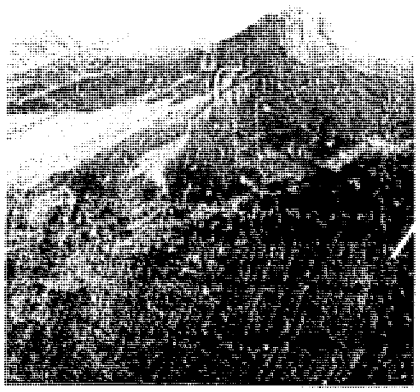
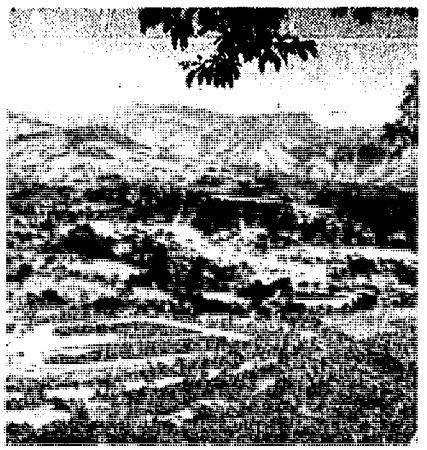
COSTA RICA

COUNTRY ENVIRONMENTAL PROFILE

EXECUTIVE SUMARY





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COSTA RICA

Country Environmental Profile

Executive Summary

by

Gary Hartshorn
Lynne Hartshorn
Agustín Atmella
Luis Diego Gómez
Alfonso Mata
Leonardo Mata
Róger Morales
Rafael Ocampo
Douglas Pool
Carlos Quesada
Carlos Solera
Raúl Solórzano
Gary Stiles
Joseph Tosi, Jr.
Alvaro Umaña
Carlos Villalobos
Robert Wells

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Tropical Science Center
Apartado 8-3870
1.000 San José, Costa Rica

Preface

This Country Environmental Profile (CEP) of Costa Rica is one of a series of environmental profiles funded by the U. S. Agency for International Development, Bureau for Latin America and the Caribbean (LAC), Office of Development Resources (DR). The scope of work for this in-country study was developed jointly by the AID mission in Costa Rica; Frank Zadroga, AID regional environmental officer for Central America (REMS/ROCAP); Robert Otto, AID environmental officer (LAC); and Gary Hartshorn.

Contractual arrangements for this CEP were carried out by the Tropical Science Center (TSC), a private, non-profit Costa Rican association concerned with man's enduring relationships with natural resources in the tropics. Publication arrangements were handled by the AID mission in Costa Rica. TSC contracted local specialists to prepare sector reports during the last trimester of 1981. These review documents were edited and condensed into the present synthesis by Gary and Lynne Hartshorn.

CEP PARTICIPANTS

Gary S. Hartshorn, Ph. D., Project Director
Tropical Forest Ecologist, TSC
Lynne C. Hartshorn, Editor
Agustín Atmella, Lic.
Attorney, Wells y Asociados
Luis Diego Gómez, Lic.
Botanist, Museo Nacional
Alfonso Mata, Ph. D.
Chemist, Química, UCR
Leonardo Mata, Ph. D.
Epidemiologist, INISA, UCR
Róger Morales, B.S.
Naturalist, Areas Silvestres, CATIE
Rafael Ocampo, B.S.
Biologist, ITCO
Douglas Pool, M.S.
Agronomist, Puerto Rico
Carlos Quesada, Ph. D.
Hydrologist, Ingeniería Civil, UCR
Carlos Solera, Ph. D.
Agricultural Economist
Raúl Solórzano, Lic.
Forester, DGF
Gary Stiles, Ph. D.
Ornithologist, Biología, UCR
Joseph Tosi, Jr., Ph. D.
Ecologist, TSC
Alvaro Umaña, Ph. D.
Environmental Engineer,
Ingeniería Civil, UCR
Carlos Villalobos, Ph. D.
Marine Biologist, Biología, UCR
Robert Wells, Jurisdoctor
U.S. Attorney, Wells y Asociados

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WHAT IS SCIENCE FOR?

When Albert Einstein was asked this question he answered it with another question, "Tell me, what are children good for?"

We cannot look for romantic definitions of science in these times of crisis or war; these problems may take two decades or more to remedy. Any review of human history will show that shocks have helped to redirect political, economic and social destiny, and the quality of life has become better thanks to the millions of repeated successes, in all fields, that have permitted man to considerably dominate nature. Many men and women have participated in this gigantic adventure: history has recorded the acts of wise men and this has contributed to the generalized concept that science is something confidential and mysterious; but virtues and defects, successes and failures must also be considered when our species is involved with perpetuation and development.

Science, then, is good for growing and developing; the greatest difference between rich and poor countries is not the misery of the poor and the opulence of the rich, but the amount of resources each one dedicates to science and technology. Germany and Japan did not lift themselves from the ruins of WWII only with the economic help they received, nor from the political systems they adopted, but because both countries gave an undeniable priority to the sciences; obviously, both the available resources and a democratic political system are needed, but sound growth cannot be achieved without the coherent and vigorous component of science and technology.

