THE INTER-AMERICAN DEVELOPMENT BANK - IDB

EXECUTIVE PROFILE FOR REGIONAL DIALOG ON THE ENVIRONMENT

THE MESOAMERICAN SUB-REGION

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I. List of Abbreviations

ALIDES: Central American Alliance for Sustainable Development
IDB: Inter-American Development Bank
WB: World Bank
CBM: Mesoamerican Biological Corridor
CCAD: Central American Commission on Environment and Development
CCAB/AP: Central American Council on Forests and Protected Areas
CBD: Convention on Biological Diversity
CEPAL: Economic Commission for Latin America and the Caribbean
CIAT: International Center for Tropical Agriculture
CINPE: International Center for Economic Policy, the National University, Costa Rica
CLACDS : Latin American Center for Competitiveness and Sustainable Development
CO2 : Carbon Dioxide
CICAFOC: Indigenous Campesino Coordinator for Community Forestry
CNA: National Water Commission, Mexico
COHDEFOR: Honduran Corporation for Forest Development
CONADIBIOS: National Commissions on Biological Diversity, Central America
CONABIO: National Commission on Biodiversity, Mexico
CONAMA: National Commission on the Environment
CST: Certificate for Sustainable Tourism
CIMMYT: International Center for Improvement in Corn and Wheat, Mexico
DGMA/CCAD: General Directorship on the Environment, Central American Commission on Environment and Development
ECO-OK : Program for Forest Certification Managed by the Rainforest Alliance.
FAO : Food and Agriculture Organization (United Nations)
INAB: National Forestry Institute, Guatemala
INCAE: Central American Institute for Business Administration
INE : National Ecology Institute, Mexico
IPCC III: Third Inter-Governmental Round Table on Climatic Change
LGEEPA: General Law on Ecological Balance and Environment Protection, Mexico
MARN: Ministry on the Environment and Natural Resources, Guatemala
NOM: Official Mexican Norms
CBO: Community-Based Organization
NGO: Non-Governmental Organization
PACADIRH: Central American Plan for Integrated Development of Water Resources
PARCA: Environmental Plan for the Central American Region
GDP: Gross Domestic Product
bUNPD: United Nations Program for Development
UNEP: United Nations Environment Program

PROARCA-CAPAS: Environmental Program for the Central American Region, USAID
PROFEPA: Federal Attorney General's Office for Environmental Protection, Mexico
PROSIGA: Program for Integrated Environmental Management Systems, CCAD
RUTA: Regional Unit for Technical Assistance, World Bank
SEMARNAT: Secretary of the Environment, Natural Resources, and Fishing
SICAP: Central American System of Protected Areas
TAR: Third Assessment Report of the IPCC
NAFTA: North American Free Trade Agreement
UICN: World Union for Nature
UNOFOC: National Union of Communal Forestry Organizations, Mexico
WRI: World Resources Institute

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EXECUTIVE PROFILE FOR REGIONAL DIALOG

ON THE ENVIRONMENT

II. Background

A. Environmental Management Challenges in the Region

The countries in Mesoamerica have achieved major advances in the field of environmental management over the last ten years. Both Mexico and the Central American nations (Belize, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama), have put a whole series of legal, institutional, and operating changes in place with regard to environmental management, both in the regulatory and non-regulatory arenas. Although many countries in the region already had had regulatory agencies for managing water and forest resources beginning many decades ago, the decade of the nineties, particularly after the Rio summit in June 1992, was a construction period for institutions in charge of environmental management in Mexico and Central America. Today all the countries in the region (eight in total) have a ministry of environment, and an organic or general law backing the mandate. This is a huge achievement if you consider that at the beginning of the decade of the nineties, only two of these countries had a ministry on the issue.

Despite this positive global balance, the challenge faced by the region with regard to the environment is considerable. The Mesoamerican countries face high population growth rates – particularly in urban areas – an accelerated deterioration in the number and quality of available hydric resources, accelerated deforestation processes, and a growing impact by natural threats. During the next several decades, these countries will face the difficult task of reconciling their hydric, energy, and forest resource needs with the demands to preserve the environment and use their resources in a sustainable fashion.

In consideration of the foregoing, this executive profile seeks to identify these huge challenges, redeeming the achievements of the past decade and pointing out future courses of action facing the Mesoamerican region with regard to environmental management.

Faced with the complexity of the challenges the Mesoamerican region is facing with regard to the environment, INCAE-CLACDS has grouped these issues into a proposal revolving around three conceptual pivots that address the environmental problem and achievements at the national and regional level. These three conceptual pivots include:

Issues related to managing natural resources. Despite its rich endowment in natural resources, Mesoamerica faces a huge challenge in preserving its extraordinary natural heritage and managing its natural resources in a sustainable fashion. This profile proposes to analyze the problem and the achievements in terms of recognized importance for the region such as: preservation of biological diversity, deforestation, climatic change, vulnerability to hydro-meteorological threats, and the growing pressure on water resources.

Issues related to environmental impact and urban and industrial development. This pivot will center around issues from the "brown" agenda for environmental management, referring to environmental conditions in urban areas, problems with hydric and atmospheric contamination, management of solid and liquid wastes, and efforts being developed in the region to incorporate cleaner production technologies for managing and controlling the infrastructure. Of particular interest are the institutional frameworks for an effective policy on environmental control with regard to regulatory systems, laws and by-laws, and control and application systems, as well as re-engineering and industrial re-conversion programs that may contribute to improving the countries' performance in this area.

The environment and competitiveness. This pivot seeks to evaluate the current position and the challenges facing the countries in the region and their eagerness to participate more actively in international markets. The requirements for increasing competitiveness for the countries in the region through better integration of environmental aspects into their companies' competitive position and products will be analyzed. In addition, research will be carried out on the efforts by these countries to use their unique competitive advantage with regard to natural resources and to position themselves in environmental product and socially just markets. The latter is an important stance that offers great potential for growth in the region. In addition, the challenges inherent in offering environmental features within a business climate that encourages direct investment and the strengthening of a high-quality industrial plan will be addressed.

B. Methodology and Information Sources

The INCAE-CLACDS team turned to a combination of published and unpublished sources, as well as interviews held with key individuals throughout the region, especially the "Dialog" participants. The information available in this area is of variable quality and relevance and there are serious challenges associated with compiling and updating it.

During the course of the interview and information gathering period, the Dialog participants provided valuable data and indicators about their respective countries, of variable quality and relevance. To analyze the trends in the state of the environment in the region, publications from multi-lateral organizations such as the IDB, the World Bank, CEPAL, FAO, UNPD, UNEP, and WRI were consulted.

Elsewhere, a review of electronic sources (web sites, data banks) and printed documents was made. A great deal of literature generated by regional and national organisms about the environmental situation in Mesoamerica was also consulted as part of assembling this profile. In particular, sources such as la CCAD, INCAE, UICN, RUTA, CINPE, PROARCA-CAPAS, PROSIGA, and the Mesoamerican Biological Corridor were reviewed. In addition, publications by the State of the Region and State of the Nation Reports generated by the Mesoamerican countries since 1996 were reviewed.

III. Priority Issues for Environmental Management in Mesoamerica

A. Priority Problems: Natural Resources

In this first section the trends detected in the region with regard to management of the green agenda will be analyzed. Within this context, general trends in biodiversity, forest resource, hydric resource, and coastal marine resource management will be reviewed.

1. Land Biodiversity

In this first group of issues the region's heritage resources are of note; they are of prime importance because this is one of the areas with the most macro-biodiversity in the world. A recent study reveals that Mesoamerica is one of the most significant spots with regard to biodiversity at the world level, since on 0.77% of the earth's surface, it houses some 24,000 species of vascular plants, of which 5,000 are endemic; in addition it possesses 2,859 species of vertebrates; and it also has 4.2% of all the endemic vertebrates in the world.

In addition, Mesoamerica for millennia was a land bridge and a funnel that allowed for an extraordinary concentration of life forms. It houses a total of 1,193 bird species, which places it in second place in the world as a region with the highest level of diversity of bird fauna, after the Andes. Therefore, we find high levels of endemism in the Sierra Madre in Chiapas, in the Altos Cuchumatanes in Guatemala, in the Sierra de las Minas in Guatemala, as well as in the Montañas Maya in Belize, the Talamanca Mountain Range between Costa Rica and Panama, and in the Darién hills.

Likewise, it is one of the most important source centers for many domestic species of economic importance, and there even exist primitive varieties of beans, corn, gourds, cacao, tomato, cotton, chile, leguminous fodder, and many other species whose preservation is vital to improving the resistance and quality of cultivated varieties of the same species (León, 1979; CONABIO,1996). If we take into account the agro-biodiversity aspects, Mesoamerica is without a doubt a region of utmost importance, as demonstrated by the variety of modified or cultivated ecosystems existing in the region (WRI, 2000). In addition, it is known that both intra-species and inter-species diversity is greater in humid tropical areas than in dry tropical regions.

a) In Situ Conservation

In order to preserve the unique natural and cultural heritage in the region in the face of growing economic and demographic pressures, most of these countries have turned to active biodiversity conservation measures, creating *in situ* protected areas. There exists a great diversity of *in situ* conservation entities and until recently the most frequently employed mechanism had been state administration of protected areas. Today, however, new conservation initiatives are arising that use diverse arrangements between local governments, community organizations, and private companies.

For example, Mexico is among the top ten countries in the world in terms of mega-biodiversity; therefore the panorama is much more complex. CONABIO in Mexico has performed very encouraging work and has been at the head of discussions in the Conference of Parties (COP) of the Convention on Biological Diversity (CBD) in terms of defining the biological heritage of the neo-tropic. Likewise, Mexico was among the signatories of the Darwin Declaration on the need to encourage biodiversity inventory efforts in the world arena. Elsewhere, INBIO in Costa Rica has been innovative in this field, since it has carried out efforts to establish priorities for wildlife protection areas in the country based on their biological importance.

