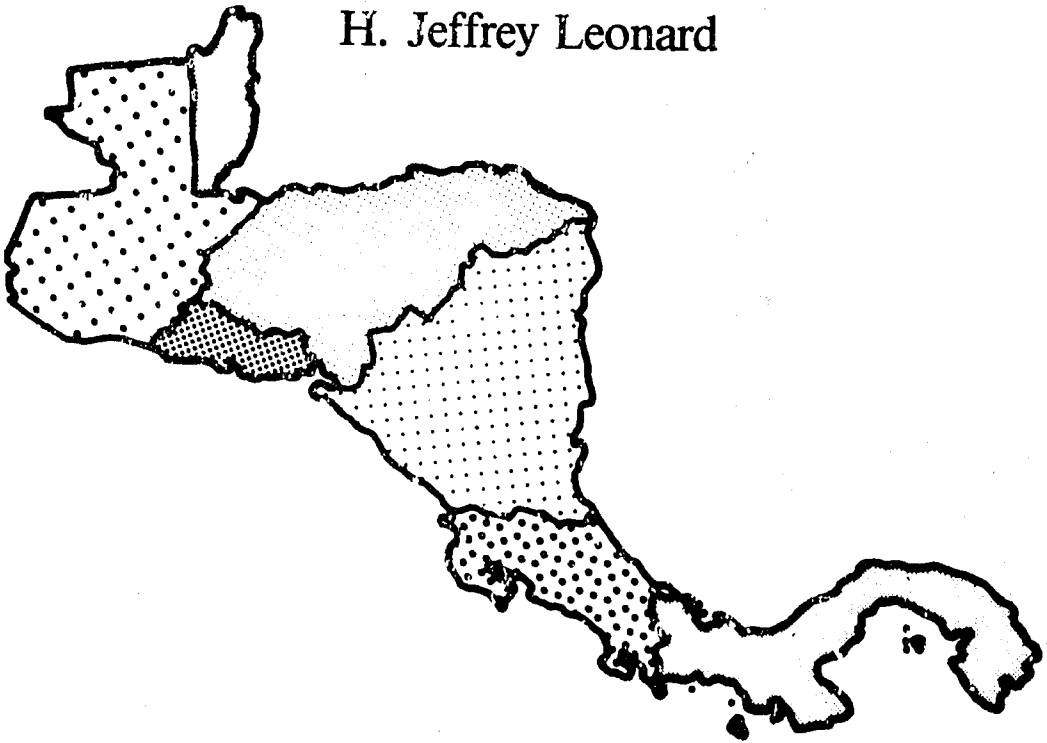


NATURAL RESOURCES AND ECONOMIC DEVELOPMENT IN CENTRAL AMERICA

A Regional Environmental Profile

H. Jeffrey Leonard



Executive Summary

IJED/Earthscan

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AND
ECONOMIC DEVELOPMENT
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By

H. Jeffrey Leonard
for the
International Institute for
Environment and Development

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FOREWORD

Central America is clearly a region undergoing profound change. Most recent analyses of the area have focused on the dynamics of the political-military situation. A few, like the Kissinger Commission's, have attempted to go beyond this limited analysis to focus on the medium- and long-term economic development of the region.

Many development plans for the region stress the critical importance of expanding agricultural production—especially for exports that will earn desperately needed foreign exchange. The majority of people in Central America already depend upon agriculture for their livelihood. These numbers are swollen by the region's rapid population growth (2.9 percent per annum). Manufacturing investment in the region has not increased significantly in recent years, and large increases in industrial employment are unlikely in the foreseeable future.

The various agriculture development plans assume that major investments must be made to improve the region's physical infrastructure. Years of neglect and destruction have left Central America's roads, utilities, and ports in poor shape to cope with an agricultural boom. None of these plans include measures to restore and rehabilitate the region's *natural* infrastructure of forests, soils, and watersheds that is the lifeblood of agriculture.

Yet all the evidence suggests that the natural infrastructure may be in worse shape than the physical one. Much of the best land in the region has undergone severe soil erosion. In El Salvador, more than 50 percent of all arable land is badly eroded. Much of the new land being cleared for farming is either very hilly, and therefore subject to erosion, or is in the moist forested areas of the Caribbean coast. In these lowland Caribbean areas, much of the soil is unsuited for sustained agriculture.

Less than 40 percent of Central America's original forest remains today, with two-thirds of the loss occurring since 1950. Rates of forest clearance have increased in every decade since the 1950s, and as much as 3 percent of the remaining forests continue to disappear each year. At this rate, Costa Rica, justly proud of its efforts to conserve its rich biological heritage, may have little primary forest with commercial value outside of its national parks by the year 2000. Marine ecosystems are also under stress. Over the last decade, catches of the commercially most important species—lobster and conch—have dropped by 41 percent and 27 percent respectively. This is due primarily to the double-edged sword of severe overexploitation of these near-shore species and increased destruction of valuable mangrove breeding habitats.

These trends are similar for all of the Central American republics, regardless of their present or past political orientation. Costa Rica, with its 40-year tradition of liberal democracy, is losing forest cover at the same rate as Guatemala, until recently dominated by military oligarchs, or even neighboring Nicaragua, with its revolutionary regime.

This is not to say that the problems of Central America do not primarily demand political solutions. Rather, it is to say that any development plans that arise from these solutions will fail in rural areas unless they contain ambitious measures to replant the region's forests, protect its critical watersheds, rehabilitate its degraded lands, and help its desperately poor small farmers to earn a decent living by sustainable farming measures.

This study was produced by the International Institute for Environment and Development under the provisions of its cooperative agreement with the United States Agency for International Development (AID). Since 1979, AID has been preparing a series of country environmental profiles to help the Agency and its host governments to incorporate environmental planning and management into the development process. This volume uses those profiles as a starting point, but goes well beyond any previously compiled information to document the rapid and extensive deterioration of the entire region's renewable resources. It is the first regional look at the problem. The full study is being published by Transaction Books, New Brunswick, N.J., in August 1987.

The preparation of any multi-country analysis requires intense collaboration with a wide range of individuals and institutions. Both the collection and review of this massive and dispersed body of information required the participation of numerous knowledgeable colleagues. To ensure that the data contained within this report are as accurate and up to date as possible, the IIED convened a technical review committee in Central America. We are grateful to the members for their time and invaluable advice both as a group and as individuals. Our thanks go to all involved:

Centro Agronómico Tropical de Investigación y Enseñanza
(CATIE) (Tropical Agricultural Research and Training Center):

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Gerardo Budowski (Forestry/Land Use)
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Interamerican Institute for Agricultural Cooperation (IICA):

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Tropical Science Center:

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United States Agency for International Development Regional Office
for Central America and Panama (ROCAP):

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Robert Winterbottom
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Joshua Dickenson III, Environmental Management consultant,
Gainesville, Florida, and

Alvaro Umaña, the Honorable Minister of Energy, Mines and
Natural Resources, Costa Rica.

IIED is particularly grateful for the help and assistance of Molly Kux of the Office of Forestry, Environment and Natural Resources at AID; James Hester, the Agency's Regional Environmental Coordinator for Latin America and the Caribbean; and Frank Zadroga of the Regional Office for Central America and Panama. Frank and Stephen Berwick of IIED developed the original idea for this report. Finally, we would like to express our gratitude and respect to H. Jeffrey Leonard for his creativity, imagination, and stamina in preparing the text.

David Runnalls
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CENTRAL AMERICA—A REGION IN CRISIS*

Central America's basic natural resources—its land, forests, water resources, coastal areas, and fisheries—are misused, and the future economic prosperity of the region's 25 million people is at stake.