Loans and charity will not alleviate the crises in the world. Consequently, our society needs ample and profound restructuring, establishing new agreements between the different social forces; reorienting and stimulating production, decreasing consumption and protecting the environment; only in this fashion will we successfully face the great challenge of forging an advanced, just, and dignified democracy.

Edgar Mohs (La Nación 5 Feb. '82)

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I.

Executive Summary

This country environmental profile of Costa Rica (CRCEP) financed by USAID was carried out during the last trimester of 1981 by the Tropical Science Center (TSC), a private, non-profit Costa Rican association concerned with man's enduring relationship with natural resources in the tropics. Sixteen experts familiar with Costa Rica's natural resources, institutions, culture and environmental problems contributed to this CRCEP.

Costa Rica has well-deserved, world-wide recognition for its stable democracy, rapid decline in population growth rate and exemplary system of national parks. Nevertheless, the country faces increasing pressures on natural resources along with concomitant environmental deterioration. The current economic crisis--the most severe in the country's history--will have profound and possibly unpredictable consequences for natural resources and environmental conservation. Increased agricultural productivity and exports are expected to lead the way out of the economic morass, yet the best agricultural lands are being degraded by pervasive soil erosion and eliminated by sprawling urbanization. Extensive deforestation has nearly destroyed any potential for large scale commercial forestry, while threatening the economic viability of hydroelectric, potable water and irrigation projects.

This CRCEP analyzes the status of natural resources development and conservation; the causes and probable consequences of natural resources destruction; the severity of environmental deterioration and the prognosis for slowing or reversing it; and institutional involvement in the development of natural resources and environmental conservation. Specific sections of this report review historical and cultural aspects, Indians, demography, nutrition and health, forests and forestry, wildlands, wildlife, coastal and near-shore marine resources, soils and land use, agriculture and cattle, water resources, energy sources, environmental contamination, environmental law and related institutions. Conclusions and principal recommendations are summarized below.

SOME HISTORICAL ASPECTS OF CULTURAL RESOURCES

Despite its small size and substantial distance from Mayan and South American cultures, Costa Rica has provided resources for prehistoric cultures. Pre-Columbian cultural Mesoamerica extented south into the Guanacaste-Nicoya region, where a sizeable population lived in the Tempisque basin. The central intermountain valleys and Caribbean lowlands form a large and complex archaeological zone that was sparsely populated by Indians from South America. The southwestern archaeological zone of Diquís, part of the Greater Chiriquí culture, is best known for the enigmatic stone spheres. Grave robbers (huaqueros) and amateur archaeologists have decimated the national archaeological heritage. Existing legislation controlling trade in artifacts is seldom enforced.

Current Costa Rican culture has been forged over more than four centuries by colonialism, independence, republicanism, dictators and democracy. Social patterns were established in the Seventeenth Century partly by the early success and later decline of the cacao economy. Municipal rule, established in the Eighteenth Century, helped foster Costa Rican individualism and social identification. The Nineteenth Century was a fundamental period in the development of Costa Rican culture: Independence (1825), the First Republic (1848), founding of the Universidad de Santo Tomás (1843), local emphasis on public education, ascendancy of coffee and coffee-growers and growing independence from the Catholic Church profoundly influenced impressive cultural gains. Though these cultural developments extended well into the Twentieth Century, they were altered by international events such as wars and economic changes. European influence declined as Costa Ricans turned to the United States, Chile, and Argentina for advanced education. Compared to the Nineteenth Century, the Twentieth Century has been disappointing culturally, though growing appreciation exists for the national parks system and

Indian cultures. The 1940-41 reopening of the Universidad de Costa Rica should have been a cultural milestone, but weak training and unrealistic goals have hindered cultural advancement. The political events of 1948 had contrasting effects by revitalizing democratic ideas, while establishing mediocrity and inefficiency in the Civil Service.

Recommendations

Enforce existing legislation protecting the country's archaeological heritage; require adequate financial and political support for the National Museum.

Strengthen cultural heritage through both the education system and popular media.

INDIANS

Despite the wholesale decimation of indigenous populations during the early colonial period, Costa Rica still has six ethnic Indian groups, plus two ethnic descendent groups. Current estimates of the Indian population range from 11,000 to 19,000. Most of the 278,839 ha of official Indian Reserves are in the Cordillera de Talamanca. These Indians practice traditional shifting cultivation, an ecologically sound use of forest resources when the population density is low. The Indian's most serious environmental problems are the loss of their reserve land and exploitation of natural resources within their reserves. Existing legislation protecting Indian cultures and their natural resources has been weakly and inconsistently applied. The new mining law and exploration for petroleum directly affect Indian Reserves. State involvement in mining could easily circumvent the legislative intent to protect Indian lands and people. The Talamanca Indian groups negotiated an agreement with the government to permit petroleum exploration and exploitation on Indian Reserves; however, it is uncertain if the agreement will effectively protect Indian culture and land.