In 1997, it was calculated that 58% of the remaining forest coverage in Central America was in the Central American Protected Area System (SICAP) (UICN, 1997). Of the 24 eco-regions identified by Dinerstein (1995) in Mesoamerica, 11 are in a critical state and 11 are threatened with disappearance. This information accounts for the strategic importance of the efforts carried out by the states in the region in the area of *in situ* conservation. (See Chart 1-1 in Appendix 2).

b) *Ex Situ Conservation*

One means of conserving the genetic wealth in the region that is in full upswing in the countries is *ex situ* conservation of the biological diversity components and their genetic resources and of the wildlife species and domestic crops. *Ex situ* conservation is dealt with in Article 9 of the Convention on Biological Diversity (CBD), which has been signed by all the countries in the region. It provides unique opportunities for the region, especially for the development of research and training in the use and propagation of the biodiversity components. Among the initiatives linked to *ex situ* conservation in Mesoamerica we can include:

a. Gene banks, such as seed, sperm, and ova banks;
b. In vitro collections of plant tissue and microbial growths;
c. Animal reproduction in captivity and artificial propagation of plants, enrichment of voluntarily sprouting plants and secondary forests; and
d. Gathering of live organisms for zoos, aquariums, and botanical gardens for research, education, and dissemination.

2. Forests

Latin America and the Caribbean are one of the world regions with the highest proportion of land covered with forests. They have 47 percent of total forests, which represents 852 million hectares of tropical forest and 43 million hectares of other temperate and dry forests (FAO, 1997; 2000). Although at the world level deforestation decreased 20 percent during the nineties (in comparison to the eighties), forest loss rate remained constant in Mesoamerica and barely decreased in South America (FAO, 2000). In Mesoamerica the total forest surface decreased from 81.3 million hectares in 1980 to 73 million hectares in 2000. In Central America it was estimated during the middle of the nineties that there was an annual deforestation rate on the order of 388,000 hectares (CCAD, 1998).

The changes in forest coverage in the region in the decade of the nineties reveal distinct processes underway for the agricultural frontier in the region. In total, an average of 113,000 hectares of forest per year were lost, at an annual 1.5% rate for the region during the nineties. Profound differences were detected in forest availability between El Salvador and Nicaragua, since the former lost barely 7,000 hectares of forest/year during the nineties, which represented 4.6% of the existing forest in the country. On the other hand, Nicaragua, the country that, after Mexico, had the greatest area of lost forest, lost 117,000 hectares per year during those same years, which represents an annual rate of 3% of its forest supplies (See Chart 1.1.).

Chart 1.1. Changes in Forest Coverage in Mesoamerica During the Years 1990-2000

Country	**Total Forest Area (Thousands of Hectares)**	**Changes in Forest Coverage 1990-2000**	
		In Thousands of Hectares/Year	As a Percentage/Year
Belize	1,348	-36	-2.3
Costa Rica	1,968	-16	-0.8
El Salvador	121	-7	-4.6
Guatemala	2,850	-54	-1.7
Honduras	5,383	-59	-1.0
Mexico	55,205	-631	-1.1
Nicaragua	3,278	-117	-3.0
Panama	2,876	-52	-1.6
MESOAMERICA	**6,287**	**-113**	**-1.5**

Source WRI, 2001

The natural forests in the region must be understood to be a system and not a simple group of trees. They have a fundamental impact on all levels of social and economic life in the Mesoamerican communities, both in the present and in the future. In some countries, they bear critical socio-economic importance since they provide supplies to the wood industry both for domestic consumption and for exportation and generation of foreign currency. They also supply traditional goods such as food, energy, non-wood forest products, medicine in many rural populations (WRI, 2000), and environmental goods and services for urban populations and regional business corridors (carbon capture, natural disaster containment, recharging aquifers, and detention of erosion and soil loss).

Due to the foregoing, it is clear that the priority problems for the natural forest in the region are:

a. The conversion of forest land to other uses, due to expansion of agricultural, livestock, and urban lands.
b. Deforestation and non-stainable use of the forest for wood production.
c. Degradation and fragmentation of the forest ecosystems and forest fires (particularly in tropical areas).

A superficial analysis of forest product generation reveals that they have increased constantly over the last thirty years. In 1970, round log production in Mesoamerica was 31.6 million m^3. In 1995 this volume had doubled to 59.9 million m^3.

In Mexico, two-thirds of its timber potential is in temperate forests and within those, pines represent half the volume of lumber produced. Of this total volume, 80% of the wood felled and processed is used for energy in the form of firewood and vegetable charcoal.

Although much of the firewood comes from agricultural land, living fences, and secondary forests, the volume of extraction for energy purposes continues being very high in several countries in Central America. In Guatemala, the commercial energy sources only made up 38% of the total energy consumption in the country in 1995. Nevertheless, the consumption of non-commercial energy sources (primarily firewood and vegetable charcoal) increased 72% between 1985 and 1995.

During the El Niño Phenomenon from 1997-1998, forest fires in Central America destroyed 1.5 million hectares of forest. Of those, one million hectares were agricultural lands equivalent to 5% of the region's territory, with economic losses valued at US $14 million (CCAD, 1998b) (See Chart 1.2.).

Likewise, the impact of forest fires was also exceptionally high in Mexico during this period, since 14,302 incidents occurred that affected a surface area of 583,664 hectares (SEMARNAP, 1999).

Chart 1.2. Fires Detected in Central America and Average Damages to the Forest and Agricultural Sector (December 97 – May 98)

Country	Land Surface (Hectares	No. of Fires	Damages in Forest Hectares/ 1998	Damages in Agricultural Hectares/1998	Total Affected Area Hectares/ 1998	Total Surface Percentage
Belize	**2,143,500**	**656**	**22,960**	**16,400**	**39,360**	**1.83 %**
Guatemala	**10,889,000**	**10,906**	**381,710**	**272,500**	**654,360**	**6.00 %**
El Salvador	**2,097,000**	**227**	**7,945**	**5,675**	**13,620**	**0.64 %**
Honduras	**11,49,200**	**9,594**	**335,790**	**239,850**	**575,640**	**5.12 %**
Nicaragua	**12,142,800**	**15,196**	**531,860**	**379,900**	**911,760**	**7.51 %**
Costa Rica	**5 ,13,300**	**1,511**	**52,885**	**37,775**	**90,660**	**1.78 %**
Panama	**7,51,700**	**4,196**	**146,860**	**104,900**	**251,760**	**3.33 %**
TOTAL	**51,86,500**	**42,286**	**1,480,010**	**1,057,150**	**2,537,160**	**4.96 %**

Source: Central American Commission on the Environment and Development – CCAD – 1998 Forest Fire Balance in Central America 1998 - San Salvador, El Salvador, Chart No. 5, p. 8.

Forest plantations also had an upswing in Mesoamerica during the nineties as shown by a diagnosis of the Central American forest sector performed by UICN in 1997, which substantiated the existence of 358,089 hectares in forest plantations in the region (CCAD, 1998, UICN,2000).

In 1995 it was estimated that there were 109,000 hectares of artificial forests in Mexico (UNEP, 2000). These artificial forests will tend to increase in surface and economic importance as commercially exploitable forests diminish and modern techniques for sustainable forest cultivation are used. It bears mentioning that there has been a series of experiences in the form of incentives and payment for environmental services, and other creative financing projects in the region that have provided a demonstration of the long-term viability of forest resource management as a renewable resource par excellence (UICN, 2000).

3. Fresh Water

Fresh water resources in the Mesoamerica region are abundant but their geographic distribution shows a high degree of disparity in the availability of these resources as well as areas with growing hydric deficits. Of the total 1,123 km^3 of water annually available for the region, annually a total of 84.4 km^3 are extracted for domestic, industrial, and agricultural uses.

Although some countries such as Belize (66,470 m^3), Panama (51,616 m^3) and Nicaragua (37,484 m^3) have high volumes of fresh water available per capita at the global level, there are profound differences in relation to other countries that have a much lower per capita availability, such as El Salvador (2,820 m^3) and Mexico (4,136 m^3) (WRI,2000).

It is believed that countries that have less than 5,000 m^3 of water available per capita face "stressful" situations with regard to the supply of hydric resources for human use (UNEP-GEO-LAC, 2001; UCR/Development Observation, 2001). (See the pertinent charts in Appendix 2.)

Surface water in the region is divided into large hydrographic basins, many of them of international importance, such as the Colorado River, the Grande River, the Usumacinta River, the Grajalva River, the Paz River, the Motagua River, the Lempa River, the Coco River, the San Juan River, and the Sixaola River. Many of these basins encompass wetlands of great international importance with up to a total of 22 sites and cover 1,188,000 hectares. All of them were recognized by the RAMSAR Convention (WRI,1999).

In Mexico's case there are the Alto Golfo and Colorado River Delta Biosphere Reserves, the Lagartos River in Yucatan, and the Centla, Tabasco, swamps. There also exist internationally important wetlands in the Cuatrocienagas Flora and Fauna Reserve in Coahuila and the national marshes in Sinaloa and Nayarit. In Central America, there are many internationally important wetland sites, particularly in the areas of the Dulce River in Guatemala, Juquilisco Bay in El Salvador, the Gulf of Fonseca, the Corinto-Poneloya mangroves, and the Los Guatusos Wildlife Refuge in Nicaragua, and Caño Negro, Tortuguero, Palo Verde and Térraba Sierpe in Costa Rica, and the Gulf of Chiriquí and the Gulf of San Miguel in Panama.

Mesoamerica is without a doubt a privileged region with regard to hydric resources. Regrettably, this richness is increasingly threatened due to mismanagement of water, its over-exploitation, and its degradation. At the same time there are local factors that make the situation critical in some areas, particularly with regard to the geographic distribution of water and population, since most of the population in Central America lives on the Pacific seaboard, while it is the Caribbean where most of the hydric wealth is found. Similarly, the population in Mexico is concentrated in the country's center and north, while most of the available hydric resources are found on the Tehantepec Isthmus.

The result of these growing pressures on water resources is that many ecosystems have been severely degraded, which has caused the loss of their capacity to provide goods and services, with the respective consequences for human populations and the ecosystems themselves.

The problem affecting this relationship between water, human populations, and nature in Mesoamerica is due in large part to the lack of integral management of hydric resources based on a solid understanding and taking into account all the groups involved. This does not provide for the affected parties to participate in the decision making process.

