Andean societies has occurred at the expense of environmental degradation. While most countries have had for some time relatively good legislation to deal with “green” issues—management and preservation of natural resources—lack of effective institutions, priorities, and proper implementation has made this legislation largely ineffective (World Bank, 1998). The problem of “brown” issues, that is pollution, is relatively newer and, thus, even more poorly dealt with. Although countries like Colombia have been innovative and relatively successful in tackling the issues of urban water pollution, water and air pollution remain high environmental priorities throughout the region (World Bank 1998).

As mentioned, environmental degradation is often institutional in nature. Lack of political will, overlapping institutional mandates, limited capacity and budgets, inadequate environmental standards, procedures, and enforcement all contribute to a difficult management of environmental issues. This is so even if environmental awareness exists and officials understand the importance of sound environmental management. These concerns are echoed in the Inter-American Development Bank's *Annual Report on the Environment and Natural Resources* (1998) that identifies institutional fragility as a key barrier to successful environmental management. Thus, some institutional development does not necessarily translate into improved resource management and environmental quality. Table 3 summarizes the recent history of environmental management in the region in terms of legal and institutional development. Venezuela, being the wealthiest in terms of income per capita, pioneered the enactment of environmental law and the establishment of a Ministry of the Environment in 1976, a full 20 years before Ecuador, and at least 15 years earlier than other Andean countries. Yet, the data on environmental performance (more on this below) suggest that other factors are contributing to the ineffectiveness of institutions in managing natural resources and maintaining environmental quality.

Table 3. Environmental Management in the Andean Region plus Chile*

Country	National Environmental Law	Ministry of Environment	Environment Chapter in Constitution	Executive Environmental Agency
Bolivia	1992/95	1992	No	Yes
Chile	1994	1994**	Yes	Yes
Colombia	1993	1993	Yes	Yes
Ecuador	1996	1996	No	No
Peru	1990	1995**	No	No
Venezuela	1976	1976	Yes	yes

*R. Huber, J. Ruitenbeek and R.S. da Motta, Market Based Instruments for Environmental Policymaking in Latin America and the Caribbean: Lessons from Eleven Countries (1997).

**National Commission

The key “green” environmental concerns in the Andean region (summarized in Table 4) are the preservation of the tropical forests and the biodiversity therein. The key “brown” issues for the Andean countries are industrial water pollution (most severe in Venezuela, Peru, and Bolivia) and water pollution from agrochemicals (in Colombia). Air pollution poses severe threats to human health in large metropolitan areas such as Lima and Caracas, though estimates of health damages are only available for Bogotá and Quito (Table 5). As evident from the table, water pollution is most severe in Peru, where health damages may be as high as \$1 billion. Thus, the challenge for the Andean countries is how to balance economic growth and the modernization that accompanies it with environmental management.

Table 4. Key Environmental Concerns in the Andean Region

Bolivia	Besides deforestation from land clearance operations and logging, and soil erosion from poor agricultural practices and overgrazing, Bolivia also suffers from desertification, loss of biodiversity (due in part to habitat loss) and threats to water supplies from industrial wastes.
Colombia	Suffers from deforestation and soil damage, including damage from overuse of pesticides, as well as air pollution from vehicle emissions.
Ecuador	Suffers from land degradation, deforestation, soil erosion, desertification, threats to biodiversity, and water pollution.
Peru	Suffers from deforestation, threats to biodiversity, overgrazing and soil erosion, and the pollution of rivers and coastal waters from municipal and industrial discharges. In Lima air pollution is a threat to human health.
Venezuela	Sewage pollution of Lago de Valencia. Oil and urban pollution of Lago de Maracaibo. Soil degradation. Deforestation. Urban and industrial pollution, especially along the Caribbean coast.