Throughout Central America, the overwhelming evidence is that pressures from growing populations and expanding economies are causing people and governments to overexploit the natural resources at their disposal in order to satisfy immediate daily needs, increase employment opportunities, increase current revenues, and avoid difficult political decisions such as the redistribution of productive lands. As a consequence, depletion rates of forests, soils, fisheries, and other crucial resources far exceed renewal rates, and secondary problems—soil erosion, sedimentation of hydroelectric dams and coastal harbors, and water pollution—have reached crisis proportions in many parts of the region.

This "mining" of the environment facilitates the short-term subsistence efforts of both people and governments but has contributed to the ongoing long-term decreases in food production, per capita income, and human well-being that are occurring in many parts of the Central American region during the 1980s. Growing evidence suggests that all of the nations of the region are experiencing direct financial losses and have already sacrificed substantial future economic opportunities as a result of careless management of vital renewable natural resources.

To cope with these problems and to alleviate widespread human suffering, the governments of the region, as well as other nations and international assistance organizations that fund Central American development programs, must take steps to help the countries of the region implement sound natural resources management practices. They must devote more attention to the environmental consequences of many of the development programs in the region. And unless development programs include regional approaches to regional problems, those programs are likely to be counter-productive in the long run.

At the core of Central America's environmental crisis are two stark facts:

- The region's population has exploded.

In 1920 there were about 5 million people in the seven countries; by 1960, 12.5 million; by 1986, more than 25 million—a 400 percent increase over 1920. Central America's population has grown at a faster rate than any other region of the world in recent decades and is now growing at a rate of 2.9 percent a year, higher than all of Latin America and just about equal to that of Africa. If this rate is maintained, the region's population will double again in 24 years. And in Nicaragua, Honduras, and Guatemala—

“...pressures from growing populations and expanding economies are causing people and governments to over-exploit the natural resources at their disposal in order to satisfy immediate daily needs...”

*H. Jeffrey Leonard wrote this study for the International Institute for Environment and Development. Dr. Leonard is a senior associate with the Conservation Foundation, Washington, D.C.

countries that contain over 60 percent of the region's people—the annual population growth rate is about 3.5 percent per year.

- This mushrooming population is over-taxing the region's mismanaged and over-exploited renewable natural resource base. The problems of rapid population growth are compounded by two other factors that only further increase the strains being placed on the fragile natural resource base of the region. First, opportunities to earn a living in the manufacturing or service sectors are severely limited by the grave economic situation that prevails in all of these countries. Second, a number of deep-seated political and economic traditions constrain access to the most fertile agricultural lands of the region for the majority of people.

Throughout Central America, these factors have combined to leave the mass of the rural population in a position of dividing up the region's limited resources among more and more people, producing a decreasing amount of the region's basic food requirements, and, especially in rural areas in recent years, suffering declining standards of living by measures of both per capita income and quality of life indices.

In many instances, the only recourse for much of the rural population in Central America in recent years has been to intensify exploitation of the lands and natural resources around them. This has had devastating consequences for the environment throughout Central America. Many steep and rugged watersheds have been cleared by fire, by extension of agriculture and grazing and by other careless land use practices. This has caused massive erosion, increasing flooding and mudslides during the rainy season, and has contributed to reduced stream flows during drier times of the year. Serious land erosion is also occurring on less steep lands, primarily because of extensive clearcutting of forests, overgrazing and compaction of the soil by livestock, and the exhaustion of lands cleared for cultivation. Ironically, however, much of the timber that is being cut in Central America is being burned or left in place, rather than being harvested, compounding the squandering of potentially valuable resources.

“...unless development programs include regional approaches to regional problems, those programs are likely to be counterproductive in the long run.”

Natural Resources and Socio-Economic Trends

The environmental crisis in Central America is integrally linked with the wide array of socio-economic problems plaguing the seven countries of the region: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.

Consider these factors:

- [] The economies of the region are wracked by declining income and

escalating international debt. Agricultural productivity is low and per capita production of basic foods has stagnated or declined throughout the region. At the same time export earnings have not increased rapidly enough to permit increased importation of food. Harvests of lobster and other valuable shellfish have declined in many coastal areas of the region in recent years.

- High migration continues from rural areas, especially heavily populated hillside areas of the central highlands, into urban areas of the region. Most governments of the region are trying to develop the fragile Caribbean areas of the region as a safety valve to divert some of these migrants, but in many cases the agricultural production from these newly conquered lands has been disappointing and unsustainable. Although much of the electricity in the region is currently from hydropower, this resource remains underutilized. The hydropower capacity that does exist is seriously endangered by watershed deterioration and consequent sedimentation in reservoirs and river channels.
- The health and quality of life indicators of the countries of Central America also present a depressing picture. For example, mortality rates for infants and children remain high in much of Central America. In contrast to the rest of the hemisphere, respiratory diseases and other communicable diseases such as diarrhea, malaria, polio, and tuberculosis are major causes of death, except in the urban areas of Panama and Costa Rica. The resurgence of malaria is a particularly serious problem for Central America, especially in conjunction with the appearance of insecticide resistant strains of malaria-carrying mosquitos. Widespread and heavy use of pesticides, many that are no longer used in the United States, also threaten human and environmental quality.

All of these socio-economic problems are combining today in Central America to make the conditions of day-to-day living for a growing number of people more and more dismal. The Kissinger Commission's "Report of the National Bipartisan Commission on Central America" concluded in 1984 that about half of the urban population and up to three-quarters of the rural population in El Salvador, Guatemala, Honduras, and Nicaragua could not satisfy their basic needs in nutrition, housing, health, and education. Although relatively better off, the populations of Belize, Costa Rica, and Panama, particularly those in rural areas, have experienced marked declines in their standards of living in recent years.

Neither the environmental nor the economic crises that are today undermining efforts to improve the welfare of the people of Central America were inevitable. Despite the problems caused by international events--such as declining terms of trade, a quadrupling of oil prices in the

1970s, and tremendous increases in rates of interest owed on foreign debts—all the countries of Central America have a great capacity to provide for themselves. Indeed, on the whole, Central America is extraordinarily rich in natural resources. Its volcanic soils are among the most fertile in the world; it has abundant supplies of timber and fresh water; and its coastal waters yield shrimp, lobster, and numerous other marine resources.

Why Then The Crisis?

When thinking about the economies of Central America, several critical factors must be borne in mind:

- Most people in Central America are directly dependent upon the natural resource base for their livelihood. In fact, about 25 percent of total domestic economic production in each of the seven countries comes from agriculture, forestry, fishing, and related activities. This dependency will not be substantially reduced in the foreseeable future, for the manufacturing and service industries in the region cannot provide enough jobs for the fast-growing population.
- For long-standing social, economic, and political reasons, a small minority in each Central American country (except Nicaragua) controls most of the total wealth and arable land. Much of the land best suited for basic food crops is either tied up in large under-used landholdings or is used for cattle raising or export crops such as cotton. This commercial agricultural sector provides substantial employment during harvest times; however, in many areas this employment drops during other seasons.
- The overwhelming majority of the agricultural workforce in Central America—small-scale farmers and landless peasants—is relegated to hilly, marginal, or otherwise fragile lands. These subsistence farmers produce most of the foods for domestic consumption. But crop yields are very low by U.S. standards. Few government programs to increase yields or incomes are targeted at these farmers. Many of the governments in the region continue to encourage migration to frontier areas in the sparsely populated Caribbean areas, often with the help of foreign aid funds. Although some of the frontier regions may merit development, much of the frontier land will not sustain traditional agricultural productivity under large-scale land clearing and the traditional annual cropping practices of small-scale farmers. Thus, the solution to overcrowding in Central America's urban areas and to the increasingly marginal existence of poor farmers is not likely to be found in schemes to transport these masses into the frontier areas of Central America. Nevertheless, the frontier developments

“...all the countries of Central America have a great capacity to provide for themselves.”

continue; and as they advance, they permanently destroy primary tropical forests which serve as repositories for some of the greatest natural biological diversity on the planet.