Recommendations

Conduct environmental and anthropological studies to determine the potential effects of mining and petroleum exploration and exploitation upon the Indian communities in their Reserves.

Strictly and effectively enforce the Indian Law; provide adequate financial support for CONAI.

CONAI must set aside petty politics and fulfill its legal and ethical mandate.

DEMOGRAPHY

Costa Rica's estimated 1979 human population was 2.2 million, with the majority living in the Central Valley. Twentieth Century population growth rate averaged 2.1% /year, 1901-1950; 3.3%/year, 1951-1975 (one of the highest in Latin America); and 2.6% since 1975. The population boom was due to a marked decline (33%) in crude death rates and an increase in birth rate. Life expectancy (73.1 years, 1980) is exceptionally high for a developing country; it is largely due to effective public health programs.

The striking decline in population growth rate in the past two decades is due to a dramatic reduction in the birth rate from a high of 48.3 births per 1,000 inhabitants in 1955-60 to 29.6 births/1,000 in 1975. The largest decline occurred in 1965-70 when there was not an organized nor foreign assisted family planning program. Costa Rica is unusual in that family planning information and services effectively reach the lower classes, e.g., 64-78% of rural women used contraceptives in 1976. However, the birth rate has increased slightly in the past few years, perhaps due to lack of government support for family planning.

If the trend in population growth rate evident by 1975 were to continue to decline to 2.2%, the country is projected to have a population of 3.4 million by the year 2000. If the rate hovers at 2.6%, there will be about 4 million Costa Ricans in the year 2000. Even if replacement fecundity were reached in the year 2000, demographic inertia would put the definitive population at 5.9 million for the year 2090. However, this would require an unusually rapid decline in fecundity that is unlikely in the current social context.

Costa Rica's major demographic problem is not simply the various projections of future population, but rather how population growth relates to land availability, utilization, and tenure. Population density in relation to arable land (currently 225/km^2) indicates the country is close to the saturation level for the best land. Thus the population projections for the year 2000 and beyond must be taken seriously if agriculture is to remain the keystone of Costa Rica's socioeconomic development.

Recommendations

Establish and promote a national demographic policy that will stabilize population growth to a level compatible with national development capability.

NUTRITION AND HEALTH

Based on vital statistics, nutritional status and life expectancy rates, Costa Rican health is at the level of many industrialized nations. This clearly indicates that good health is more dependent on social policies than level of economic development. Benefits from education, justice, environmental sanitation, standard of living, preventive medicine and social security are of greater magnitude in Costa Rica than those observed in other Central American countries.

Among variables that promote good health, the control and prevention of infectious diseases have substantially reduced morbidity and mortality rates. Quantity of food intake has remained nearly constant, but there is a trend to increased consumption of animal protein and of a more varied diet. Changing dietary habits is increasing the risk of obesity and the pathology associated with it. The present economic difficulties will add more stress to the already limited food budget of the poor, causing increased malnutrition and chronic infection.

Recommendations

Costa Rica's outstanding advances in public health must be maintained in spite of the current economic crisis.

Maintain the national infrastructure to continue programs of immunization, rural water supply, latrine, health care and nutrition in spite of the current economic difficulties.

Improve health education in order to increase individual responsibility in the maintenance of good health.

FORESTS AND FORESTRY

The varied physiography and climate of Costa Rica support 12 ecological Life Zones, each with an impressively diverse biota. Two Life Zones, *Tropical moist* and *Tropical wet*, cover nearly half of the country. Of the 12 Life Zones, only the *Tropical Subalpine rain paramo* (0.2% of the country) is naturally without forest cover. By 1977 only 15,900 km² (31%) of forests remained, largely on the Cordilleras de Talamanca and Central, and in northeastern Costa Rica. More than half the deforestation currently estimated at 60-70,000 ha/year, has occurred since 1950. Demand for land rather than for timber, is the primary cause of deforestation.

Valuable land has traditionally been forest-cleared land; natural forests therefore were of little economic value and invasion by forest-clearing squatters to demonstrate land possession was a natural result. DGF preoccupation with timber traffic rather than deforestation is illustrated by the area deforested being triple the amount authorized for cutting by the DGF. ITCO settlers are responsible for an appreciable amount of legal and illegal deforestation.

Of the 15,900 km² of remaining forest in 1977, 4,183 km² are in national parks and equivalent reserves; 2,788 km² are in Indian Reserves; while 11 Forest Reserves cover 4,338 km². At a deforestation rate of 70,000 ha/year, the 4,600 km² of unassigned forest will be cut by 1985. The DGF regards the decreed forest reserves as exploitable timber reserves, yet most of them occupy critical catchment areas, where their hydrological functions have much greater value than does the timber.

The well-developed sawmill industry utilizies 76% (DGF 1980) of installed capacity; inadequate information is available for other timber industries. The timber industry has minimal involvement with its sources of raw materials. Despite inclusion of production forestry in the USAID Conservation of Natural Resources loan, natural forest management possibilities are bleak.