Among the factors affecting environmental management of water resources are:

a. A fragmented and in some cases antiquated legal framework.
b. Use of the resource without applying the ecosystem concept that would promote solidarity between the users and that takes into account the ecosystems as water users.
c. A non-integrated vision of resource management at the sector level and at the level of the basins themselves.
d. There does not exist any real understanding of the water situation in the region.

e. There is a lack of participation by the local populations directly affected by decision making.

4. Coastal Marine Resources

Mesoamerica has an extremely rich and varied marine and coastal biota the length of its 38,457 kilometers of coastline. There are contrasts both between the Pacific Ocean and the Gulf of Mexico – Caribbean Sea region, as well as between the Sea of Cortez, the Mesoamerican Reef System on the east side of the Yucatan Peninsula, and the different gulfs in Central America (Honduras, Fonseca, Nicoya, and San Miguel).

Along the 14,696 kilometers of coastline in Central America there are 1,600 kilometers of reefs, among them the second largest barrier reef in the world off the coasts of the Yucatan and the Gulf of Honduras. It is also estimated that the Central American coasts maintain 21.6% of the region's population, contributing US $750 million to the regional GDP from fishing production, and providing direct jobs to more than 200,000 people. In addition, this coastal area encompasses more than 267,000 hectares of mangroves and sustains a large number of both traditional and indigenous human populations in the coastal areas. (CCAD, 1998a; Girot, P. 2000).

In Mexico, the fishing sector provides almost 2.5 million direct and indirect jobs. The country receives almost US $800 million per year from fishing product exports, while aquaculture products add up to 15% of this total (US $120 million). Shrimp exports alone (38,000 MT) represent income of US $437 million per year. Mexicans annually consume between 15 and 21 kilos of coastal marine fish products, although it is estimated that 40% of the country's population has no access to this market because of the prohibitive cost. (Pérez Gil, R. et al., 2000)

The Mesoamerican fishing industry has concentrated on exporting a select group of products, a fact that negatively affects the prospects of reaching sustainability levels in the use of coastal marine resources.

Due to historical reasons, shrimp farms generate the most income in Mexico as a seafood export product. In countries such as Honduras, Guatemala, and Costa Rica, in the last decade there has been a very important upsurge in export volumes for shrimp and tilapia since the nineties, coming almost exclusively from aquaculture. Setting up shrimp growing operations has led to significant changes in land use in the Pacific mangrove areas. Aquaculture has offered an alternative to traditional industrial fishing methods that sapped the marine ichthyological populations in the region.

On the other hand, some people criticize the expansion of shrimp growing operations because of their impact on the mangrove ecosystems and because they introduce exotic species to the fresh water ecosystems in the region.

The extraction rates for marine species reflect non-sustainable management of fishing resources in Central America. Nicaragua increased its annual marine fishing volume from 4,235 MT in 1984 to 23,259 MT in 1998. Belize tripled its marine fishing volume and Honduras increased its volume 250% during the same period. Similar conditions are applicable to lobsters, conchs, and sea urchins and more recently to exports of sea cucumber. All these species are believed to be at the limit of their potential for exploitation and ongoing extraction under conditions of limited control, which may result in the collapse of the populations during the short- and medium term.

5. The Green Agenda: Toward a Synthesis of Trends

This executive profile compiled a great deal of data and indicators about environmental performance by the countries in the region. As an option for deriving trends with regard to the previously described management of proprietary resources, a series of composite indicators was designed to provide a synopsis of the state of the natural resources and the pressures to which they are submitted. The result is Matrix 1.3 presented below.

This matrix provides for analysis of the countries' behavior in relation to the percentage of forest surfaces, the forest product growth rates, the percentage of national territory in protected areas, the percentage of the total forest in forest management areas, and the forest area in hectares per capita. The colors refer to the resource status, in order from excellent to deficient to bad. The arrows refer to the trends in the state of natural resources (biodiversity and forest), and reflect a good measurement of the pressures to which they are submitted.

MATRIX No. 1.3 INSERT MATRIZVERDE2 FILE

Generally, this synopsis lets us identify priority issues and, even more importantly, provides the ability to detect the effects of environmental policies on natural resource management. For example, during the nineties all of the countries in the region constructed a national system of protected areas and although the percentage of territory in protected areas is low (i.e., bad or deficient), all of the countries manifest an increasing trend because more parks and reserves were created than a decade ago.

On the other hand, forest production is increasing in almost all the countries, except for El Salvador. Nevertheless, in some countries it has been detected that forest surface has increased in the last several years compared to the middle of the nineties (Costa Rica, Honduras), which shows the effects of establishing forest policies and incentives leading to an increase in the forest mass. This matrix provides a synopsis of the primary trends in managing natural resources.

B. Priority Problems: Urban, Agricultural, and Industrial Development.

In this second section the priority issues linked to managing urban growth and the impact of agricultural and industrial activities on the environment are tackled. This section is divided into three parts: 1) urban; 2) agricultural; and 3) industrial.

1. Urban Development

a) Trends in Population Distribution and Urban Growth

The population in Mesoamerica multiplied four fold between the decades of 1950 and 2000, going from 37 to 138 million inhabitants. This number could reach 188 million in the year 2015 (WRI, 2000). Although demographic growth rates have tended to decline since the middle of the 20th Century (they reached 3.0% annually in 1975), they remain high in relation to other regions, with an average annual growth on the order of 1.8%. The fertility rate for the whole region has decreased from 5.9 children per woman in 1975 to 3.8 children per woman in 1996. Nevertheless, the biggest transformation occurring in the region in the last thirty years has been the explosion in the urban population, primarily as a result of the migration from the countryside to the city. In 1970, just 53% of the Mesoamerican population lived in urban areas; today this percentage exceeds 67%, with a total population undergoing strong growth.

Some 92.1 million people lived in urban areas as of the year 2000, of which 74.6 million belong to Mexico alone. Guatemala is the only country that still has most of its population in rural areas, since in all the countries in the region the urban population already exceeds the rural population. Despite this, Guatemala City is the largest city in Central America with 3.2 million inhabitants and stands out as the city with the second highest growth rate in Latin America after Toluca, Mexico, with 6.8% and 7.3% annual growth rates respectively.

Elsewhere, the annual urban population growth rate between 1990 and 1995 in Nicaragua reached 4.8% and in Honduras, 4.5%. Mesoamerica possesses two of the ten largest cities in Latin America, Mexico City (18.1 million), which is the second most populated city in the world, and Guadalajara (3.9 million) which is in ninth place (WRI, 2001). It has 12 cities with more than 750,000 inhabitants, of which 8 are found in Mexico. It is precisely these cities that will grow the most in the coming decades through a process associated with labor force growth rates, i.e., the age group between 15 and 30. In contrast to the urbanization and industrialization processes of the years between 1950 and 1960, urban growth in the nineties was marked by high rates of unemployment, crime, and lack of personal safety.

This urban phenomenon has profoundly transformed the relationships between the region's population and environment, since cities are functional centers for economic, social, cultural, and industrial development in the region and have concentrated the job supply in the last several years, which makes them consumption centers for growing volumes of natural resources (water, firewood, and food) and energy resources (electricity and petroleum derivates). In addition, they are the largest generators of solid and liquid wastes, as well as atmospheric pollution, with deep environmental consequences at the local, national, regional, and world levels.

b) Urban Environmental Management Processes

?? ***Potable Water and Sanitation***

The water problem, both with regard to availability for consumption and hydrometeorological threats, is without a doubt one of the priority issues identified by the governments in the region. There are profound differences in global availability of hydric resources, which are accentuated by differences in the annual resource extraction rate in relation to the known reserves of water.

Mexico annually extracts 22% of its total hydric surface resources available, of which 86% is for agricultural use. It is calculated that this country extracts 19% of the annual volume of its recharged aquifers.

On the other hand, El Salvador, the country with the highest "stress" level about water in Central America, annually extracts 4% of its subterranean water reserves. Nevertheless, appearances deceive, because a country with relative leeway in relation to hydric resources is Costa Rica. It depends increasingly on subterranean sources for its potable water supply for domestic and industrial use. In 2000, it extracted 5.77 km3 from subterranean water sources, which means an average per capita of 1,540 m^3, a rate much higher than the average (541 m^3) for the region. The proliferation of private wells with limited supervision and a ridiculous cost has reinforced this dependency on subterranean water sources in a country where surface water abounds.

One of the greatest threats that Mesoamerica confronts is related to the management of hydric resources for human consumption and to mitigate the effects of hydro-meteorological threats. The region still shows relatively low coverage indices for sanitation and potable water, with the urban areas being more privileged. With regard to potable water coverage, we find greater

coverage, with 80% of the total population having access to potable water. Once again, contrasts arise within and between these countries.

Generally, urban populations in the region have access to potable water in 93% of the cases, with the exception of El Salvador where just 66% of the total population had access to potable water in 1997 (See Chart 1.3 in Appendix No. 2b).

The biggest challenge in the future is to design strategies and regulatory frameworks to improve the capacity to supply water in quantities and qualities acceptable for urban populations undergoing growth. The absence of controls on coastal aquifer extractions, such as for dumping liquid wastes and industrial and agricultural effluvia, is seriously compromising the viability in the medium term of current water sources used by the majority of the populations in the region.

?? ***Solid and Liquid Wastes***

Another manifestation of the urban problem in the region is the volume of solid and liquid wastes annually generated by the main cities and industrial complexes in the region. UNEP, in its report on global environmental prospects (GEO-LAC), analyzes the degree of solid waste management for the main Latin American cities.

In Mexico City, the largest metropolis in the region with 18 million inhabitants, 18,700 MT/day of solid wastes are generated, of which 80% is collected, but only 50% is disposed of in a sanitary land fill. In contrast, all of the waste (3,000 MT/day) collected in Monterrey, Mexico, is regularly disposed of in controlled fills. It is calculated that for Guatemala City, with more than 2.3 million inhabitants, waste production is on the order of 1,200 MT/day, of which 80% is collected but deposited 100% in open dumps. In San Salvador, the second most populated country in Central America with 1.3 million inhabitants, just 60% of the 700 MT/day of solid waste is collected in an adequate disposal system. Of all the cities in the region, the only ones with more than 90% collection of solid waste are the cities of San Jose and Panama City (See Fig. 2.1 in Appendix No. 3).