Within this context, the steps necessary to create enduring economic progress in Central America can be identified. First, agricultural development is of fundamental importance. Second, although continued production of export crops is necessary to support sagging economies and generate receipts of foreign currency, more attention to improving productivity in subsistence agriculture is critical. Third, although heretofore underdeveloped areas of the Caribbean side of the region may hold significant potential, careless development of these lands is likely to exacerbate current economic and environmental problems in the region.

In short, the combination of careful development and efficient management of the region's natural resources is one of the crucial keys to future economic progress throughout Central America. Ironically, however, the record of recent years indicates that virtually all of the economic expansion generated in agriculture and related industries has come as a result of stepped up exploitation of these resources rather than management of them. Up and down the entire isthmus, these natural resource systems are being mined, squandered, poorly managed, gradually degraded, and reduced in numbers and quality.

Consider some of the indicators that point to this conclusion:

- According to a background report done for the Kissinger Commission, close to half of the farms throughout the region are thought to use land inefficiently or maintain large amounts of land in permanent fallow.
- Productivity per hectare of land is low for most crops, with food crop yields in particular reaching as little as one-third of the yields in the United States.
- It is estimated that as much as two-thirds of the best agricultural lands in Central America are today being used for extensive cattle grazing at an economic return far below that which they could produce in cultivation of either export or food crops.
- Cattle ranching operations use far more land than necessary and are highly inefficient producers, in part because most of the pasture in the region is left in its native state rather than upgraded and managed.
- There is vast waste of cut timber, with only a very small portion of the annual timber cut in the region used for commercial purposes.
- Rates of reforestation are very low, amounting to about 7 percent of the annual timber cut across the region.
- Little processing is done of raw timber for a wide range of downstream industrial uses, meaning that the region is a net exporter of low value-added timber and a net importer of many high value-added wood, pulp, and paper products.

“...the combination of careful development and efficient management of the region's natural resources is one of the crucial keys to future economic progress throughout Central America.”

- Overfishing is endemic in coral reef, cay, seagrass, and other near shore areas throughout the region, so much so that shortages of such high value species as conch, lobster, and some species of shrimp are becoming major problems in many areas.
- At the same time, development of continental shelf and deep sea fishing industries in most of Central America continues to lag for a lack of not only capital and expertise, but also of entrepreneurial activity.
- There is a large-scale wastage of by-catches of edible finfish and potentially useful trashfish that are caught in conjunction with exploitation of shrimp and other high-value marine species.

These and numerous other indicators of economic inefficiency in the natural resource-based industries of Central America show major barriers to future economic development in the region. But they are also major causes of the massive degradation of the region's soil, forest, and water resources. Unless the dual problems of economic inefficiency and environmental deterioration are addressed simultaneously in the coming decade, little progress can be expected toward improving the level of social and economic development in Central America.

ENVIRONMENTAL CONSEQUENCES OF MISUSE AND MISMANAGEMENT OF CENTRAL AMERICA'S NATURAL RESOURCE BASE

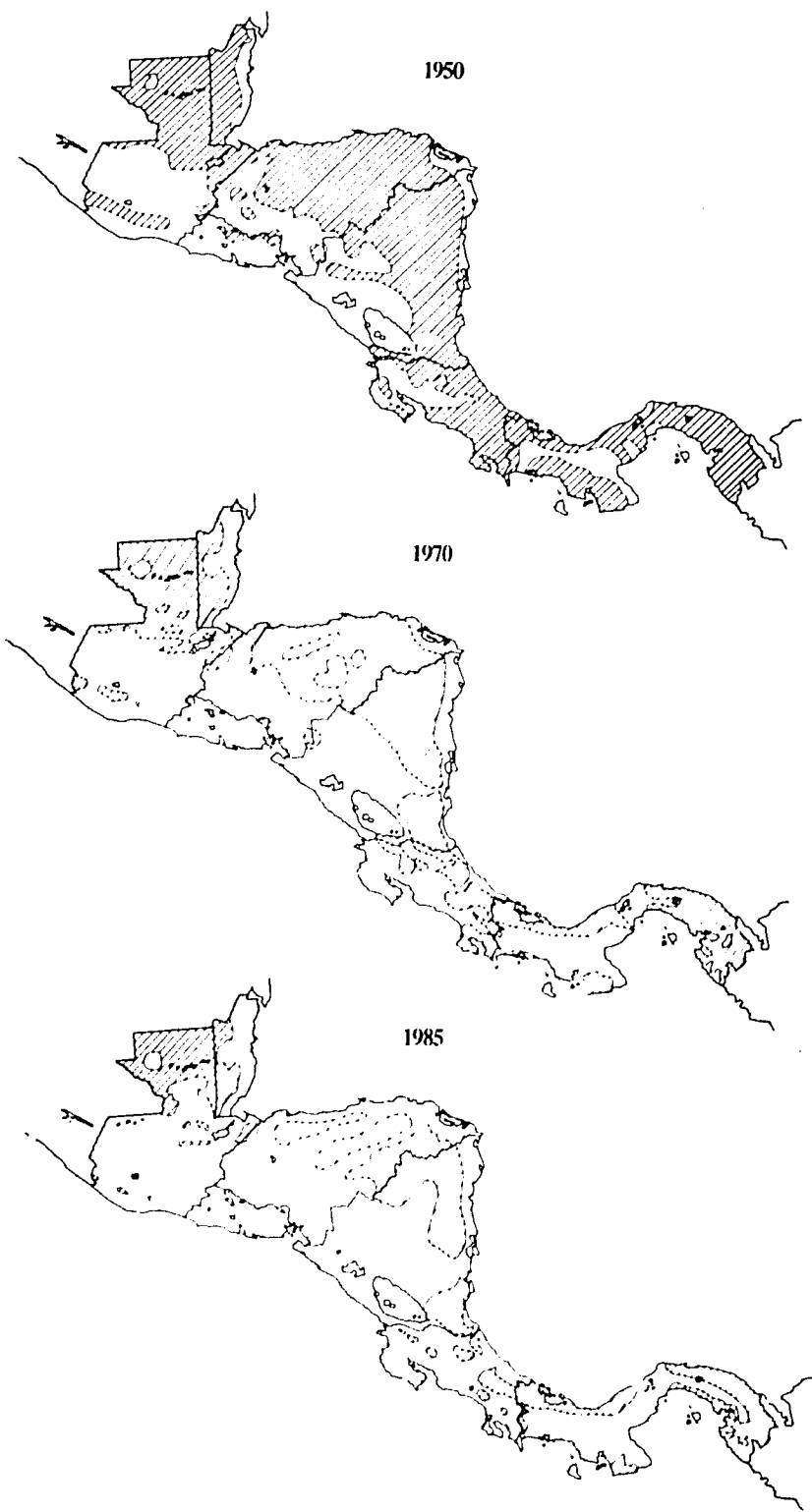
Loss of Forests

The most important ecological change occurring throughout Central America as a result of population and economic pressures is the rapid and continuing conversion of forests to other land uses. Today less than 40 percent of the land area of the seven countries remains forested. That is not unusual in comparison to other regions of the world. What is unusual, however, is the rate at which the Central American landscape is being transformed. For example, it is estimated that two-thirds of all the forests cleared from the time Central America was settled have been cleared since 1950. And rates of forest clearing have increased in every decade since 1950. In 1970, 49 percent of Central America was forest and woodland. By 1980 this figure was down to 41 percent—a loss in one decade of 15 percent of the region's forest cover, or an area larger than the state of Maryland.