Reforestation efforts totaling less than 4,000 ha are negligible when compared to deforestation. Forest plantations have been established for cosmetic and tax purposes, often on agricultural land, rather than on lands needing reforestation. Without establishing major forest production either from natural forest management or plantation forestry, Costa Rica will have to import most of its wood (as is now the case for wood products) before the end of this century.

Recommendations

The DGF must comply with and enforce the Forestry Law, particularly to control deforestation; ITCO should not be allowed to ignore and abuse the Forestry Law.

All Forest Reserves should be evaluated according to land use capability and forestry potential; those Forest Reserves, or portions thereof, occurring in critical catchments should receive absolute protection and be reclassified as Hydrologic Reserves.

The reforestation program needs to be restructured to stimulate forest plantations where they are needed most, to massively increase the area reforested each year, and to improve the matching of species with site.

The timber industry must become actively involved in sustained yield forestry; they should not receive government assistance when the industry collapses from lack of raw material.

WILDLANDS

Wildlands are forest areas legally protected or managed for a variety of purposes ranging from resource exploitation to absolute protection, including environmental recreation and education. Although Costa Rica has not legally adopted national conservation objectives for managing wildlands, truly impressive achievements in conservation have occurred. Forty-five wildlands units (Fig. I-1) comprising nine management classes have been legally established: 11 Forest Reserves (433,805 ha); 13 National Parks (399,158 ha); 7 Biological Reserves (18,346 ha); 13 Indian Reserves (278,839 ha); 2 Wildlife Refuges (7,530 ha); 7 Protection Zones (14,800 ha); 1 Cultural Monument; 4 Recreational Areas (566 ha) and 1 National Monument (218 ha). Legally established wildlands occupy about 952,000 ha, equivalent to 19% of the country. However, only the national parks, biological reserves, wildlife refuges, recreational areas and National Monument are adequately protected and administered.

Except for the recently decreed La Amistad Bi-National Park, all wildlands units have been created without prior ecological and cadaster studies. The management objectives and categories, geometric shape, boundaries and justification for most units do not coincide with the area established. Consequently, many wildlands units require boundary adjustments, management plans and expropriation of private inholdings.

Recommendations

Legal national conservation objectives should be established as a basis for development of a national conservation strategy.

Conduct an independent evaluation of Forest Reserves and Indian Reserves that is similar to the recently completed evaluation of National Parks and Equivalent Reserves.

Consolidate the national system of wildlands: define objectives; prepare management plans; provide adequate protection and administration; and expropriate private inholdings in each unit.

Allow continued use of private inholdings (to be expropriated) within designated wildlands only so long as the land is utilized appropriately.