Globally, 76% of the total population has access to sanitation systems, 37% of the population in rural areas and 93% of the population in urban areas. In San Salvador it is estimated that 80% of the dwellings have access to sanitary sewer systems. Both in San Salvador and Guatemala City, it is estimated that 2% and 3%, respectively, of used water and liquid waste are treated (WRI, 2000). In San Jose, although potable water and electricity coverage levels surpass 95%, only 20% of the dwellings have a sanitary sewer, the rest depend on individual septic tanks (State of the Nation Project, 2001). This proliferation of more than 200,000 septic tanks and the absence of treatment plants connected to the metropolitan sewers are generating aquifer contamination problems due to the infiltration of nitrates and bacteria.

The growing contamination of hydric resources, both surface and subterranean, by dumping of untreated sewage and residual industrial water comprises a formidable challenge to public health in the main urban areas in the region. The impact of organic and nitrate loads in the more urbanized basins in the region is already being felt in the marine-coastal ecosystems and is

manifested by the greater frequency of the appearance of red tides, caused by the flowering of toxic algae (dynoflagellates). These outbreaks have had a direct impact on small-scale fishing in the region, particularly on the Pacific coast.

2. Agriculture

a) Structural Crisis in Agriculture and Its Implications

One of the priority environmental problems in Mesoamerica has to do with the management of the soil. Throughout the region, the loss of available area, soil deterioration and contamination from overuse or misuse of pesticides, fertilizers and other chemical substances represent growing problems. The loss is due to factors such as erosion, change in agricultural use, and concentration of land occupancy. The deterioration is fundamentally associated with compacting, nutrient lixiviation, and contamination.

Generally, there has been an increase in arable land surface in the region. During the last decades, massive conversion of forests into crop areas and pasturelands, as well as the increase in irrigated areas, have contributed to an increase in the global agricultural production for the region. The intensification in land use, and the notable increase in irrigated land has exacerbated many of the soil degradation processes. It is calculated that there are 6.26 million hectares with salinization problems in Mexico (UNEP, 2001).

During the last thirty years, the area of permanently cultivable soils and planted land increased notably in Mesoamerica (23.7%). Although there exists little trustworthy information on the region, studies performed by CIAT and WRI confirm some critical points with regard to decreases in productivity and yields, particularly in hillside soils.

The productivity and load capacity for pasturelands in the region has also manifested a decrease. Based on a study in 1996 done by the INCAE on the environmental costs to the region's agricultural sector, it was observed that the deterioration in soil and pasture soils in Nicaragua has reduced the load capacity for pasturelands between 50 to 85%, i.e., 0.15 and 0.5 animal units per hectares. Animal raising has also decreased between 50% and 80% due to nutritional deficiencies in the pasturelands (INCAE, 1999).

b) Agricultural Frontier and Production Systems

Historically, the agricultural frontier has served as a social escape valve in many countries in the region. Still active in the nineties in countries such as Mexico, Guatemala, Honduras, Nicaragua, and Panama, the agricultural frontier was depleted decades ago in El Salvador and Costa Rica. These processes contributed to the massive conversion of forests into pasturelands during the sixties and seventies.

During the period 1970-1988, the prairie and permanent pasture land area increased from 84.70 to 93.68 million hectares (10.6%) in Mesoamerica. For most of the countries, the agricultural frontier is a key space for small landholders who produce basic grain crops with low levels of technology, many of them located in the outlying areas. As was previously mentioned in the section on forest resources, this pressure has negatively affected the region's biodiversity and has contributed to the deterioration of the hydrographic basins, increasing overflows, erosion and blockage of many riverbeds in the region.

The establishment of rural societies on mountainsides in Central America such as the highlands of Guatemala, Honduras, and El Salvador has also constituted situations that are inherent to risk. The importance of mountainside lands in the subsistence economies in the region cannot be underestimated: more than 80% of the lands planted with basic grain crops are located on mountainsides in Central America. This is the particular case of Guatemala, El Salvador, and Honduras where campesino production is based on holdings of less than 5 hectares with low levels of technology. In addition, it is estimated that 3/4 of the total annual cultivation and 2/3 of the total permanent cultivation are produced on mountainside lands (López Pereira et al., 1995:9).

Poverty affects three out of every five Central Americans. Mountainside lands are the main areas where poverty and extreme rural poverty are concentrated. The rural areas are most affected by this blight since 71% of the rural area residents in Central America are poor, and 50% are in a situation of extreme poverty. On the other hand, just one-fourth of the urban residents in the region are in a situation of extreme poverty (State of the Nation Project, 1999:176). May of these pockets of rural misery are found in the high parts of the tributaries to the main rivers in the region (Chixoy, Grijalva, Ulúa, Chamelecón, Lempa, and Choluteca) to mention just a few. The relationship between highlands where the mini-farm and indigenous and campesino agriculture predominate and lowlands and alluvial plains where there are concentrations of banana and palm plantations and shrimp operations deserves greater attention. Floods are the most frequently occurring threat in the region, taking lives and destroying productive infrastructure. What is needed, without a doubt, is a policy on territorial risk management in almost all the countries in the region.

c) Agrochemical Uses and Abuses

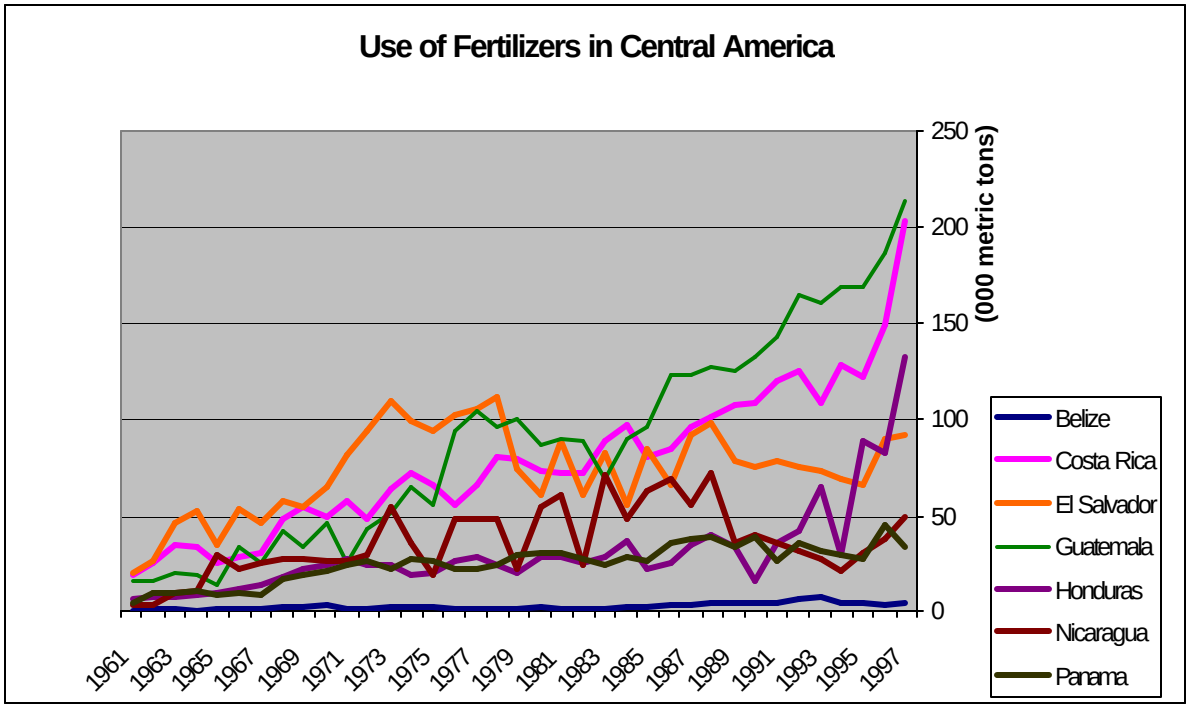
Chemical contamination of soils is becoming increasingly important in Mesoamerica given the intensification of agriculture and the use of pesticides in the last 30 years. Agricultural technology has increased production in the whole region, but the environmental costs are very high. For example, during the eighties Central America increased its production by 32% and the cultivated area by 13%, but doubled its consumption of pesticides (UNEP, 2001).

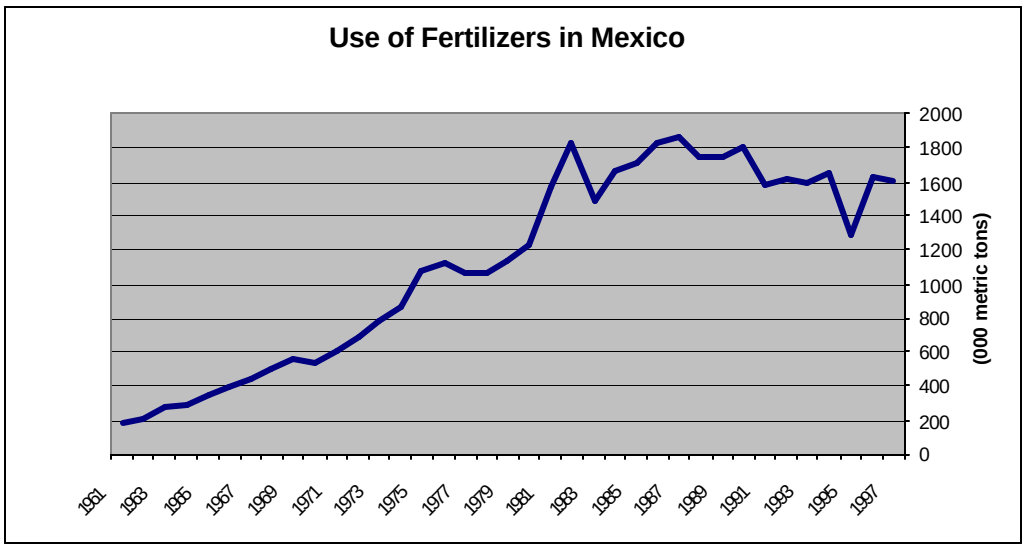
The intensity of the use of pesticides in the region is high, particularly in Costa Rica with 18 MT/ha, i.e., 14 kilos/cultivator/year. This is a figure far above the 1.9 MT/ha and 4.5 kilos/cultivator/year shown by Mexico. The impact of agrochemical contamination on the soil and water and, therefore, on human health, is a growing concern. The use of fertilizers has

increased in all the countries in the sub-region during the last several decades, going from 1,572,460 MT in 1980 to 2,438,029 MT in 1998 (See Figure 2.4)

The impact of these external factors on the region's economies has been studied very little. It would seem that the problems generated by abuse of agrochemicals is greater than the economic benefits imputed to the agricultural sector in some countries in the region. The case of poisoning from pesticides cost the Central American countries the equivalent of 2.5% of the total annual agricultural production in the region (Larson, B. and J.M . Pérez 1998 "Sustainability and On-Farm Externalities in Central America: A Critical Review and Synthesis of the Literature", HIID-INCAE Working Paper, Alajuela:INCAE). In most of these cases there exist production alternatives that may increase the return on social goods, minimizing the environmental impact.