Deforestation has its positive side, of course. It can and has provided land for crops and pasture. But forest clearing in Central America has been economically wasteful. Much of the timber being cut is being burned in place or left to rot in the fields. Commercial harvesting of timber contributes significantly to the economy of only one country in the

“Unless the dual problems of economic inefficiency and environmental deterioration are addressed simultaneously in the coming decade, little progress can be expected toward improving the level of social and economic development in Central America.”

DEFORESTATION IN CENTRAL AMERICA: 1950-1985*



*Does not include coastal mangrove forests and open pine savanna.

 Dense Forest Cover

Sources: USAID Country Environmental Profiles; Heckadon Mereno and Espinosa Gonzalez, 1985; Nations and Komer, 1983.

region—Honduras. And even there it is estimated that timber with a commercial value of \$320 million is each year burned on site or left to rot. Moreover, most experts now agree that most of the forest lands with the best agricultural potential have already been cleared. Much of the remaining forests in Central America overlie soils that are of poor quality and subject to rapid deterioration.

Deforestation also may be eliminating plant species that may some day prove to be valuable for pharmaceuticals, plant hybrids, or pesticides. About 25 percent of the medicines now produced commercially in the United States are derived in whole or in part from tropical plants. Collecting, screening, and commercializing tropical plants is still a fledgling pursuit in Central America. But there are indications that at least 15 percent of some 1,500 tree species screened in Costa Rica may be potentially useful in treating cancers.

Belize is the only country in the region that is not experiencing great forest destruction; it is losing less than 1 percent of its remaining forest cover per annum. Belize has a small population (only 150,000), and the demand for land for cattle and agriculture in the interior has not been strong enough to stimulate the assault on forests that has occurred in every other Central American country. Belize thus has the opportunity to assess its forest resources carefully and protect those forests least suited for agriculture before population pressures force it, as well, to succumb to haphazard deforestation.

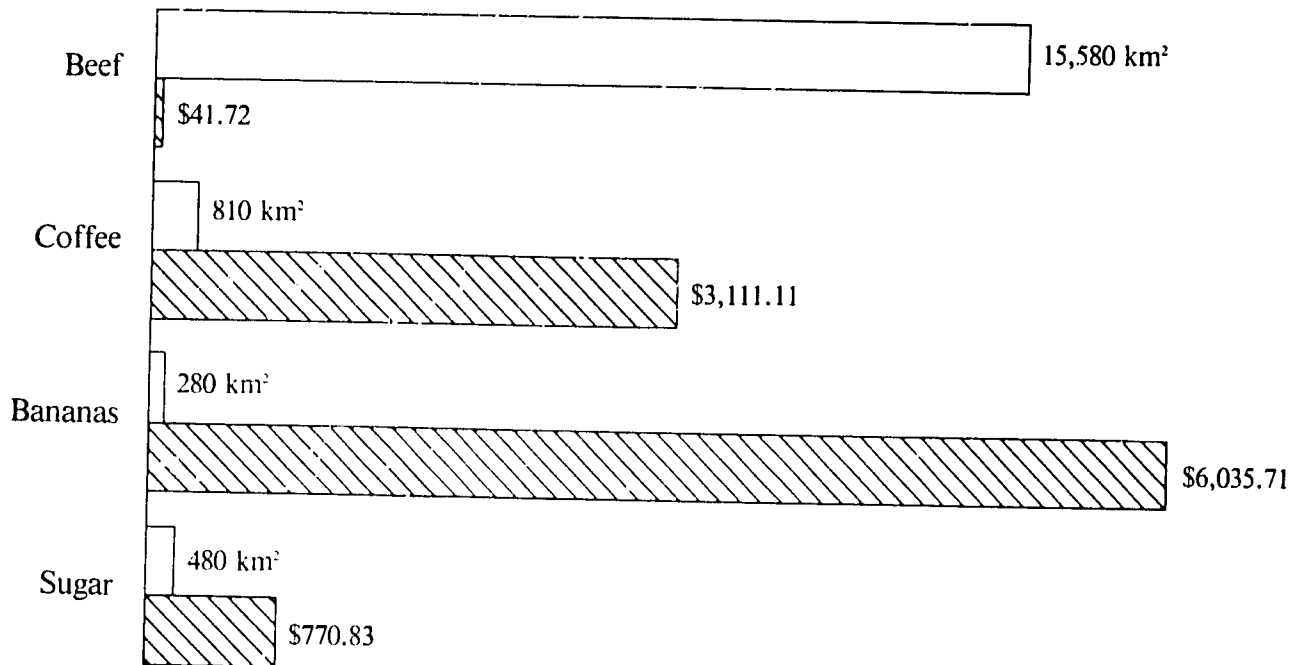
Land Degradation

Land degradation is reaching crisis proportions in every country in Central America except Belize because of extensive deforestation, expansion of cattle raising and agriculture in hillside and mountainous areas, and the absence of sound soil conservation and land management practices.

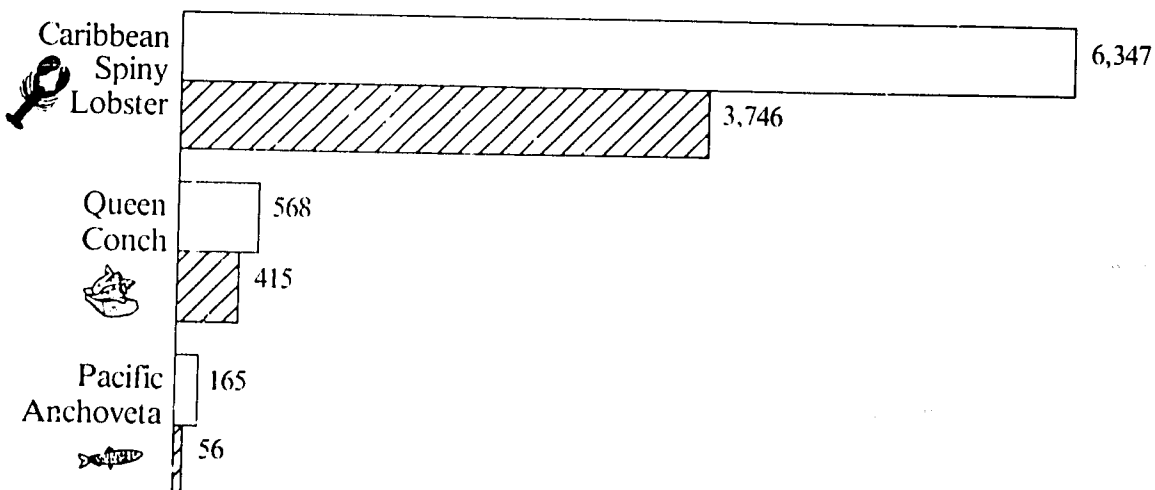
The problem is most serious in the Pacific drainage areas where the majority of the population lives—about 40 percent of all lands in the Pacific zone suffer erosion rates high enough to undermine the land's productivity. Most critically affected is El Salvador. By 1984, more than 50 percent of that country's land mass was subject to serious soil erosion or was significantly degraded by the combined forces of forest clearing, cattle grazing, and other harmful agricultural practices by peasants and fuelwood gatherers. Although other countries of the region may perceive—usually wrongly—that they can compensate for the loss of productive land on their Pacific slopes by reaching into lands on the Caribbean side, El Salvador, with only a Pacific coast, cannot. East of the continental divide, land degradation is most obvious in the interior frontier areas recently cleared for cropping, ranching, and colonization. Much of this land is abandoned after only a few growing seasons.