Source: The World Resources Institute, 1999

Table 5. Cost of Health Impacts Associated with Urban Pollution in the Andean Region plus Chile*

Country	Area Covered by Estimate	Annual Cost of Health Impacts (US\$ million)	
		Water Pollution	Air Pollution
Chile	Santiago	96-149	100
Colombia	Bogotá	16.9	4.9-15.6
Ecuador	Pichincha, Guayas and El Oro	133	—
	Quito	—	57
Peru	Nationwide	500-1,000	—

* R.M. Huber, J. Ruitenbeek and R.S. da Motta, Market Based Instruments for Environmental Policymaking in Latin America and the Caribbean: Lessons from Eleven Countries (1997). World Bank Discussion Paper No. 381.

With respect to natural resources, the region's reliance on minerals is likely to remain important for some time. In Colombia mining contributes to 4.6% of GDP while in Peru, Bolivia and Venezuela this figure exceed 10%³. With respect to non-renewable resources the region has emerged from a prolonged period of economic nationalism when primary industries were often state-owned, barriers to imports and often exports were high, and macroeconomic policies were unstable and often hostile to private investment. The recent trend towards more open economic policies has been accompanied by a parallel liberalization of mining policies⁴. Most governments have now become committed to creating an investment environment that attracts private capital, both local and foreign. The results of this liberalization have in recent years prompted a significant increase in investments in exploration. Yet, whether the mining sector will be able to fuel sustainable economic growth remains an open question. The continued existence of legal and regulatory impediments in some countries, the weakness of public mining institutions, the constraints on the growth of the small and medium mining sectors, and the inadequate treatment of the environmental and social aspects of mining still threaten sustainable development. With respect to the forest sector, most countries in the region (with the possible exception of Bolivia, more on this below) regulate forest use in manners that discourage investments in sustainable management⁵. Fiscal and regulatory policies are not consistent with the goal of promoting a competitive and sustainable forest sector and still rely heavily on CAC to ensure compliance.

³ 1997 figures. Source: IMF

⁴ World Bank (1996), "A Mining Strategy for Latin America and the Caribbean", World Bank Technical Paper No. 345. Industry and Energy Department.

⁵ Hardner J. and R. Rice (1999). "Rethinking Forest Resource Use Contracts", in Keipi K (ed), Forest Resource Policy in Latin America. IADB, Washington, D.C.

Environmental Policy: Source of Much Uncertainty and Little Improvement

Environmental policy in the Andean region is characterized by overly ambitious and strict environmental standards that cannot be realistically enforced either because the country lacks the capacity to do so or because of pressures from the private sector. Indeed, enforcement of such strict standards might involve sacrificing some economic growth. For example, Bolivia, the poorest country in South America and the third poorest in the Western hemisphere (after Honduras and Haiti), adopted environmental standards for air and water quality of equal level and strictness as those of the United States, the richest country in the hemisphere. With functional illiteracy about 30%, infant mortality at 75 per 1000 live births, 90% of rural households lacking safe drinking water, sewage, and basic health and education services, air and water quality should not be the top priority and certainly not at the level of the U.S. Bolivia, a country whose economic growth is so disadvantaged by its landlocked location, cannot afford to sacrifice even a small part of its hard won modest growth rate.

However, even more troubling are the means by which the implementation of the strict environmental standards is pursued. While the law allows for the possibility of economic instruments, the primary means of implementation have been command-and-control (CAC). These are regulations that prescribe and enforce uniform environmental standards for all pollution sources regardless of costs. For example, they prescribe a certain technology or uniform percentage reduction of emissions from all sources allowing no flexibility such as trading or payment for non-compliance. Worldwide experience, including that of the U.S., indicates that CAC is several times more costly than economic instruments (Panayotou 1998). Moreover, there is evidence that lack of flexibility in means of compliance is more detrimental to profitability and competitiveness than strictness of environmental standards (Panayotou and Vincent, 1997). Peru and Venezuela are extreme cases of total reliance on command-and-control and legal sanctions. A possible exception, in the case of Peru, is the recent introduction of water use rights based on the Chilean experience. In Venezuela, the legal framework for environmental protection is characteristically called the “Criminal Environment Law” (1992) and the defense ministry shares enforcement responsibility with the environmental ministry. Some of the region’s experience with market-based instruments for environmental management and regulation is summarized in Table 6.