In the region, erosion is the main cause of soil degradation, as well as of the consequent losses of nutrients and productivity, affecting 26% of the lands in Mesoamerica (UNEP, 2001). The costs of compensating for these losses with fertilizers and other measures negatively affect the production costs. Therefore, a solution to the environmental problems derived from the impact of agricultural activity would be to attempt to re-orient many policies and incentives toward the productive sectors in Mesoamerican agriculture in order to provide production methods that are more profitable and less damaging to the environment.

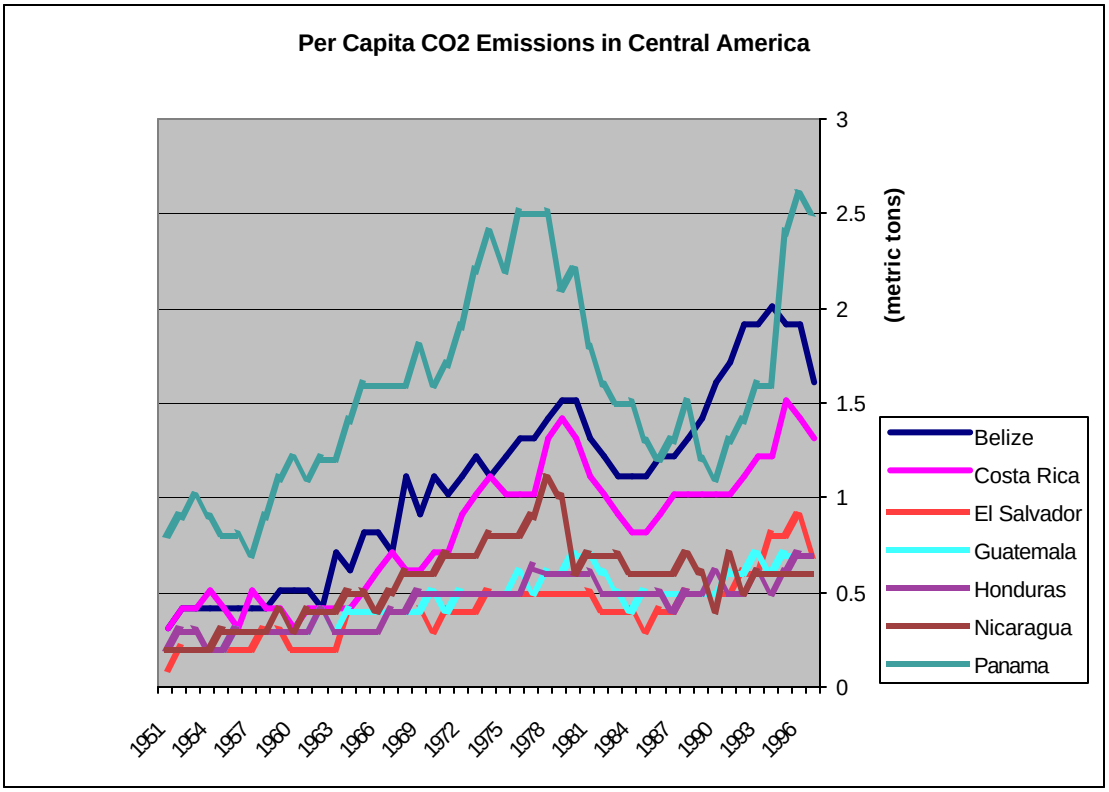


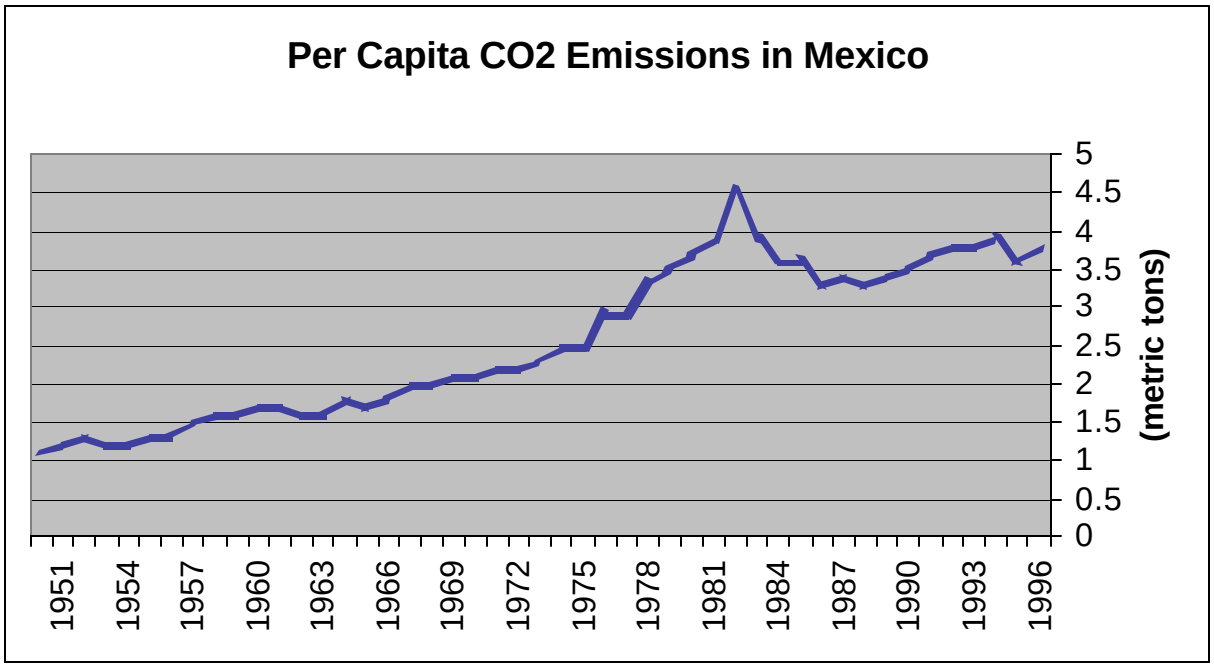


3. Industry

Industrial development in the Mesoamerican region has had many contrasts. In general terms, there is a trend toward growth of the weightiness of the industrial sector in the region's economies. Today, 25.8% of the regional GDP is derived from industrial activities and 20% is due to manufacturing activity. These manufactured products also represent 77% of the exports from the countries in the region. The value added growth rates for industry also show a growth trend, with a regional average on the order of 6.4% annually.

Nevertheless, much of this economic growth has occurred inside a regulatory framework that is lax in controlling waste and emissions. With the notable exception of Mexico, few countries in the region have developed any norms and territorial zoning and pollution control (atmosphere and water) procedures of an industrial origin. The accelerated urban growth processes have also created severe problems in managing solid and liquid wastes that are added to the contribution by the industrial sector. An analysis of atmospheric emissions of CO2 provides a good macro indicator of the impact of the industrial and automotive arena on environmental management.


Per Capita CO2 Emissions in Central America
3
2.5
2
1.5
1
0.5
0
(metric tons)
1951
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
1993
1996
Belize
Costa Rica
El Salvador
Guatemala
Honduras
Nicaragua
Panama


Per Capita CO2 Emissions in Mexico
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
(metric tons)
1951
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
1993
1996

The levels of atmospheric contamination in the region also reflect a gradual change in gas emissions with a greenhouse effect from sources linked to the change in land use and deforestation toward industrial sources and those linked to transportation. (See Chart 2.1). The per capita C02 levels in the region reveal this transitional situation.

Mexico, a country with an extensive industrial infrastructure and a very large vehicular population, heads up the list with regard to industrial emissions. Countries such as Nicaragua and Honduras still owe most of their emissions to agricultural activities and changes in land use. Since 1970, the increase in the number of automobiles has provoked a notable increase in emissions. In Mexico City, for example, the number of vehicles increased four fold between 1970 and 1996 (CEPAL, 2000; UNEP, 1999). In addition, the topography and meteorology of various cities aggravate the impact of pollution: for example, the Valley of Mexico obstructs the dispersal of contaminants in the metropolitan area (UNEP, 2001). It is important to point out that Mexico is the primary regional emitter; with net emissions of 444.5 million metric tons in 1990, its per capita emissions are double those of the other countries in the region (UNEP, 2001).

Chart 2.1. Mesoamerica: Industrial $C0_2$ Emissions and by Land Use Type. Industrial Change Index. 1992

Country	Industrial $C0_2$ Emissions and Energy (Thousands of MT)	$C0_2$ Emission Change by Land Use Type (Thousands of MT)	Industrial Emissions/Land Use Change Emissions
Belize	264	980	0.26
Costa Rica	2,769	1,094	2.53
El Salvador	4,714	3,930	1.19
Guatemala	5,657	21,000	0.26
Honduras	4,085	13,048	0.31
Mexico	308,632	135,857	2.27
Nicaragua	2,728	14,784	0.18
Panama	6,286	1,155	5.44

Source WRI, 1996; *UNCCC Secretariat*, 2001

Based on available statistics, the automotive population in the region continues to grow rapidly. In Mexico in 1996 12,395,000 vehicles were registered, of which 8,623,000 were personal automobiles. In 1998, a ratio of 144 vehicles per 1,000 inhabitants was reported for all of Mexico (IDB-PPP 2001). In Costa Rica, on the other hand, the automobile population increased very rapidly during the nineties, doubling in 10 years. Just between 1997 and the year 2000, the automobile population increased 27%, with a total in 2000 of 677,000 vehicles, an average of 130 vehicles per 1,000 inhabitants (State of the Nation Project, 2001).