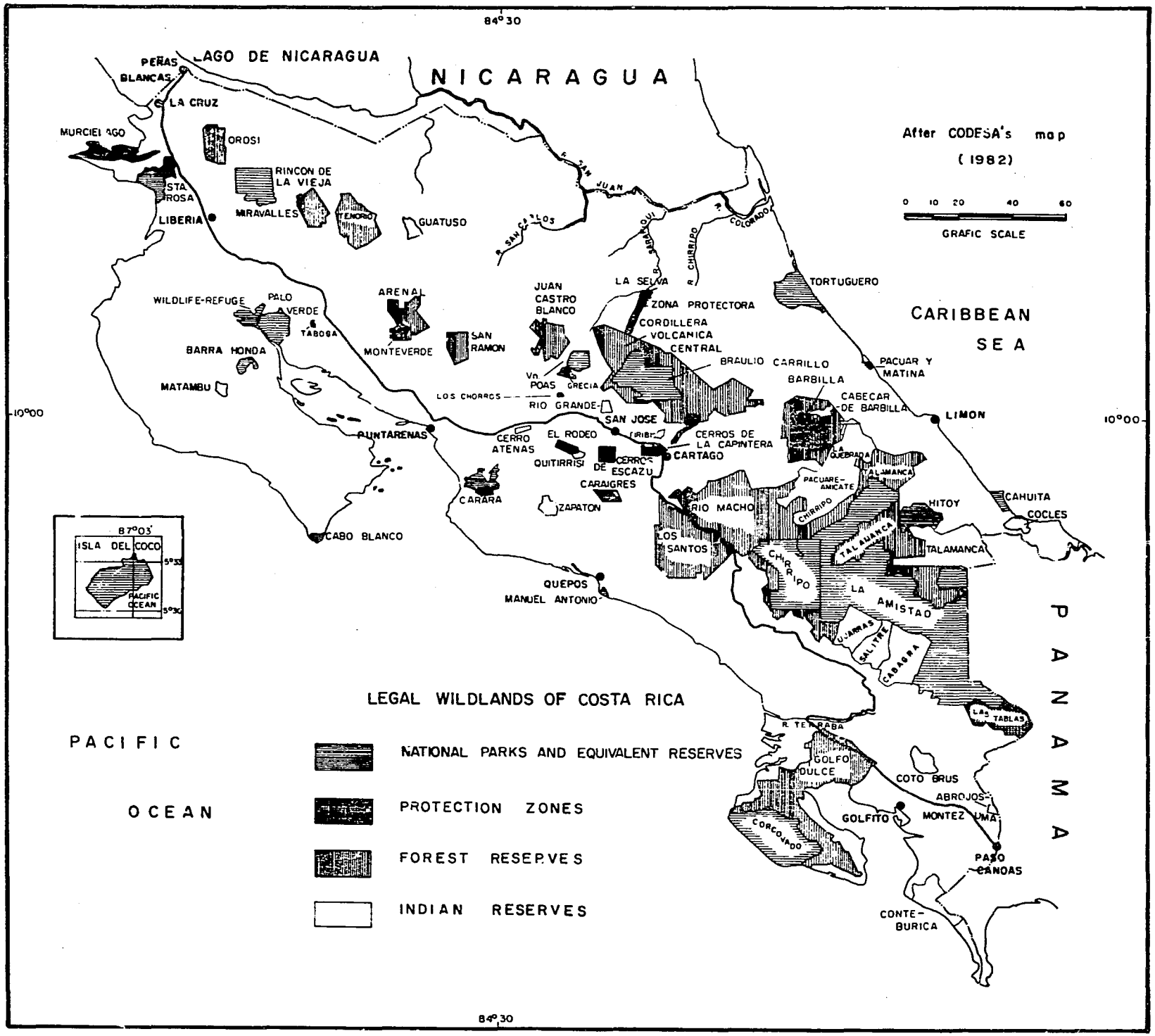

Figure 1-1.—Wildlands units legally established by the government of Costa Rica.

WILDLIFE

Costa Rica has a fairly well-know herpetofauna of about 360 species, an avifauna of some 850 species and a mammal fauna of 205 species. Much less is known about invertebrate groups, although arachnids, lepidopterans and some coleopterans are now receiving concentrated study. Though Costa Rica has few endemic species, a substantial number of species have restricted distributions, particularly in the highlands and in the Golfo Dulce lowlands. Four classes of wildlife resources are recognized: endangered species, species used by man, pest species and species without any direct importance to man.

Of the endangered herpetofauna, the golden toad is protected in the Monteverde Cloud Forest Reserve, the green turtle nests on the protected Tortuguero beach and the Pacific Ridley turtle nests on the protected Ostional and Nancite beaches. The two endangered crocodilians maintain good populations in the lowland Pacific national parks and wildlife refuge.

Seven of the 11 endangered bird species are large birds of prey. Two officially endangered bird species are thriving in protected wildlands: the Scarlet Macaw in Corcovado; and the Quetzal in Monteverde, Chirripó, Braulio Carrillo and Poás. Hunting outside of protected wildlands does not seem to be endangering any bird species except perhaps the Great Curassow, Crested Guan and Muscovy Duck. The local predilection for cage birds threatens the Yellow-headed Parrot, Yellow-tailed Oriole, Dark-backed Goldfinch and the Yellow-bellied Siskin. Pesticides seem to be causing toxicity problems in the lower Tempisque heronries. A few bird species are serious pests.

All cat and monkey species are among the 16 officially endangered mammal species, plus two highland squirrels, the tapir, manatee, and giant anteater. Jaguars, ocelots, giant anteaters and tapirs appear to require large tracts of protected forest for survival. A UNA study shows that white-tailed deer, collared peccary, common opossum, armadillo and paca are important sources of protein in rural areas. Hunting with dogs is a major problem in the unprotected forest reserves and occasionally so in the national parks and equivalent reserves. Pocket gophers, cotton rats, and vampire bats are major mammal pests.

Recommendations

Define wildlife policy functions and responsibilities, and increase coordination and cooperation of the institutions involved with wildlife.

Approve the proposed Wildlife Law, then implement and enforce it.

Provide additional wildlands units to protect migratory waterfowl in Guanacaste and to protect one or more forest corridors for bird and mammal altitudinal migrations on the Caribbean slope.

Train wildlife biologists in areas of pest control, population biology, and management.

COASTAL AND MARINE RESOURCES

The Pacific coast is almost five times longer than the Caribbean coast and is also more complex, with much greater tides, rocky headlands, sandy beaches, deepwater bays and major estuaries. Yet the only coral reef occurs at Punta Cahuita on the southern Caribbean coast. Although mangroves occur on both coasts, they are much more extensive on the Pacific coast where major estuaries and associated mangroves occupy 15% of the coastline. Nearly half the mangrove forests have been destroyed for tannin, firewood, charcoal, saltworks and shrimp ponds.

Scenic beauty is considered the most important coastal resource, especially along the northern Pacific coast where there is extensive tourist development. However, coastal development has been chaotic and largely uncontrolled, with little concern for natural resources such as potable water, or environmental problems such as contamination. Location of tourist facilities, industrial complexes or port structures is often based on political pressures and local interests.