Table 6. The Use of Market-Based Instruments in the Andean Countries plus Chile*

Country	Credit Subsidies	Taxation and Tariff Relief	Deposit-Refund System	Solid Waste Levy and Tipping Fees
Bolivia			Voluntary for glass, paper and plastics	Collection fees based on weight
Chile		For forestry activities	Voluntary for glass and plastic beverage containers	Flat fees; tipping fees under consideration
Colombia	For abatement investments in the industrial sector	Income and value-added tax rebates for abatement investments	Voluntary for glass beverage containers on consumers	Electricity surcharge
Venezuela	For investment on mercury recovery in artisanal mining	Sectoral responsibilities in different ministries	Voluntary for glass beverage containers on consumers	Flat fees paid by municipality
Ecuador		For Abatement investments in the industrial sector	Voluntary for glass beverage containers on consumers	Flat fees

* R.M. Huber, J. Ruitenbeek and R.S. da Motta, *Market Based Instruments for Environmental Policymaking in Latin America and the Caribbean: Lessons from Eleven Countries (1997)*. World Bank Discussion Paper No. 381.

The highest environmental priority in all the countries, but especially in Bolivia and Peru, is to ensure safe drinking water and sanitation systems. This is of crisis proportion in the urban slums and the rural areas of even the wealthier Andean countries, especially Venezuela and Colombia. In Bolivia 75% of the rural households and 25% of the urban households have no access to safe drinking water; over 90% of the rural household and a third of the urban households have no in-home sewage system. In Peru, as recently as 1990 half the population was not connected to the public water supply and 60% were not connected to a sewage system. Poor cost-recovery due to control of user fees below the long-term municipal costs of supply and lack of funds from other sources have led to inadequate investments in water supply and sanitation infrastructure.

To address the critical water and sanitation needs of the population several countries in the region are considering administrative decentralization. Part of the decentralization is to permit local taxation and privatization of public utilities. For example, in 1997 Bolivia awarded a concession for the water supply and sanitation in La Paz, El Alto to Aguas del Illimani, a consortium led by Lyonnaise de Eaux, with the objective of achieving 100% coverage in the metropolitan area by December 2001. In Colombia, the Findeter (Financiera de Desarrollo Territorial, S.A.) Program facilitated the investment in water supply and management treatment through a system of escrowed revenues from waters tariffs at first-tier banks, which in turn endorse them to Findeter as security for loans for re-lending to municipalities. Nevertheless, more needs to be done in terms of marginal cost pricing, establishment of clear property rights for water resources, mobilization of financial resources through innovative financing mechanisms, and more involvement of civil society.

Although the importance of “green” issues was recognized long ago, deforestation and forest degradation continue to remain serious environmental concerns (see Table 5). Only recently, Andean governments have begun to rely on economic instruments to protect and improve the

management of forest resources. For example, Bolivia passed a new law in 1996 that introduced important modifications to the allocation, taxation, and management of forest concessions. With the new law, concessions are to be allocated through a competitive bidding process and taxed on the basis of the concession area (previously, taxes were levied on extracted volume). These changes were motivated by the belief that area taxes are easier to establish and collect, they can be set in a relatively transparent process, they are easy to enforce, and they provide incentives to loggers to become more efficient and less wasteful in forest use. The law introduced other important “incentives” for better management. Forest concessions were awarded for 40 years (pending a 5-year review) thus allowing loggers to benefit from more careful management during the first cut. Furthermore, it partly addressed government corruption and lack of clarity by creating a regulatory body (the Forest Superintendency) that is independent of political influences and in direct charge of concession allocation, taxation, management, and monitoring. Funding for the FS is directly related to its performance, since it is financed with concession fees. Since the law was enacted, the area under forest concessions has fallen from over 20 million to less than 6 million hectares, a broader set of tree species are utilized, and many companies have certified, or are in the process of certifying, their forestry operations. The law also introduced some fiscal decentralization allowing municipalities to award up to 20% of their forests as concessions. Various parties now have access to forests. They include previously informal operators (e.g., Agrupamiento Sociales del Lugar) and indigenous communities. A special fund (Funabosque) was also created to finance forest activities.