“...about 40 percent of all lands in the Pacific zone suffer erosion rates high enough to undermine the land's productivity.”

Export Receipts per km² of Land Devoted to Agricultural Commodities in Costa Rica



Declines in Heavily Exploited Commercial Species (Metric Tons) Average for 1977-79 Compared to Average for 1980-82



Land degradation and soil erosion lead, of course, to increased amounts of sediment flowing into fresh water streams, rivers, lakes, and coastal bays and estuaries. In Guatemala, for example, the annual soil runoff in areas still covered by vegetation is estimated to vary between 20 and 300 metric tons per square kilometer. In unforested areas, the soil runoff amounts to between 700 and 1,110 metric tons per square kilometer.

This sediment load takes its toll downstream. Consider hydroelectric power generation, which has increased more than five-fold in Central America in the past 20 years:

- A recent study of Guatemala's new Pueblo Viejo Quixal hydro project found that sediment was accumulating considerably faster than originally estimated at the dam site and in the upper basin. If not corrected, the lifespan of the project will be shortened and generating capacity will fall. The cost of remedial measures to enable the dam to produce at its originally projected rates will be at least \$100 million if current siltation rates continue.
- In El Salvador, too, heavy siltation in recent years has reduced the generating potential of the Cinco de Noviembre project and has greatly increased the cost of maintaining the power-generating equipment. Siltation of reservoirs is already posing problems in newer hydro projects in that country.
- In Honduras, hydro projects now under construction, at a cost of almost \$1 billion, will get their water from watersheds with high sediment rates. Yet little has been done to reduce the threat of siltation to these projects.
- In Costa Rica, which gets 99 percent of its electricity from hydro projects, the watersheds above virtually every major hydro plant are deteriorating. At one plant, the revenue lost because of sedimentation is estimated between \$133-274 million.

The problem extends beyond the borders of individual countries, for many watersheds encompass more than one nation. The Lempa River is one example. Rising in south-central Guatemala and western Honduras, it then flows into El Salvador. It drains 49 percent of El Salvador's territory and provides 93 percent of El Salvador's hydroelectric generating capacity. Yet nearly 8,000 square kilometers of the 18,000-square kilometer Lempa watershed is either in Guatemala or Honduras. Indeed, much of the sediment that is harming El Salvador's hydro plants flows across the borders from Guatemala and Honduras.

Sedimentation has caused other problems too. In Panama, rapid deforestation has led to a doubling of siltation in the lake that supplies water to operate the Panama Canal, the cornerstone of Panama's economy. In Honduras, a rapid buildup of sediment is reducing the capacity of the reservoir that provides water for Tegucigalpa, the capital. In Guatemala, sedimentation reduced the carrying capacity of the Motagua River by 50 percent between 1960 and 1980. This threatens an

extensive government-sponsored irrigation program, it has led to increased flooding causing millions of dollars of damage and has reduced the navigable distance on the river.

Destruction of Coastal Resources

Because of its unique location—a narrow landmass separating the world's two great oceans in a tropical climate—Central America has been endowed with some of the most beautiful, abundant, and potentially productive coastal resources on earth. Its coral reefs, mangrove swamps, and estuaries provide habitats for commercially valuable shell and fin fish.

But these resources are also now threatened. One contributing problem is overfishing, especially in near coastal waters. In Belize, queen conch catches have dropped 75 percent in recent years since peaking in 1972. Fish catches in most coastal areas of Central America grew in the 1960s and 1970s. They have remained relatively stagnant or have declined since then. In Honduras, conch populations have fallen so dramatically that harvesting for commercial or local consumption has virtually ceased. Lobster and open-water shrimp catches have dropped since 1978 when they topped 5,000 metric tons. The governments of the region have tried to stop overfishing by limiting seasons for various species, by limiting the number of boats licensed, and by limiting harvesting and controlling poaching.

Another problem is the continuing and extensive destruction and degradation of crucial coastal habitats. No matter how effective the attempts to control overfishing, future supplies of fish in the region may be reduced unless habitat destruction and degradation is halted. This problem is only slowly being recognized, and no major efforts have yet been made by any government in the region to preserve, protect, and wisely manage coastal resources.

Mangrove forests are the breeding grounds for most species of fish, shrimp, and lobster, yet coastal mangrove forests have been harvested, removed to make way for coastal development, or damaged by man-made pollution at increasing rates in recent years.

In Guatemala, Honduras, and El Salvador, mangroves are widely harvested for firewood and for making charcoal. Some areas have been completely destroyed, others degraded. Agricultural runoff also threatens mangroves in El Salvador, Honduras, and Guatemala; the runoffs carry sediment and pesticide residues into the mangrove estuarine waters. In Costa Rica, mangroves have been destroyed to provide bark for the tanning industry (recently outlawed), for salt production, and for coastal development. In Panama, mangrove swamps have been drained, cleared, and filled for urban expansion, mariculture activities, and resort development.

It has been estimated that a square kilometer of mangrove estuary can

“Because of its unique location, Central America has been endowed with some of the most beautiful, abundant, and potentially productive coastal resources on earth.”

produce a commercial yield of \$95,000 per year in fish and shellfish production. Thus, in addition to the ecological damage caused by mangrove destruction, Central American countries have also suffered major economic losses because of mangrove destruction. Belize is the only country in the region where mangroves are not now being significantly degraded or eliminated.

Pesticides

Indiscriminant use of pesticides, many restricted or no longer allowed in the United States—DDT, DBCP, leptophos, and BHC, for example—is one of the most pervasive environmental contamination and human health problems in Central America. Many are extremely dangerous; some are toxic to humans, others can cause cancer or sterility. And the levels used, especially in the cotton-raising areas of the Pacific coast, far exceed recommended doses. This, of course, is a major economic cost. Indeed, pesticides now account for nearly 50 percent of agricultural costs in some areas.

The pesticide problem is manifold. Field workers wear little or no protective clothing. Some cannot read or do not understand warning labels. Some wash application equipment in irrigation channels or streams. Since most of the workers' homes do not have running water, workers and their families often bathe in streams contaminated with pesticides. Profligate and careless aerial spraying compounds the problem; in some countries pilots are paid a percentage of the volume of pesticides sprayed.

The heavy use of pesticides over the years in Central America has destroyed some natural insect predators and has led to the emergence of pesticide-resistant insects. This has been followed by increased pesticide applications—in some areas from a recommended average of 8 applications to more than 40 per year.

Widespread use and abuse of pesticides has caused many poisonings and deaths. In a recent five-year period, some 19 thousand pesticide poisonings were medically certified—17 thousand in Guatemala and El Salvador alone. But record keeping is poor, and it is generally believed that the true human toll is substantially higher. The U.S. Agency for International Development has reported that there are about 1,800 pesticide poisonings per 600 thousand population in Central America each year compared to 1 per 600 thousand a year in the United States.