Commercial fishing is largely restricted to Pacific waters; seasonal catching of lobster and green turtles occurs along the Caribbean coast. Fish catches from the littoral Pacific have decreased since the mid-70's even though the fishing fleet continues to increase, suggesting that Costa Rica should not expect larger catches from her littoral fisheries.

Aquiculture operations are developing rapidly in the country. Commercial rearing of shrimp and crayfish is a capital- and technology- intensive operation; hence the rearing of filter-feeding molluscs may be a more appropriate enterprise for rural coastal inhabitants. Fish culture primarily involves rearing Tilapia in ponds.

Recommendations

Develop coastal and marine resources through an integrated national policy to overcome the existing inadequate administrative structure.

Reform existing legislation to include relevant concepts of the Law of the Sea and to facilitate integrated coastal zoning.

SOILS AND LAND USE

Agricultural production has traditionally served as the primary source of national economic development and is expected to play a key role in the current program for economic recovery. Past and future use of the country's soils will largely determine the possibilities for sustained increases in agricultural productivity. Preliminary estimates of land capability indicate the following maximum sustainable use of Costa Rican soils: 9,437 km^2 (19% of the country) for permanent productions of annual crops; 4,656 km^2 (9%) for permanent pasture; 8,158 km^2 (16%) for perennial crops; 16,088 km^2 (32%) for production forestry; and 12,491 km^2 (24%) requiring absolute protection. Higher class lands can be used less intensively, e.g., a perennial crop can be grown on land classified for clean-tilled crops, but not *vice-versa.*

In 1980 there were about 19,000 km^2 of pasture and 2,250 km^2 of clean-tilled crops (including bananas and sugar cane). Pastures apparently occupy up to 76% of lands suitable for annual crops--an under-utilization of

soil capability. Extensive deforestation of potential production forests in the past two decades for pastures is an over-utilization of soil capability. The conversion to pasture of low-fertility soils on steep topography in high rainfall areas causes serious soil erosion and poor productivity.

National estimates of hydric erosion suggest 17% of the country is severely eroded and 24% is moderately eroded; flat plains and primary forest suffer little hydric erosion. Serious and widespread erosion (30% of the area) occurs on the Pacific side with another 30% moderately eroded. A rough estimate of soil loss is 680 million tons/year to erosion, of which over 80% is caused by overgrazing pasture lands. Since topsoil is essentially a non-renewable resource, the soil loss seriously threatens not only the country's agricultural productivity, but the economic viability of hydroelectric, potable water, irrigation and forestry projects as well.

Soil degradation is not limited to erosion losses; physical compaction, repeated burning, poor road design and construction, chemical toxification and inappropriate land use are also contributing to the pervasive deterioration of Costa Rica's soils. The rapidly expanding megalopolis (from Paraiso to Atenas by the year 2000) is eliminating some of the country's best agricultural soils. Planning and zoning for the greater metropolitan area is *post facto*, responding to political and speculative forces rather than considering the unique productiveness of these irreplaceable soils.

Recommendations

Investigate pasture soils in various life zones and pasture conditions to ascertain effects of extensive grazing.

Classify land according to capability as prerequisite for increasing and sustaining agricultural productivity.

Develop under-utilized lands now in pasture, but suitable for annual crops to increase agricultural productivity.

Critically review and evaluate Central Valley urbanization and recommend legal, political, administrative and technical means to minimize the elimination of excellent agricultural lands.

AGRICULTURE AND CATTLE

The agricultural sector has traditionally played a key role in Costa Rica's socioeconomic development and is expected to make even more substantial contributions to solving the current economic crisis. Agriculture accounts for 28% of national employment, 19% of GNP, and 74% of export income. The top exports are coffee, bananas, beef and sugar. Major agricultural imports include basic grains, fruits and vegetables, and animal feeds. Costa Rica has the technical capability to produce all its own food except for wheat, but has not done so due to crop preferences, low yields, high costs, lack of incentives, and cheaper imports.

Increases in agricultural production over the past decade were due to expansion of area under cropping rather than higher yields. Depressed prices for traditional exports have accentuated the balance of payments deficits. Crop diversification is promising, but major successes in increasing agricultural exports require marketing outlets, technical and financial assistance and strong support from the government.

Beef cattle production has increased dramatically over the past two decades, as is reflected by the dominant position of pasture land among farm uses. Mini-farms (< 20 ha) are more efficient producers of beef (383 kg/ha/yr) than family size (122 kg/ha/yr; 20-200 ha) or large farms over 200 ha (162 kg/ha/yr). The cultural predilection for beef cattle is reflected by the sacrifice of income just to continue as a beef rancher and the strong attraction for investors who become absentee owners or gentlemen farmers.

Increased cattle production can best be attained by intensifying management of cattle farms, rathers than continuing expansion of pasture on marginal land. Improving pastures and adopting rotation grazing systems would do more to increase beef cattle production than the other incentives proposed in the National Development Plan. The national production goal of 91,600 tons of beef for 1982 is unrealistic.