However, in all Andean countries agricultural encroachment remains a serious issue⁶. In Colombia, notwithstanding the 100+ laws that deal with forestry issues, forest degradation continues due to agricultural encroachment, infrastructure development, and (often illegal) mineral exploration. Recent reforms in land ownership titling (previously requiring forest clearing) and official recognition of traditional territories and rights have begun to slow this trend. In Ecuador, reliance on petrodollars favored large infrastructure development in the past with minimal control and planning. Regulation of forestry issues still relies significantly on CAC. In Peru, agricultural expansion is the primary cause of deforestation. Commercial operations have been regulated primarily through command and control. Commercial forestry has, so far, generated few revenues for the government and provided the vehicle for more encroachment. In Venezuela, government capacity is insufficient to enforce regulation primarily based on command and control and in the context of a lot of corruption. Furthermore, the issue of forests and protected areas management clashes with widespread legal and illegal mining and with institutional uncertainty for both economic operators and, especially, indigenous communities.

Despite some progress in Colombia and Bolivia, environmental management continues to be at the same time overly centralized and segmented into many institutions (this is especially true of Venezuela and Peru). Environmental management is neither insulated from political influences nor coordinated. Therefore, variable and inconsistent enforcement results whenever environmental management is in conflict with economic objectives or political interests. Evidently, the financial crisis in Ecuador, social conflicts in Colombia and political developments in Venezuela are having a significant impact on environmental management primarily by diverting attention and resources to “more pressing” short-term concerns.

⁶ The following is based on A. Contreras (January 1999), “Las políticas de Gobierno y los bosques en cinco países Andinos.”

Colombia, more than any other country in the region, has legally attempted to streamline and decentralize its environmental management through the creation of the regional environmental protection agencies and the deployment of economic instruments. However, two concurrent important economic reforms had opposite effects on environmental management. Trade liberalization has helped improve resource use efficiency, reduce waste and make accessible cleaner technologies. By contrast, tax reform, and the streamlining and simplification of the tax system has made the introduction of environmental taxes and tax differentiation more difficult.

Most economic instruments employed in the region are in the form of subsidies (e.g. accelerated depreciation, tax exemptions and low-interest loans) for the import of pollution control equipment that contravenes the “polluter pays” principle, and may exacerbate pollution problems over the long-run. In Venezuela, for example, a 15% abatement of corporate taxes for environmental investments has led to excessive capital intensity in pollution abatement without perceptible improvements in the environment and was abolished in 1991. The most sophisticated economic instruments for environmental management employed in the Andean region is the Quito effluent charge: a discharge norm has been set; firms that discharge more than the norm pay a charge equal to the cost of municipal treatment, while the firms that discharge less than the norm pay no charge. While clearly a compliance incentive rather than a true pollution charge, this system is innovative in three respects: (a) the charge is computed bi-annually on the basis of a formula reflecting the combined organic content of different pollutants; (b) it is a presumptive charge that can be reassessed on request following inspection and corroboration of claims of lower discharges; and (c) the norm is being reduced over time as to achieve the desired river water quality within 8-10 years.

A similar system is employed for mobile air emission sources and vehicles that do not meet the norm pay fines that are higher than the cost of fixing the problem, thereby providing an incentive to comply with the norm. These two examples notwithstanding, pollution and resource depletion charges through the Andean region as in many other developing and some developed countries, are set too low to change behavior and they act merely as financing mechanisms for public sector environmental investment. For example, a deforestation tax in Venezuela did not lead to reforestation because it has been set below the marginal cost of reforestation but generated considerable financial resources (Huber et. al. 1997).

Energy and water subsidies, which were among the highest in the world, have been reduced throughout the region, most precipitously in Venezuela, resulting in significant environmental benefits, although fossil fuels, power and water are still priced below full cost. Further reduction of energy and water subsidies should generate both environmental and economic benefits in all five countries, but especially in Peru and Venezuela.