Elsewhere, Panama has an average of 102 vehicles per 1,000 inhabitants. In addition, there are contrasts with regard to the geographic concentration of automotive population. To cite one example, in Guatemala it is calculated that there is a national average of 17 vehicles for every thousand inhabitants but in Guatemala City, this figure rises to 109. In El Salvador there is an average of 61 vehicles per thousand inhabitants, but in San Salvador there is a rate of 113 vehicles per thousand inhabitants, while in Belize City this indicator reaches 83 vehicles per thousand inhabitants (WRI, 1999).

The rhythm of increase in the automobile population has also resulted in a tangible increase in roadway congestion in the main cities in the region. Motorization in El Salvador grew 17% annually between 1990-1996, in Guatemala and Honduras by 12%. These accelerated increases in the vehicle population have not been accompanied by investment in roadway infrastructure at the same rhythm as demand, resulting in an increase in congestion and atmospheric pollution in the main cities in the region. The impact of these levels of roadway congestion causes the contribution by vehicles to the levels of atmospheric pollution in large cities to be particularly high. In the case of Mexico City, 97% of the carbon monoxide emissions and 75% of the nitric oxide emissions come from automotive sources (WRI, 1996).

4. Threats, Vulnerability, and Risk

Mesoamerica is a region that is particularly exposed to natural threats; its main environmental disasters are related to natural events of a climatic or tectonic nature. Those of a climatic nature include the *El Niño* phenomenon, droughts, hurricanes, tornados, tropical storms, floods, high tides, avalanches, slides, and fires. Those of a techtonic nature include earthquakes, seaquakes, and volcanic eruptions. It is also necessary to consider environmental disasters originating in technological factors, such as mining disasters, petroleum accidents and aquifer contamination by nitrates and heavy metals.

A brief review of the natural disasters that have impacted the region's countries reveals that hydro-meteorological threats, both from floods and droughts, constitute the largest cause of loss of human life and productive infrastructure in the region. The deadly combination of land degradation in the mountainous regions and the galloping urbanization in densely populated cities downhill comprised the ideal context for a disaster in the dimensions of Hurricane Mitch. A desolating figure of 18,000 dead, hundreds of wounded, thousands evacuated, and material damages to the roadway, housing, and productive infrastructure estimated at more than US $6 billion (CEPAL, 1998). One year later, a cyclone impacted the states of Tabasco and Veracruz in Mexico, generating numerous losses due to floods and slides. Both losses of human life and material damages were due on the one hand to threats of a particular intensity, but above all else to the social vulnerability and environmental deterioration conditions that aggravated the impact of the hydro-meteorological events.

El Niño (ENOS) is the best known hydro-meteorological event affecting the occurrence of disasters, and has been the main factor affecting many marine and coastal areas, possibly intensified during the last twenty years by the global process of climatic change.

Climatic changes in general and *El Niño* in particular are associated with the incidence of some epidemics that, as has been seen, make up the second cause of death due to disasters of a natural origin, with 18.4 percent of the total victims.

Cyclical variations in temperature and rain associated with *El Niño* are particularly important since they may favor the appearance and proliferation of epidemic illness vectors such as malaria, dengue, yellow fever, and the bubonic plague (WHO, 1999).

Elsewhere, the environmental causes of disaster are due to a combination of climatic variability and the impact in 1997-1998 of *El Niño* (ENOS). Thus, the high rates of deforestation and erosion have led to a rapid deterioration in hydrographic basins, particularly in the more urbanized regions. This reinforces the notion that risk management and reduction in the impact of hydro-meteorological threats require appropriate management of the hydrographic basins and restoration of the ecosystems that are important to the hydrological cycle, such as cloud forests and wetlands.

Half of the deaths due to disaster are due to floods; this growing impact by hydro-meteorological threats is due in part to the deterioration of hydrographic basins, deforestation and accelerated and disorderly urbanization. These threats are exacerbated by the social vulnerability conditions existing in the region – generally aggravated by factors such as poverty and deficiencies in planning and prevention – which permit the unleashing of the disasters.

The climatic change scenario generated by the Third Assessment Report (TAR) by the Inter-Governmental Panel on Climatic Change (IPCC III) estimated that it is very probable that there will be an intensification of impact due to droughts and more frequent hurricane activity. The region has already suffered the onslaught of disasters as is the case with Hurricane Mitch. This case is notable in the sense that, for example in Honduras and Nicaragua, the most affected countries, more than 10,000 people died and hundreds of thousands were injured, while the directly affected population (transferred to refugee camps or displaced) was almost 700,000 people. The economic and environmental damage has been estimated at US $4.7 billion.

Also associated with the climatic change and global warming process, there is a risk that the predicted increase in the sea level may particularly affect the nations with population concentrations on the coast. In Latin America and the Caribbean, where 60 of 77 of the largest cities are on the coast, 60 percent of the population lives less than 100 kilometers from the coast (Cohen et al., 1997), and an increase in sea level is particularly worrisome to the small insular states in the Caribbean that have territorial limitations on populating the less vulnerable areas.

5. Status and Trends of the "Brown" Agenda

In the analysis of the management trends for the "brown" agenda illustrated by Figure 2.2, six categories of resources and conditions were defined: urban environmental quality, management of hydric resources, food resources, energy sources, contamination, and vulnerability; this matrix was constructed based on a complex series of indicators. The limitation on the composite indicators are evident in the sense that they group existing indicators and compound their own deficiencies. This combination also tends to reduce the extremes and dilutes specificities. Nevertheless, some trends jump out such as, for example, the deficient status of risk management for disasters and urban environmental contamination.

In general, urban environmental quality is in decline. Although hydric resources are in critical conditions in El Salvador and in some regions in Mexico, in countries such as Honduras and Costa Rica availability of the resource in global terms is good.

Chart 2.2 INSERT MATRIZCAFE2.XLS

C. The Environment and Competitiveness

The competitive future and potential for development in Mesoamerica are closely related to the natural environment. Although there exist huge differences between the structure of economies in Central America and those in Mexico, there exist parallel trends, particularly with regard to transition toward more urban economies where industrial production and services predominate. Thus, linking the environment to competitiveness will not solve the environmental problems in the region, but will significantly contribute to an increase in the endowment of natural resources in the region and their quality and economic importance.

A detailed analysis of the competitive position of Central America shows that the environment is the primary base sustaining that position. That position is vulnerable due to a combination of economic and political factors since natural resources in the region tend to be used as supplies with an extremely low value in the production processes, or as a dump for garbage and other wastes. The result is a loss of value for the society and the loss of an endless number of opportunities in markets with an environment conscience.

One of the largest challenges for Mesoamerica will be to ensure environmental sustainability through the preservation of its natural resource base, at the same time improving its competitiveness through using that same resource base. This requires compliance with three conditions: (a) minimizing the waste of scarce resources produced by environmental contamination; (b) production, whether of agricultural crops or tourism, must be sufficiently flexible to be constantly adapted to the changing conditions in the world market and to increase competitive advantages; and (c) part of the earnings coming from business success must be channeled in turn toward the protection, regeneration, and improvement in the resource base that sustains productivity and profit.[1]

[1] In this paragraph, an analogy is made between the capital reproduction process and the process for reproducing and using natural resources precisely that way, as an analogy.

The successful incorporation of environmental factors within the region's competitive framework will align its productive sectors with more valuable market opportunities, make the business climate more attractive for foreign investors, offer new and interesting business potential, and protect the resources the region needs to survive in the future.

The Mesoamerican countries are barely exploring the opportunities encapsulated by the emerging "green" markets. Nevertheless, it is important to point out that many possibilities exist for the region in emerging markets for products of higher quality or environmental or social value. The comparative and competitive advantages that the region offers through its endowment in climate, variety of natural resources, and broad productive understanding combined with privileged access to the most important markets in the world are notable.

In this area there are several indicators that illustrate advances toward an incorporation of environmental attributes appraised by the market into the region's productive processes and products. These include the rate of adaptation to international environmental administration systems (such as ISO 14001), percentages of agricultural production under organic conditions, and the state of certain policies that may promote or decrease the successful incorporation of environmental aspects.

IV. Achievements

A. Achievements Within the Legal and Institutional Framework

An important factor in the development of environmental policies in Mesoamerica has been the impulse provided by following the multi-lateral conventions on the environment from the nineties. All the countries in the region are signatories to the main conventions arising out of the Rio Summit in June 1992 (See Appendix 3/Chart 3.1, which contains a list of the environmental conventions ratified in Mesoamerica). All the countries in the region have a legal regulatory framework on the environment in full evolution, which is without a doubt an important achievement of the last several years. Today there is a legal and institutional scaffolding that allows for channeling environmental policies in the region's countries.

The decade of the nineties has without a doubt been a period of significant advances in the institutional construction of environmental management in Mesoamerica, practically non-existent in the region 10 years ago. To cite one example, ministries on the environment are today present in all the countries in the sub-region.

The last to be created was the Ministry of Environment and Natural Resources (MARN in Spanish) in Guatemala in January 2001, which succeeds the National Commission on the Environment (CONAMA in Spanish). There have also been notable advances in the development of a regional institutional framework, such as in Mexico with the signing in 1993 of the North American Free Trade Agreement (NAFTA), which has been integrated into the environmental management systems in North America. On the other hand, with the creation in 1989 of the Central American Commission on the Environment and Development, environmental integration for the region has allowed without a doubt greater convergence and synchronization of the regulatory and non-regulatory instruments in the region.

In that sense, the creation of the Central American Alliance for Sustainable Development (ALIDES in Spanish) began in 1994 to consolidate the political and legal instruments and the technical offices for following the regional and international agreements. Within the framework of ALIDES, the Central American Commission on the Environment and Development (CCAD in Spanish) was able to influence the signing of regional conventions such as the Convention for the Conservation of Biodiversity and Protection of Priority Wildlife Areas in Central America. This gave rise to specific agreements and conventions on forests, protected areas, and more recently, climatic change. Out of these conventions, technical institutions were established in charge of follow-up, in particular the Central American Council on Forests and the Central American Council on Protected Areas, and of directors of the region's protected areas, in addition to an array of offices arising from civil society, as well as projects for cooperation at the regional level.