Recommendations

Encourage a GOCR priority to increase agricultural exports and investigate import substitutions as well as give technical and financial assistance.

Emphasize high-value, non-traditional crops, many of which are already grown in Costa Rica on a small scale, in agricultural diversification projects.

Increase production of beef by intensifying farm management, particularly pasture quality and use, rather than by continued expansion of pasture onto marginal lands.

WATER RESOURCES

Rugged topography and high rainfall provide Costa Rica with an incredible richness of water resources, conservatively estimated at 9 million Kw of hydroelectric potential and 350 m^3/second of sustained groundwater flow. A progressive development strategy by ICE has led to the development of numerous hydroelectric projects that now generate 99% of the nation's electricity and permit the sale of excess electricity to neighboring countries. Rural electrification programs have reached 70% of the population. The escalating cost of electricity has caused an appreciable drop in the annual growth of demand and has precipitated numerous disconnections by urban poor who can no longer afford electricity.

Unfortunately, ICE is not complying with its legal mandate to conserve, defend and protect the country's watersheds. Virtually every major watershed is being degraded by deforestation and inappropriate land use. Unless critical watersheds for both existing and potential hydroelectric projects are protected, the economic feasibility and viability of their hydroprojects will be seriously jeopardized.

ICAA and rural municipalities supply potable water to 98% of the urban area and 62% in rural areas. Even if new projects are completed as scheduled, demand is expected to exceed supply by the late 1980's. ICAA also ignores protection of water supplies due to the mistaken

attitude that other institutions are responsible for watershed protection and pollution control.

Irrigation information is ambiguous, perhaps due to the diffusion of responsibility among several government institutions. Although irrigation could substantially increase agricultural productivity, the lack of national policy, experience and expertise must be overcome. The environmental and socioeconomic aspects of the Morácia irrigation project have not been adequately evaluated.

Watershed deterioration is increasing the risks of flood damage, particularly at the eastern base of the Cordillera Central and along the narrow floodplains of the Central Valley. Ciudad Neilly is probably the most poorly located community in the country.

Recommendations

Define national development policy for water resources; a technically qualified secretariat should coordinate the various institutions involved in the protection, supply, use and recovery of water.

Protect critical watersheds from deforestation and inappropriate land use; declare hydrologic reserves and delegate their protection to the responsible institution (e.g., ICE, ICAA).

ENERGY RESOURCES

Costa Rica's dependence on imported energy increased dramatically over the past decade: 80% is now imported. Although hydropower produces 99% of the country's electricity, that is only 19% of the country's total energy consumption. Petroleum is the principal component of imported energy; it fueled rapid growth of the transport sector. With Mexican assistance, Costa Rica is drilling two test wells in 1982 to determine if petroleum deposits in southeastern Talamanca are commercially exploitable. The petroleum deposits are thought to be small and costly to exploit.

According to OLADE, Costa Rica's petroleum import costs will more than double by the year 2000, given a low GNP growth rate and constant petroleum cost. If the country recovers economically, a medium rate of increase in GNP would require $ 550 million for petroleum imports in 1985.

Even if commercial petroleum is found, Costa Rica must adjust energy consumption trends to national renewable energy resources. Diversification of local energy sources and substitution for imported energy must become national policy. The transport sector's inflexibility and dependence on imported diesel is the most intractable component of an energy substitution program.

Costa Rica's responses to the energy crisis have been largely counter-productive. Government subsidy of diesel fuel and fiscal policy favoring import of diesel vehicles stimulated a 50% increase in diesel consumption from 1974 to 1979. Because the RECOPE distillery in Moín could not meet the national demand for diesel fuel, direct import of diesel fuel increased 600% during those same years. The lack of a national energy policy and institutional coordination in energy matters has greatly hindered the government's capability to effectively and rationally deal with the energy crisis.

Recommendations

Continue to accelerate development of hydroelectric and other renewable energy sources to attract energy-intensive industry and promote substitutes for imported energy.

Rationalize the consumption of petroleum derivatives, particularly diesel fuel, by reducing imports and subsidies, restricting the import of diesel vehicles and substituting hydroelectric power.

ENVIRONMENTAL CONTAMINATION

The exceptional social, economic and demographic changes of the past 40 years have profoundly affected the environment, principally due to modern consumerism. Environmental protection measures lag far behind imported and local technological advances. Potable water quality is quite good except for rural systems outside the control of ICAA. Nevertheless, organic matter, industrial and domestic effluents and sediments still contaminate the country's rivers--the most serious national contamination problem. The Central Valley rivers are highly polluted with anionic detergent effluents. Contaminated river water is often used to irrigate vegetable crops in the Central Valley.

Key aquifers for the metropolitan area are being contaminated by garbage dumps, careless use of pesticides and fertilizers, and lack of sewer systems. Coastal aquifers are particularly susceptible to salt water intrusion and contamination by organic matter and agro-chemicals.