A major concern with subsidy reduction and introduction of environmental charges and/or enforcement of environmental regulations is a possible loss of competitiveness. For example, in Peru the government has hesitated to regulate or impose a tariff on imports of used cars and buses out of concern that this is inconsistent with the government’s free trade policy. In Venezuela, the state-owned oil company had resisted the sale of unleaded gasoline in the domestic market on account of the financial crisis. However, private firms are increasingly taking measures to improve their international competitiveness that also result in improved environmental performance. For example, in Ecuador, a non-ferrous metal and ceramic company in Guayaquil invested about U.S. \$1.5 million to adopt more efficient and cleaner technology, to switch to more environmentally friendly chemicals and to recover waste by-products as to

improve its ability to compete in a free trade environment (Huber et. al. 1997). Similarly, in Venezuela, private companies concerned with their corporate image have begun to improve environmental management practices based on international standards (e.g. ISO1400).

Finally, lack of clear and transparent regulations, frequent changes in policy, and inconsistent enforcement create a general uncertainty concerning government policies that is detrimental to both environmental protection and the investment climate, especially foreign investment. This raises the perceived risk to investment and correspondingly increases the required rate of return (inclusive of the risk premium) needed to attract investors.

Indeed, according to the World Economic Forum Survey, business executives in Colombia, Peru, and Venezuela perceive environmental regulations in these countries as relatively inflexible, unstable, and non-transparent with detrimental effects on competitiveness (Table 7 and Panayotou and Vincent, 1997). As the region attempts to attract more trade and investment thereby participating more fully in regional and global economies, environmental regulations will need to become more flexible, stable, and transparent. This could both increase environmental effectiveness and enhance competitiveness, especially in exports to environmentally sensitive markets such as those of Europe and North America.

Table 7. The Global Competitiveness Report: 1999 (World Economic Forum)

	Bolivia	Colombia	Ecuador	Peru	Venezuela	Argentina	Chile
Competitiveness Ranking	55	54	53	36	50	42	21
Competitiveness Index	-1.50	-1.48	-1.34	-0.37	-1.09	0.07	0.57
Market Growth index	0.18	1.06	0.34	2.14	1.39	6.52	2.63
Flexibility of environmental regulation	2.85	3.10	2.88	4.04	3.50	3.64	3.50
Environmental regulations are transparent and stable.	2.74	2.89	2.81	3.60	3.49	3.13	3.26
Export position as a national priority	2.23	3.81	3.36	4.19	3.04	3.72	5.28
Favorable exchange rate policy impact on exports	3.79	3.55	3.40	3.86	2.34	3.92	3.48
Foreign access to invest in capital markets	5.81	5.46	5.56	6.64	6.30	6.74	6.40
Cross border ventures negotiated without Government interference	5.65	4.51	4.63	6.60	5.57	6.39	6.03
Overall infrastructure is superior than in major trading partner	1.58	2.04	2.16	2.66	3.09	3.44	3.12

EMERGING ENVIRONMENTAL MARKETS

Current State of Agriculture, Tourism and Environmental Services

The incredible richness in natural, historical, and cultural sites makes the Andean region a highly attractive tourist destination. Yet the potential contribution of tourism to economic activities in the Andean countries is largely untapped in both quantity (number of international tourists, see Table 8) and quality (type of tourists) terms. Only in Bolivia are revenues from international tourism a significant percentage (12%) of total export earnings (Table 9). Everywhere in the region, revenues from tourism could be increased significantly through better development and marketing of the country's riches. Colombia is the only country that achieved tourist arrivals in excess of one million (mid-1990s), but currently the sector is suffering from problems of personal insecurity, uncertainty and adverse publicity due to the internal conflict. (See the chapter on "Governance" in this report for a discussion of the effects of the guerrilla war on security.)