In some areas of the Pacific coast, 80 kilograms of pesticide are applied on each hectare of cotton, one of the highest uses in the world. One country, El Salvador, used at least 20 percent of the world's total parathion production in a recent year. DDT residues in the tissue of people in cotton-growing areas have been measured at almost seven times higher than levels found in the tissue of urban residents. Very high levels have also been found in milk and meat samples—in some milk as much as

“The U.S. AID has reported that there are about 1,800 pesticide poisonings per 600 thousand population in Central America each year compared to 1 per 600 thousand a year in the United States.”

90 times higher than the residue level allowed in the United States.

The pesticide problem in Central America has contributed to and has been compounded by a resurgence of malaria in some areas. In 1982, 3,000 cases of malaria were treated in Belize compared to 1,600 in 1980 and 2,075 in 1981. This has made it necessary to increase use of DDT in and around many villages. DDT use is also widespread in Guatemala, Nicaragua, El Salvador, and Honduras.

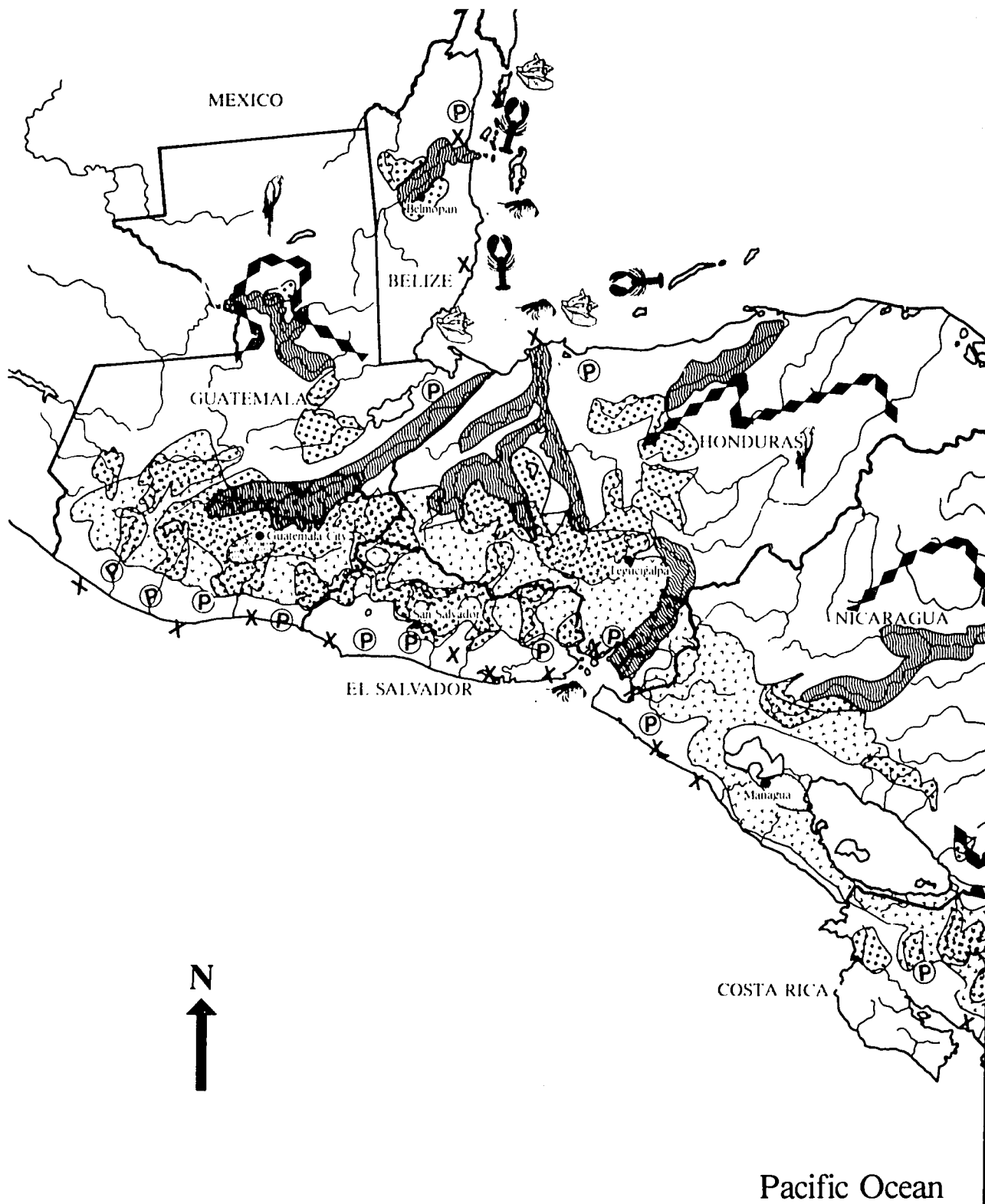
The people of Central America are not the only ones endangered by the gross misuse of pesticides in their region. About 70 percent of all agricultural production in Central America is exported, much of it to the United States. And pesticide use is heaviest on the large plantations, farms, and ranches that produce the key export crops—cotton, coffee, beef, bananas, citrus, and sugar cane. Although U.S. inspectors have blocked the entry of Central American meat and crops with increasing regularity in recent years because of pesticide contamination, it is likely that some of these contaminated products escape detection. Thus U.S. consumers may also be exposed to foods from Central America containing high levels of pesticides.

Pesticides also pose a threat to Central America's abundant wildlife. Although no detailed studies have yet been made, a recent Nature Conservancy report noted that the heavy use of pesticides in Central America may be adversely affecting North American birds that winter there. Said the report: "It would be ironic if North American migrant birds were suffering from the effects of heavy pesticide use in their non-breeding quarters, just as they were recovering from such usage in their breeding grounds."