1. Regional Policies, Institutions, and National Regulatory Frameworks

Institutional construction with regard to the environment has been significant. New laws were promulgated such as the General Law on Ecological Balance and Protection of the Environment (LGEEPA in Spanish, 1996) in Mexico, the Organic Law on the Environment in Costa Rica (1996), and the General Law on the Environment (Law No. 41) in Panama (1998). These new institutions concentrate on public administration of the environment, with different areas of competence and mandates. For example, the INE in Mexico is an institution with many powers, encompassing state administration of the forest and the National Water Commission (CNA in Spanish), as well as environmental management in general. In contrast, some countries have autonomous institutions in charge of forest administration, such as Guatemala (INAB) and Honduras (COHDEFOR).

The creation beginning in 1992 of national commissions on sustainable development has ensured monitoring the commitments derived from the Rio Summit. In the preparations for Rio 92, the Central American presidents subscribed to the Convention for the Conservation of Biodiversity and Protection of Wildlife Areas in Central America. Based on the agreements passed in Rio 92, in particular arising from the Convention on Biological Diversity, are the CONADIBIOs, which are government institutions in charge of safeguarding compliance with and execution of the Rio agreements.

Among the more palpable signs of progress in application and monitoring by the countries in the region of the compliance with the commitments acquired in the CBD, the formation of the National Commissions on Biological Diversity (CONADIBIOs in Spanish) and their processes for formulating national strategies on biodiversity were generated. Today, it can be said that almost all the countries have advanced a great deal in the formulation of strategies, plans, and programs for conservation and sustainable use of biodiversity. In short, today biodiversity is part of the regional lexicon and is on the political agenda in all the countries.

In Mexico, based on the Organic Law of the Federal Public Administration, the custody of environmental management lies in the hands of the Secretary of the Environment and Natural Resources (SEMARNAT in Spanish), as part of the federal executive branch, to comply with those commitments. A sector of the SEMARNAT is the National Commission on Understanding and Using Biodiversity (CONABIO), whcih was created in 1992 by the Mexican government as a focal point to attend to, as the name indicates, issues relative to national biodiversity. To that end, the head of the SEMARNAT resolved that the CONABIO would be responsible for complying with the previously mentioned commitments, in particular for putting together the National Strategy on Biodiversity, as well as any others that may be derived from relationships with the CBD. Costa Rica and Mexico already have National Strategies on Biodiversity and have encouraged great advances in innovative appraisal mechanisms for environmental goods and services.

Although the framework of national and regional policies has contributed to the construction of a legal system with regard to the environment, there still exist enormous gaps in regulations,

ground rules, and definition of control standards for performance by those countries with regard to the environment. A notable exception without a doubt is Mexico, which, because of the size of its economy and the complexity of its environment-society relationships, has developed an important series of instruments and mechanisms to encourage better environmental management. It bears clarifying that the environmental policy in Mexico is inscribed within a national and federal regulatory framework on territorial zoning and is backed by a progressive process for decentralizing the environmental inspection and control functions.

Pane No. 3.1: Priority Intervention Regions for Regional Development in Mexico

Priority Intervention Regions for Regional Development in Mexico
a. The metropolitan areas in the Valley of Mexico and adjoining urban areas, the metropolitan areas of Monterrey, Guadalajara, Puebla, Leon, and Torreon, as well as the nothern border.
b. The intermediate region in the central-northwest corridor.
c. The urban-industrial corridors in the west, northeast, and center-gulf.
d. The regions and corridors (particulary the southeast corridor) that can support dynamic new territories.

Regional zoning is under the competence of the states and the Federal District; 5 regional zoning plans have been decreed and 7 more are in the process of being decreed in areas of great ecological importance.

In technical terms 17 zones, 8 belonging to coastal areas and the rest to priority regions and industrial areas, including the northern border (IDB, 2001 Environmental Management in Mexico) have already been completed.

The most significant contribution in the area of environmental norms and standards in the region comes from the experience in Mexico through official Mexican norms (NOM in Spanish). These norms are federal statutes and regulations with mandatory compliance throughout the national territory. Between 1985 and 1990 80 NOMs were put together related to discharging residual water, handling dangerous and municipal residues, automotive vehicles and industrial sources, as well as for natural resources.

Currently there exist 2 NOMs having to do with water pollution, 22 NOMs regulating aspects of atmospheric contamination, and 6 NOMS about Estimates of Environmental Impact (EIA in Spanish), developed within the LGEEPA framework in Mexico. In addition, there are policies on environmental impact studies for productive investments and especially through the constitution of a federal entity in charge of supervising and inspecting the EIAs, as is the case of the PROFEPA.

Likewise, the SEMARNAT in Mexico has put a number of programs to reinforce federal, state, and local institutions in charge of environmental management in motion. In particular the Program for Minimizing and Integral Management of Residues in Mexico has worked during the last four years on defining clear regulations for handling waste for the country. That program has operated within a clear framework of decentralization and citizen participation to solve pollution

problems caused by solid wastes. In addition, the Program for Air Quality has concentrated on the main urban areas in the country, in particular the Metropolitan Area of the Valley of Mexico, where problems with atmospheric contamination are the worst.

One of the program's primary goals is to notably reduce emissions of hydrocarbons (CO2, CO), as well as nitrogen oxide and suspended particles in the Valley of Mexico. The CO2 emission curve in Mexico was stabilized during the second half of the nineties, which meant an undeniable achievement by the environmental policies and norms and was the result of intense inter-agency collaboration.

Mesoamerica has been consistently innovative during the nineties in creating instruments for integrating the environment with macro-policies and sector policies such as the new environmental accounts and the economic appraisal of environmental good and services. Despite notable isolated experiences, its adoption and introduction in the main decision making centers of the public administration has tended to be limited. (Espinosa, G. and M. Rodríguez-Becerra, 2001).

2. Environmental Funds and Economic Instruments

The creation of environmental trust funds directed at financing environmental conservation and management activities is a promising instrument for efficient gathering and assignment of economic resource costs. There exist notable experiences with national environmental funds in Mexico, Guatemala, and Panama. They arise in moments of economic recession and in some cases have become a unique source for financing conservation projects for governmental and non-governmental institutions. There exists considerable potential to duplicate and extend these environmental fund experiences to the other countries in the sub-region.

Despite their limited adoption in the Mesoamerica sub-region, economic instruments for generating sources of income for environmental management are promising in terms of the ability to generate new financing, both from international sources and national markets. Among the economic instrument options applied to environmental management we find usage coefficients and contamination coefficients or emission permits. Other sources of financing for environmental management are derived from monies generated by economic activities with great impact on the environment such as transfers or payments for environmental services by the hydrocarbon, mining, and hydroelectricity sectors. The experiences in Costa Rica (a tax on driving and gasoline, environmental service payments, etc.) show that new financial resources can be generated that do not depend on the precarious ordinary budgets of the environmental ministries in the sub-region. In Mexico, for example, they collect taxes on gasoline and the rights to use and discharge water; in addition, accelerated deprecation is allowed for environmental control equipment and there is no duty on anti-contaminant equipment and bonds and guarantees on environmental management of materials and residue.

For the tenth anniversary of the creation of the Central American Commission on the Environment and Development in 1999, the DGMA/CCAD launched the Environmental Plan for the Central American Region (PARCA in Spanish). This plan proposes for the first time a

strategic articulation between development objectives and conservation of the natural heritage in the region and part of the confirmation of the promulgation of environmental legislation that marks a good portion of the decade of the nineties; this step is necessary but insufficient to ensure sustainable development in the region, since the challenges being faced are many. Among others, there is the persistence of chronic levels of poverty, particularly in rural areas, the uncontrolled expansion of the agricultural frontier and urban settlements, the growing land degradation and the generation of risk and vulnerability scenarios that were tragically illustrated during the impact of Hurricane Mitch in October 1998.

Without a doubt, the framework proposed by the PARCA is a new application orientation for the CCAD. It seeks clear integration of the "green" and "brown" agendas into the region's environmental policies, focusing the conservation aspects of biodiversity and water and the search for environmental development and clean development systems that can sustain development into the future for the region in the same plan.

One of the projects encouraged within the PARCA framework has been PROSIGA, which has been developed in three countries in the region (Guatemala, Costa Rica, and Panama). It consists of an integral study of environmental development systems, which provides for development based on a certification and accreditation system, also employing complementary norms and voluntary mechanisms for compliance. This project has contributed to synchronizing environmental policies, particularly for environmental impact studies. As if that were not enough, it has the singular advantage of offering clear strategic pivots and monitoring mechanisms that are feasible to be put into practice in the region. It is hoped that this way greater achievements may be reached through the ALIDES.

B. Achievements in Environmentally Managing Natural Resources

1. *In Situ* Conservation

The achievements in creating protected areas during the nineties have been considerable. More parks were created during the nineties that during all preceding decades. In 1989 3.4% of the Mesoamerican territory was protected for a total of 82,571 km^2; less than 10 years later in 1997, these protected areas were 245,808 km^2, i.e., 10.2% of the territory in protected areas for the whole region (see Chart No. 1.5 in Appendix ___).

In some countries in the region, the growth in the extent of protected areas has been on the order of 3,681% (Nicaragua), and 2,084% (Guatemala); for example, today 20% of the national territory in Guatemala is under some form of protection, a great achievement compared with 0.9% in 1989. Only five protected areas in the Central American region surpass 500,000 hectares (the Maya Biosphere Reserve in Guatemala; Río Plátano, Honduras; Bosawas, Siapaz, Nicaragua; and Darién, Panama). There are 113 private protected areas and 70 areas have been identified that are protected by co-management and co-administration agreements between

NGOs, local governments, and communities. (Rodríguez, J. 1998, McCarthy, R and A Salas, 1997)

Based on 1999 data, Mexico has 117 protected natural areas of a federal nature or established by the government; they encompass a surface area of 13,357,108 hectares (i.e., 7% of the national territory) in the following categories: biosphere reserves, natural monuments, flora and fauna protection areas, natural resource protection areas, national parks, and national marine parks (SEMARNAP-INE 1999). In addition, the states have established 176 protected natural areas through state and municipal decrees, as well as private reserves and community properties that include diverse hectare (1.4% of the national territory) management categories. Thus, Mexico has protected natural areas with a surface area of 1,910,218 hectares, which represents 8.4% of the national territory (CONABIO 1998).