**Table 8. International Tourism in Andean Countries plus Argentina and Chile
Number of Arrivals (thousands)**

	1980	1985	1990	1995	1996
Andean Total	1,539	1,718	2,234	3,265	3,403
Bolivia	155	127	217	350	375
Colombia	553	784	813	1,399	1,254
Ecuador	243	238	362	440	500
Peru	373	300	317	479	515
Venezuela	215	269	525	597	759
Argentina	1,120	1,503	2,728	4,101	4,286
Chile	420	418	943	1,540	1,450

Source: The World Development Indicators 1998

**Table 9. International Tourism – Receipts (% of total exports) in Andean Countries
plus Argentina and Chile**

	1980	1985	1990	1995	1996
Bolivia	3.88	5	8.6	11.84	12.5
Colombia	6.7	6.37	4.68	6.25	6.26
Ecuador	3.15	4.03	5.76	4.84	4.89
Peru	4.49	5.26	6.29	7.74	7.36
Venezuela	1.22	2.72	2.64	3.91	3.35
Argentina	3.49	10.42	13.35	18.03	16.91
Chile	2.78	2.74	5.25	4.66	4.91

Source: The World Development Indicators 1998

Because of their natural resource endowments, the Andean countries are in an excellent position to benefit from the emerging markets for environmental services. Perhaps the most impor-

tant are the opportunities presented by the Clean Development Mechanism. This mechanism is a flexibility instrument of the Kyoto Protocol on Climate Change that allows developing countries to sell low-cost carbon off-sets to developed countries that have assumed a commitment to reduce their carbon emissions. Ecuador and Bolivia have acquired valuable lessons through their carbon offset initiatives. Yet, in the whole region opportunities abound for combining initiatives financed by carbon sales with protection of biodiversity and resolution of social conflicts, especially in the Amazon region. Table 10 shows that all five countries have signed and ratified the Climate Convention, as well as the Biological Diversity and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) conventions; this should enable them to tap the emerging markets in carbon credit, biodiversity, and other environmental services.

Table 10. International Environmental Conventions Signed/Ratified by Andean Countries plus Argentina and Chile

Climate change					Biological Diversity *		CITES *	IUCN Goal *
		Year		Entry into force	Year		Became a party	of 10% of land area protected
		Signed	Ratified		Signed	Ratified		
Bolivia	Ratification of the FCCC	10-Jun-92	3-Oct-94	1-Jan-95	1992	1994	1979	Yes
	The Kyoto Protocol	9-Jul-98	—					
Colombia	Ratification of the FCCC	13-Jun-92	22-Mar-95	20-Jun-95	1992	1994	1981	No
	The Kyoto Protocol	—	—					
Ecuador	Ratification of the FCCC	9-Jun-92	23-Feb-93	21-Mar-94	1992	1993	1975	Yes
	The Kyoto Protocol	15-Jan-99	—					
Peru	Ratification of the FCCC	12-Jun-92	7-Jun-93	21-Mar-94	1992	1993	1975	No
	The Kyoto Protocol	13-Nov-98	—					
Venezuela	Ratification of the FCCC	12-Jun-92	28-Dec-94	28-Mar-95	1992	1994	1978	Yes
	The Kyoto Protocol	—	—					
Argentina	Ratification of the FCCC	12-Jun-92	11-Mar-94	9-Jun-94	1992	1994	1981	No
	The Kyoto Protocol	16-Mar-98	—					
Chile	Ratification of the FCCC	13-Jun-92	22-Dec-94	22-Mar-95	1992	1994	1975	Yes
	The Kyoto Protocol	17-Jun-98	—					

United Nations Framework Convention on Climate Change (UNFCCC) <http://www.unfccc>

* World Resources Institute 1998-99 data tables

www.wri.org/facts/data-tables.html

In the case of Bolivia, exploring the increase in the provision of high-value global services deserves special attention. Because of the country's geographic location (landlocked), economic growth based on the export of low-value agricultural products and primary commodities is

severely disadvantaged. The generation of wealth through international tourism and the sale of environmental services will by-pass this structural constraint resulting in high-value transactions and generation of social and environmental co-benefits. Another area deserving attention is the production of high-value horticultural crops for export.

CHALLENGES AND OPPORTUNITIES FOR A COMPETITIVE REGION

The region is moving along a development path that requires sound environmental management. Yet, vested interests and structural inertia from a time of natural resource bonanza still pose a serious challenge to the improvement of environmental management in the region. This is reason for concern at a time where increased integration in the global economy and emerging market opportunities call for a timely and proactive approach to environmental management.