The generally massive and indiscriminate use of pesticides makes them pervasive contaminants of air, food, water, and menaces to human health. Although the government has restricted the use of organochlorates, they are still readily available and widely used. Pesticide problems arise frequently from lack of education and understanding of the function and hazards of pesticides. Copper toxicity ruined 50,000 ha of excellent agricultural soils in southern Costa Rica.

Solid wastes are probably the most inadequately managed, yet widespread contaminants in the country. Central Valley urban centers not in the COIM have large problems with solid waste management.

Air pollution comes principally from automotive exhausts; industrial contamination of air is minor in the metropolitan area. Narrow and congested city streets greatly accentuate localized air pollution. San José has abnormally high levels of acid rain and high levels of particulate matter in the air. Vehicles are also the major source of noise pollution, especially on San José's narrow streets and at bus stops.

Occupational health statistics suggest an enormous amount of occupational stress, yet only 10-15% of laborers use protective clothing. Pesticide poisoning is quite common, but few workers seem to take the risks seriously.

Quality control and inspection of commercial foods has been largely ignored in Costa Rica. The government food control laboratory is contaminated, overcrowded and overwhelmed with technical difficulties.

Recommendations

Government agencies concerned with environmental contamination and protection must coordinate activities to protect public health.

Increase research on the effects of contaminants on man and environment.

Enforce existing laws concerning environmental contamination.

ENVIRONMENTAL LAW

An information center for environmental law does not exist, plus the classifications system used in legal information sources does not recognize environmental law as a distinctive body of law. ASCONA's lawsuit to annul the executive resolution reducing the size of Palo Verde National Park was one of the first civic attempts to challenge environmental problems or threats in the courts. The UCR Institute of Legal Research is analyzing environmental legislation.

There is an abundance of legislation, norms, decrees, and principles that directly or indirectly concern natural resources and the environment. Environmentalists working for the enforcement and implementation of existing laws can effect considerable protection and conservation just using the legal tools already available. Unfortunately, many of these efforts have been left to the overloaded public sector, with the consequence that most conservation-type laws seem to be ignored or not enforced by government officials.

The hierarchical ranking of legal norms is (from the top) international treaties, laws approved by the legislative assembly, executive decrees, regulations and administrative resolutions and agreements. Expansion of public sector involvement with natural resources and the environment means that these activities are controlled primarily by political forces. Thus government programs and policies may be major causes of environmental deterioration. Another consequence of political dominance is that legal questions become subservient to political goals and interests.

Civil and penal mechanisms available to the conservationist include defense appeals; edicts; restraining order of an administrative act, the effects of an administrative act, or the execution of an administrative act; the accusations before the Public Ministry, administrative authority, transit tribunal or for misdemeanors. Three actual case studies are reviewed:

(1) ASCONA's suit to annul reduction in size of the Palo Verde National Park;

(2) unauthorized construction of a house in the 200 meter coastal zone; and

(3) lack of judicial enforcement of the Forestry Law's norms controlling deforestation.

Recommendations

The legal area of environmental law should be recognized by all components of the Judicial System.

Each new law with probable environmental consequences should contain extensive and explicit norms for environmental protection.

Draft an environmental code to simplify the environmental legal situation and to assign specific functions to existing institutions, eliminate overlap and derrogate all legal norms in opposition to the code.

Appoint an environmental prosecuting attorney.

Strengthen the independent power of the Judicial Branch to serve as an effective balance to the growing power of the public sector dominated by the Executive Branch.

INSTITUTIONAL ANALYSIS

Costa Rica does not have a national environmental policy that integrates all sectors; rather, each sector defines its own policies and objectives. Institutional goals are often too general and grandiose to affect specific policy; consequently few goals are attainable and few institutions seriously try to implement sectoral environmental policy. Existing policy is usually a response to problems, rather than a strategy for rational utilization of natural resources and environmental protection. The fragmented sectoral approach to policy formulation occurs without formal interinstitutional coordination. Although OFIPLAN is charged with coordinating government projects and policy, it does not take responsibility for implementation.

Human resources are marginally adequate in most institutions. The Civil Service system fosters mediocrity and stagnation, while the best qualified and dynamic professionals prefer private enterprise. The current economic crisis could provoke a massive brain-drain of top professionals leaving the country for foreign employment. University admissions and graduation policies are not based on potential employment demand, thus 50% of the university graduates do not find employment in their chosen fields.

International and bilateral financial aid is important to natural resources development and environmental conservation. Particularly noteworthy are the USAID grants to ASCONA for conservation education. Foreign investments in public sector development projects are projected at US $ 600-700 million per year, which is only a fraction of estimated costs just for the proposed Boruca hydroelectric project, a tripling of area planted to sugar cane to produce alcohol, electrification of the transport sector and petroleum exploration. Costa Rica has not taken advantage of the Mexican-Venezuelan petroleum agreement offering up to 30% of the petroleum bill for attractive loans.

Recommendations

Define government and private institutions' efforts to effect an integrated national environmental policy for environmental management, natural resources conservation and scientific research.

Strengthen SINAPROMA to influence national and sectoral projects involving natural resources and the environment.