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Environmental Pollution

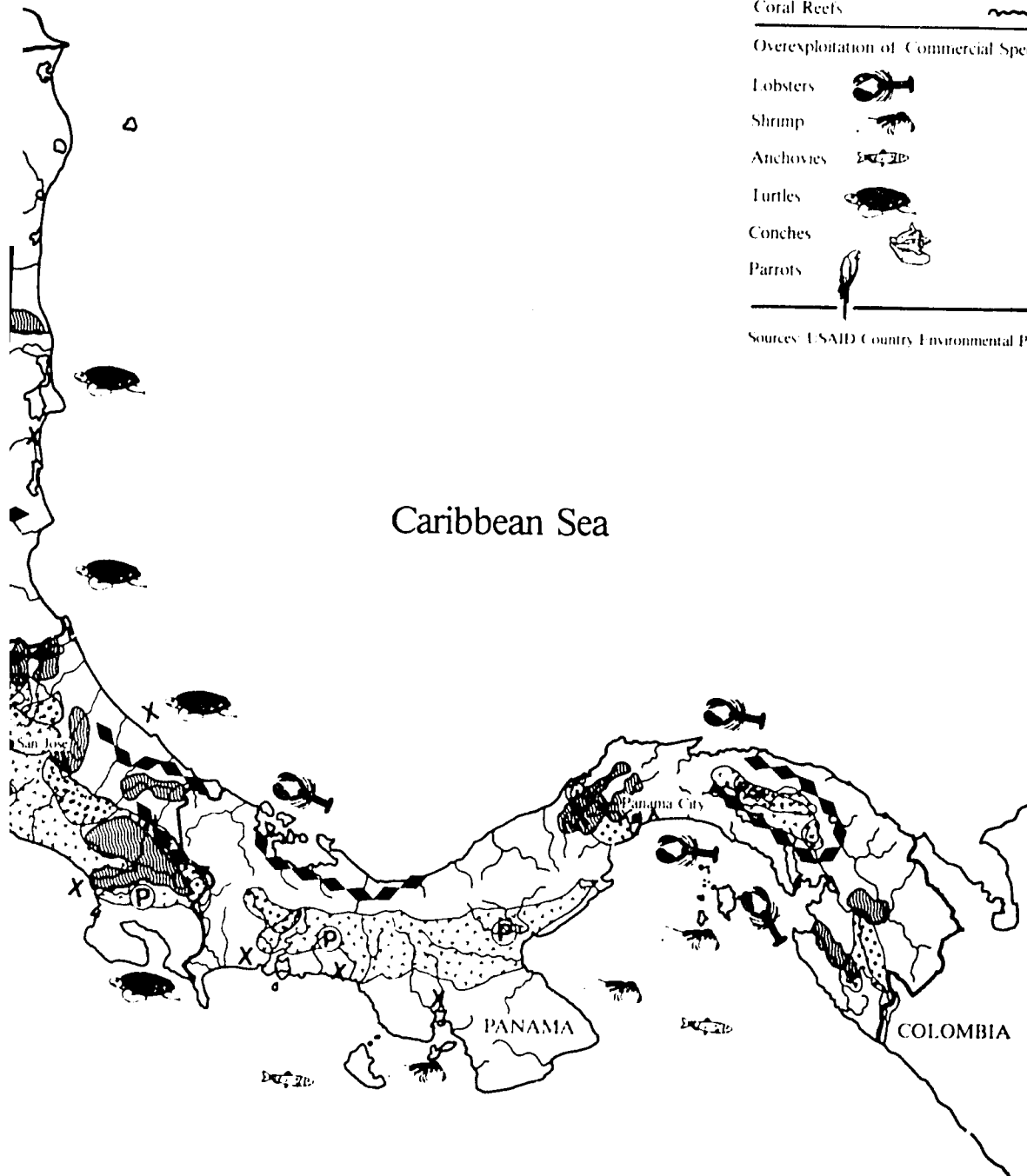
Beyond rampant pesticide contamination, the most serious environmental pollution problem in Central America is water pollution. Most urban areas have some form of centralized sewage collection system—sewers, canals, or open gutters—for storm runoff and domestic sewage. But there are fewer than a dozen sewage treatment systems in all of Central America. Thus, most sewage is discharged untreated directly into rivers, lakes, or coastal waters. This creates major health problems for rural populations downstream, since rivers and streams are still widely used for washing and bathing; thus, as noted earlier, enteritis and diarrheal disorders remain the major cause of death in Belize, Guatemala, Honduras, and Nicaragua.



ENVIRONMENTAL DESTRUCTION IN CENTRAL AMERICA

- Mangrove Destruction X
- Reported Pesticide Poisonings (P)
- Urbanization of Prime Agricultural Lands [Solid Box]
- Watershed Destruction [Dotted Box]
- Increased Flooding [Horizontal Lines Box]
- Deforestation Front [Diagonal Lines Box]
- Severe Soil Erosion [Stippled Box]
- Coral Reefs [Wavy Line]
- Overexploitation of Commercial Species
- Lobsters [Lobster Icon]
- Shrimp [Shrimp Icon]
- Anchovies [Anchovy Icon]
- Turtles [Turtle Icon]
- Conches [Conch Icon]
- Parrots [Parrot Icon]

Sources: USAID Country Environmental Profiles.



ENVIRONMENTAL MANAGEMENT IN CENTRAL AMERICA

Each Central American country has at least one government agency or department directly concerned with environmental and natural resources problems. In reality, however, control of natural resource issues is often divided among a variety of ministries and departments, resulting in conflicts of interest, duplication of efforts, excessive bureaucracy, and general inefficiency. In most countries, natural resources protection is erroneously viewed as secondary to and separate from economic production. Agricultural policy generally takes precedence over environmental policy. Thus conflicts between land use for agriculture and protection of natural resources persist. Indeed, there seems to be little understanding of the need for economic development that can be sustained over the long term through wise management of the natural resource base.

One of the most significant obstacles to natural resources protection in all Central American countries is insufficient and/or poorly trained personnel. In addition to a lack of training institutions within Central America, government salaries are notoriously low. When effective personnel are hired, they soon move on to high-level posts where they earn more. And some of the best natural resources personnel sometimes move to other nations or go to work for international organizations.

In general, most nations in the region have environmental and natural resources legislation. Enforcement is another matter, however. There is little political or financial support to make those laws work. Thus some observers have noted that most Central American environmental laws are worth little more than the paper they are written on.

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Regional and International Considerations

Both the causes and effects of many of the worst natural resource problems in Central America reach beyond the borders of the individual nations. Natural resource destruction at the local level in one country can have spill-over effects in neighboring countries. Conversely, the ability of one country to control its most pressing natural resource problems may be hampered by the fact that it shares watersheds, natural ecosystems, or migratory biological resources with other countries in the region that have less desire or administrative capability to solve the problems.

This greatly magnifies the challenge to individual governments and to international development assistance organizations to reverse the deterioration of the region's natural resource base. One country's laws to control rampant destruction of its coastal and wildlife resources may be meaningless if legal or illegal demand for wood, mangrove bark, or exotic endangered species continues in neighboring countries. Efforts to preserve the power-generating capacity of major hydroelectric projects, or to assure the long-term availability of valuable marine resources such as shrimp and

lobster, will be successful only if they are undertaken in all countries that share upstream watersheds and such critical marine habitats as mangroves and coral reefs.

CONCLUSIONS

Economic growth and equitable distribution of the fruits of that growth are obviously the top priorities for Central America. The costs will be high: an estimated \$24 billion in outside aid, according to the Kissinger Commission report, just to get back to per capita 1980 gross domestic product levels by 1990.

Although economic development efforts for Central America must stress industrialization and increasing manufacturing output, much of the region's economic growth will still come from increases in Central America's traditional commodity exports—coffee, bananas, cotton, sugar, and meat. Yet, the limits of the international market to absorb these products, coupled with the high inefficiency of allocating prime agricultural land to beef cattle, make it imperative that all countries of the region focus their agricultural development efforts on two goals: 1) diversification of the commercial agricultural base and 2) increased productivity in and emphasis on the production of domestic foodstuffs.

Yet, major increases in agricultural production are not likely without new programs to maintain, protect, and rehabilitate the region's natural resource base. The strains placed on the natural resource base may be already nearing their limits. Pesticide use on export crops is approaching the point where the additional costs and dangers to human health are not balanced by corresponding increases in yield. Areas opened up for cultivation and grazing only recently have already been abandoned after a few years because of careless management of the land and soil. With increasing economic pressure to feed, house, and clothe rapidly growing populations, such signs of exhaustion and stress of the natural resource base could grow in the future.

Indeed, while agricultural development in the region continues to stagnate, and human welfare for perhaps a majority of all people continues to decline, the future potential productivity to be gleaned from the region's soil base and remaining forests is being slowly undermined, and the waterways of the region are filling with silt and pollution. Moreover, some of the most significant and debilitating health problems facing the region could be substantially reduced with improvements in environmental management—for example, provision of safe drinking water, vector control, and more focus in agriculture on production of basic foodstuffs.

Even the prospects of industrialization are endangered by the deterioration of natural resources. Most of the region's electricity is generated by hydro plants. The region has limited renewable energy sources and little oil. Indeed, much of the foreign debt problem is due to the high cost of

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petroleum imports. Yet, watershed deterioration is already reducing power output from the region's hydro dams through soil erosion and subsequent siltation of reservoirs.