The extent to which the Andean countries will be able to slow environmental degradation and capitalize on their natural resource endowments depends on a better understanding of the interactions between economic agents (whether they be firms, households, social organizations, local and central governments) and natural systems. A tentative set of questions is proposed to improve our understanding of these linkages.

- Are the current rates of natural resource extraction consistent with long-term rent maximization?
- To which extent has resource dependency put other sectors at a disadvantage (Dutch disease)? Where are innovative policies most needed to mitigate the adverse impact of resource dependency?
- What fraction of natural resource rents is being reinvested in the economy? Are there policies that may promote higher reinvestment rates and economic diversification away from natural resource dependency?
- Is rent capture from resource extraction equitably distributed between private sectors operators and the public sectors? Are current regulations promoting rent dissipation?
- To which degree can market-based instruments (such as pollution charges) be used to reduce environmental damage? What can be learned from the recent experience of the region and other regions of the world?
- What are the most appropriate roles for central and local governments in ensuring that environmental damage will not hinder sustainable economic growth? Which kind of environmental problems lend themselves to local solutions? Which ones require central coordination and policy?
- What role do communities and the civil society play in informing, regulating, and enforcing environmental management? Which existing norms and institutions need reinforcing and which need reforming?
- What kind of projects can the region offer as part of the Clean Development Mechanism? At what costs? How should it prioritize investments in environmental management that would produce multiple benefits (e.g., protect biodiversity, sequester carbon, attract tourism revenues, etc.) at the least cost?

- What is the international demand for cultural, historical and nature-based tourism in the region? Which service improvements would yield the highest returns? Is there scope for improved coordination of tourism activities (marketing, etc.) across countries and within countries (e.g., main urban and tourism sites)?
- How could these countries better capitalize on their unmatched wealth of biodiversity?
- How to ensure that revenues from emerging markets (carbon, tourism, agriculture) are widely distributed as to provide both the right incentives for sustainable management and to prevent exacerbation of income inequality?
- What are the critical stumbling blocks (e.g., infrastructure, institutions, local capacity, information, marketing) that are currently preventing the region from taking full advantage of these opportunities?

REFERENCES

- Contreras A. (1999), "Las políticas de Gobierno y los bosques en cinco países Andinos." Mimeo.
- Hardner J. and R. Rice (1999). *Rethinking Forest Resource Use Contracts*, in Keipi K (ed), Forest Resource Policy in Latin America. IADB, Washington, D.C.
- Huber R.M., J. Ruitenbeek and R.S. da Motta, (1998), *Market Based Instruments for Environmental Policymaking in Latin America and the Caribbean: Lessons from Eleven Countries*. Discussion Paper, no. 381. Washington, D.C.: World Bank. p viii, 79.
- Inter-American Development Bank (1998), *Economic and Social Progress in Latin America: Facing up to Inequalities in Latin America*. Available at http://www.iadb.org/oce/IPES98_eng/.
- Inter-American Development Bank (1998) *Annual Report on the Environment and Natural Resources*.
- Sachs, Jeffrey D. and Andrew M. Warner (1995) Natural Resource Abundance and Economic Growth, HIID Development Discussion Paper No. 517a, October 1995.
- Panayotou T. (1998), *Instruments of Change: Motivating and Financing Sustainable Development*. UNEP and Earthscan Publications Ltd, London.
- Panayotou T. and J.R. Vincent (1997) *Environmental Regulation and Competitiveness*, in K. Schwab and J. Sachs (eds) The Global Competitiveness Report, World Economic Forum, Geneva, Switzerland
- World Bank (1997), *Expanding the measure of wealth: indicators of environmentally sustainable development*. Environmentally Sustainable Development Studies and Monographs Series, no. 17. Washington, D.C., Author. p viii, 110.
- World Bank Industry and Energy Department. (1996). *A mining strategy for Latin America and the Caribbean*. Technical Paper, no. 345. Washington, D.C.: World Bank. p xviii, 108.