This is not to say that the problem is hopeless. In the future, though, public and private economic development projects in Central America must go hand-in-hand with measures to reverse the deterioration of the environment and the region's natural resource base. Unless that is done, substantial resources, public and private, will continue to be wasted and poverty will continue to be the way of life for the vast majority of the people in Central America.

On the other hand, in spite of the severity of the environmental problems throughout Central America, natural resource management programs in the region can only succeed if they are linked closely with other important economic development programs, since a fundamental step toward improving environmental management must be the provision of economic alternatives that help reduce the pressure of expanding populations on the resource base. No government in the region can be expected to pursue major natural resource management objectives if the result would only be to force more rural people into already overcrowded urban areas where employment opportunities are scarce.

Thus, development assistance programs in Central America must not only emphasize the mutual interdependence between conservation and development goals in the long term, but should actually pursue such goals in concert with other efforts. In particular, the U.S. government, other bilateral donors, the World Bank, the Inter-American Development Bank, and other important multilateral development assistance agencies must take concerted actions to head off an ecological and economic disaster of massive proportions in Central America in the future.

A PLAN FOR CONSERVATION-ORIENTED AGRICULTURAL DEVELOPMENT

Agricultural development, as the Kissinger Commission Report stressed, is the most critical key to improved economic and social welfare in Central America. Even though the goal of improving the management of natural resource systems was not explicitly stated anywhere in the Kissinger Commission report, it is obvious that implementation of many of the recommendations set out by that report to stimulate agricultural development would also lead to better resource management. For example, the Commission made recommendations for U.S. assistance to:

- encourage elimination of the worst inequities in land distribution;
- stimulate more efficient use of potentially productive but idle lands;

“...public and private economic development projects in Central America must go hand-in-hand with measures to reverse the deterioration of the environment and the region's natural resource base.”

- improve legal procedures to guarantee smallholders secure title to their lands;
- focus agricultural development efforts on improving productive efficiency of small producers of basic foodstuffs;
- increase access of small farmers to rural credit programs.

To the extent that U.S. development assistance in Central America can help the countries of the region accomplish these goals, it is likely that some of the worst natural resource problems will be eased in the process.

In addition, a series of positive development initiatives in the agricultural sector should be pursued. All the steps recommended in this program—which is elaborated in the full-length text of this study—can be introduced under current political-economic conditions in most rural areas of the region and can rely on techniques and programs that have already proven to work under the conditions prevailing in the region. Most important, this integrated program for increased agricultural development would have the effect of simultaneously creating rural employment, slowing population migration to urban areas, reducing import dependence for essential agricultural inputs, and greatly improving the status of natural resource management. The key components of this integrated program include increased attention to:

- Rural public works programs.
- Development of local animal feed industries.
- Increased meat production for domestic use.
- Local commodity processing industries.
- Agricultural diversification.
- Improved crop yields in the subsistence sector.
- Improved agricultural extension services for small farmers.
- Introduction of mixed cropping and agro-forestry systems.
- Integrated pest management programs.
- Nitrogen-fixing techniques in agriculture.

“All the steps recommended in this program can be introduced under current political-economic conditions in most rural areas of the region and can rely on techniques and programs that have already proven to work under the conditions prevailing in the region.”

ENVIRONMENTAL POLICIES FOR DEVELOPMENT PROJECTS

The major international development assistance agencies that operate in Central America should take a number of important steps to ensure that the projects they sponsor or support do not contribute to greater environmental degradation. All natural resource-based development projects in the region should include, as an integral component of the initial project proposal, a plan of action to ensure that there is no significant deterioration of the natural resources affected. This is only prudent because ultimately the long-run productive returns to these investments are going to depend on continuing management of these natural resource systems. In particular, the following policies should be established:

- Forest management and reforestation programs for all timber harvesting, wood processing, and wood-consuming projects;
- Upland watershed management for hydroelectric and water supply projects;
- Integrated pest management in conjunction with commercial agricultural projects;
- Mangrove, coral reef, and other marine habitat protection in tandem with fishery development projects;
- Environmental impact analysis and alternative routing studies for all major road-building projects;
- Land capability studies for potential development sites in frontier zones of the Caribbean region.

IMPROVING REGIONAL ENVIRONMENTAL MANAGEMENT

No governments in the Central American region currently have available adequate baseline data with which to make important development planning decisions about the uses of their essential natural resources. Furthermore, all countries lack specialists trained in environmental sciences and natural resource management to design and implement needed natural resource programs. Thus, international donors should help to better the capabilities of regional organizations and national governments by improving critical natural resource information and upgrading the human resources to manage natural resources. These should include programs that target:

- Improved land capability and land use information.
- Promulgation of regional land use and development goals.
- Development of guidelines for managing special eco-systems.
- Greater attention to the interdependence between conservation and development programs.
- Increased watershed management and soil conservation programs for small farmers, especially in areas with potentially fragile lands—steep slopes, high rainfall, etc.
- Introduction of a regional program for monitoring and reducing water pollution from sewage and industrial sources.
- Increased support for marine and coastal resources development and protection.
- Initiation of a coordinated program to screen genetic resources of the region, assess the economic values of critical wildlands and wildlife, and provide regional support for wildlands and wildlife protection areas.
- Encouragement of a regional program to preserve, protect, and record the rich and diverse cultural resources of Central America.
- Creation of a regional scholarship fund for training in environmental sciences and natural resource management.

POSTSCRIPT

A comprehensive treatment of the issues highlighted in this summary is available in the full text of "Natural Resources and Economic Development in Central America" published by Transaction (New Brunswick, N.J.) in August 1987.

Also available from IIED are individual environmental profiles for each of the seven countries of Central America prepared earlier under USAID sponsorship.

Together these documents represent a "first"—an integrated compilation of environmental data about a geographical region of the developing world. They offer planners and developers essential information about the region's ecologic, economic, and social systems. In addition to providing valuable data on the individual countries of the area, these documents reveal the regional nature of many of the region's problems.

These materials may also be viewed as addenda to the Kissinger Commission's earlier report on the social, economic, political, and military problems of Central America. They clearly demonstrate the link between environmental problems and many of the social and economic problems of the region.

APPENDIX

ENVIRONMENTAL PROFILES

The purpose of Environmental Profiles is to provide a comprehensive picture of a country's environment and natural resources. This includes an analysis of the present use, management, and conservation of natural resources such as soil, water, trees, forests, and rangelands, which are of fundamental importance to sustained economic development and social well-being. Ecologically sound development planning must be based on a clear assessment of a country's natural resource potential. Frequently, information necessary for such an assessment is widely dispersed and not readily accessible. The profiling process can serve to collect, integrate, and publish this information in a manner that is useful to scientists, planners, and decision makers.

The profiles listed here are in-country studies that include considerable information on natural resources and environmental problems, as well as institutional, policy, and legal aspects of environmental conservation and resource management. They usually conclude with a series of recommended strategies or actions needed to deal with environmental issues. They have, in many cases, been printed with illustrations, maps, and other graphics.

Profiles provide a benchmark description of the extent and condition of a country's natural resources, which can serve as a basis for evaluating trends in resource use and areas of significant environmental changes in the future. They also promote recognition of the environment as a system of interacting and interdependent natural, agricultural, industrial, urban, and other components with numerous opportunities for both complementarity and conflict. Profiles can also serve to highlight crucial gaps in our knowledge of the environment and natural resources—knowledge that must be complete if sustainable development is to occur.