On the other hand, there is a sharp contrast between the legal situation of protected natural areas in Mesoamerica and their real situation. In most cases, protected areas have received legal protection through decrees, but this has not been able to be put into practice since most of the areas do not have surveillance and even less management plans that allow for the use and conservation of biodiversity in situ.

In addition, most of the protected areas in the region face serious threats derived from a set of economic and social factors. Faced with the sensitive impoverishment of the rural populations in most of the region's countries, pressure for access to natural resources has increased. Among the most significant processes have been the advance of the agricultural frontier, the expansion of mono-cultivation on a large scale, the preponderance of use patterns that are not sustainable for the land due to the subsistence logic of increasingly pauperized rural populations.

In addition, the protected areas themselves lack a series of resources that make it difficult and in many cases impossible to properly manage and control them, such as the lack of qualified personnel, insufficient funds, lack of planning tools, little support by the civil society, and areas that are extremely small or too big for the existing institutional capacities.

2. *Ex Situ* Conservation

With regard to *ex situ* conservation, various countries have advanced in creating and regulating botanical garden, zoological, and germ plasma collection activities. The versatile role played by *ex situ* conservation initiatives make them particularly attractive. The boom in techniques linked to bio-technology through tissue cultivation, in vitro propagation and cryogenic preservation of genetic material in the world arena is starting to take effect in Mesoamerica. In Chart 6 (Appendix 2) it can be seen that there exist zoos in almost all the countries in the region, but that botanical gardens and even more so germ plasma banks are more restricted in their distribution. On the other hand, zoos have a longer history, including public institutions and private collections that fulfill an important mission in educating and sensitizing public opinion. It bears

mentioning that the relation between trafficking in species for exportation to international markets is more common in private zoos.

To cite one example, Mexico has founded 47 botanical gardens, 22 of which house a total of 2,870 species, as well as 235 species with a status of rare, threatened or being in danger of extinction. The National Ecology Institute has 54 registered zoos, many of which actively participate in conservation programs for priority species and some of which are also dedicated to research programs (CONABIO 1998). Finally, there has been an upswing in the creation of germ plasma banks where initially they were related to the ministries of agriculture in the region, in particular as seed and forest species banks

Matrix 2.1 Achievements in Natural Resource Environmental Management Policies: Regulatory and Non-Regulatory Aspects

Resource	Regulatory Aspects	Non-Regulatory Aspects
Biodiversity	CONADIBIOS in Central America CONABIO in Mexico Program for Protected Natural Areas in Mexico 1995-2000 (SEMARNAT) National Biodiversity Strategy (Mexico, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama) Central American Council on Forests and Protected Areas (CCAB/CCAP)	National Environmental Funds for Conservation (Mexico, Guatemala, Panama) Mesoamerican Biological Corridor
Forests	Forest Law (Mexico, Guatemala, Belize, Honduras, Nicaragua, Costa Rica, Panama) Program for Forest Development (PRODEFOR-Mexico) Forest Strategy (Central America-CCAD)	Forest Incentives Forest Certification (Mexico, Belize, Guatemala, Honduras, Nicaragua, Costa Rica and Panama)
Fresh Water	National Water Commission (CAN-SEMARNAT) National Ecology Institute (INE) PACADIRH (Central America) CRRH-CCAD CAPRE-CCAD	Water Usage and Discharge Rights (Mexico) Payment for Environmental Services (Costa Rica)
Marine-Coastal Resources	National Fishing Institute (Mexico) Mesoamerican Reef System (Mexico, Belize, Guatemala, Honduras)	Environmental Research and Education (Mexico, Belize, Guatemala, Nicaragua, Honduras, Costa Rica, Panama)

Based on everything previously mentioned, it is clear that today a huge effort is underway to reconcile conservation and development. In addition a race against time has begun since it is not enough to conserve the ecosystems encompassed by the boundaries of the areas designated as protected.

The efforts by the Central American countries have been considerable and, despite the huge limitations, most of the ecosystems and eco-regions present in the region are found within the SICAP. This regional structure, under the auspices of the CCAD, has allowed for an exchange of experiences and better coordination between countries with regard to conservation. A concrete initiative in that sense has crystallized into what today is known as the Mesoamerican Biological Corridor (CBM in Spanish).

3. The Mesoamerican Biological Corridor

The CBM is a strategic framework for territorial zoning that seeks to maintain the ecological continuity between North and South America since it links protected areas that today come to 9.5 million hectares, i.e., 18% of the territory in Mesoamerica, from the Isthmus of Tehuantepec, Mexico, to the Darien region in Panama. It reaches 14 million hectares in total, of which 8 are protected areas and 6 are connecting areas. Some 30% of the population in Mesoamerica lives in this area.

The CBM seeks to connect protected areas to achieve conservation of the still present resources, making free movement and dispersal of plants and animals possible and, therefore, the continuity of vital biological processes. It is also gambling on the gradual rehabilitation of deteriorated areas close to protected areas through productive restoration of the landscape, thus improving the quality of life for local inhabitants by making the connection areas examples of development sustainable by the reduced local scope to emulate large-scale development.

The Mesoamerican Biological Corridor initiative emerged as part of the efforts to comply with and apply the regional and international conventions on the use and conservation of biodiversity. One of the main ALIDES directives refers to this issue and to taking advantage of the earth's vitality and diversity in a sustainable fashion, addressing in particular *"Protecting and conserving biodiversity of all species of plants, animals, and other organisms in the genetic populations within each species and the variety of ecosystems."* Among the mechanisms it establishes in order to comply with this strategic objective is the articulation of national systems of protected areas into the Central American System of Protected Areas (SICAP in Spanish). The concept of the Mesoamerican Biological Corridor was designed in an effort to consolidate the inter-connection of systems among themselves.

This corridor was invented around 1994 by the Paseo Pantera (Panther Passage) Project and its concept has evolved over the last several years. Since it is a project centered on the conservation

INCLUDE BIOLOGICAL CORRIDOR MAP

of the natural heritage in Mesoamerica through the creation of more protected areas and the purchase of proprietary land for conservation, it has come to be conceived of as a strategic project that incorporates the concepts of sustainable use, productive landscape restoration, interconnection, and communal management.

In its latest definition, the Mesoamerican Biological Corridor is understood to be: *"an organized and consolidated system of territorial zoning, composed of natural areas under special systems of administration (nuclear, buffer, and multiple-use zones and interconnection areas), providing a group of environmental goods and services to the Mesoamerican and world society; providing spaces for social gatherings to promote investment in conservation and sustainable use of natural resources and biodiversity, with the goal of contributing to an improvement in the quality of life for inhabitants in the region"* (GEF, 1998:5).

In the discussions at the national and regional level that led to this definition, the need arose to extend the reference framework for the Mesoamerican Biological Corridor (CBM) beyond a system of protected areas, taking many of the rural, campesino, or indigenous communities residing close to or within the region's primary protected areas into account in its conception. Many of these at the same time will be custodians or users of the biological diversity components in the region.

In the declaration signed in July 1997 by the Central American presidents officially sanctioning the CBM project, there was insistence on the need to create *"an innovative framework for achieving the principles of sustainability for society and the environment defined by the Central American Alliance for Sustainable Development (ALIDES), centering on natural and human systems on the regional scale for inter-generational periods."* (GEF,1998:5)

C. Achievements in Environmental Management of Urban, Agricultural, and Industrial Development

1. Strategic Management of Water

The problems with water availability and quality are considered by many to be the most important for Mexico and Central America in the 21st Century. Due to historical reasons and because of political failures and distorted subsidies, inefficient water utilization and consumption patterns have predominated. This has caused aquifer over-exploitation, contamination, and non-usage of bodies of water, and waste and impact on aquatic ecosystems, within the context of insufficient financing for the hydraulic infrastructure. Faced with these problems, various regional initiatives are seeking to channel the efforts to improve water resource management. Some are at the regional level such as the Central America Plan for Water Management (PACADIRH) and the activities of the Global Water Partnership that operate in strict collaboration with the UICN Initiative on Water and Nature. Other initiatives occur at the national level, particularly in countries with greater stress with regard to the availability of hydric resources, such as the Action Plan for Integrated Management of Hydric Resources in El

Salvador. The National Water Commission in Mexico, as part of the SEMARNAT, manages the country's water resources. At the beginning of the 1990s it put into motion a program called Potable Water, Sewers, and Sanitation in Urban Areas to propose a new legal framework and to seek alternate forms of financing with a mixture of public funds, internal and external loans, and the participation of private initiative.

2. Industrial and Agricultural Environmental Management

Despite being more recent, there are interesting advances throughout the region with regard to application of both regulatory and non-regulatory measures for improving environmental performance by companies. For example, all the countries in the Mesoamerican region have programs that actively promote organic production, and almost all have collaborated with multi-lateral organizations to establish programs to encourage cleaner production.

Various countries have begun the difficult yet important task of rationalizing costs and fees for water and energy, which will promote more efficient and cleaner production processes. There also are advanced programs that seek to incorporate the services that nature provides human beings. For example, there are new initiatives to compensate forest owners for the water collection services provided by plant coverage on their land, of benefit to customers in urban areas. Other programs compensate promoters of renewable energy projects to benefit climatic change. It bears mentioning that these new initiatives are in the pilot phase, but it is evident that the results are promising with regard to their ability to be replicated.

It is known that during the last two years El Salvador has advanced rapidly in applying environmental legislation, particularly in the area of liquid effluents, through its "adaptation" program for industries already in operation. Elsewhere, Mexico has followed in that sense an important rhythm during the last decade, through the application of environmental norms to industry.

During the 90s, primarily beginning with the Earth Summit in Rio de Janeiro (1992), note was taken of more active participation by business leaders in the environmental area. Together with similar organizations in other parts of Latin America, these organizations have played an important role in terms of visibility of the relationship between the environment and business and in encouraging concrete projects in favor of the environment.

Next Chart 3.1 shows a list of some of the business organizations related to the environment and sustainable development in Mesoamerica.

Chart 3.1 Business Organizations Related to the Environment and Sustainable Development in Mesoamerica

THE BUSINESS SECTOR
Business Organizations Related to the Environment and Sustainable Development in Mesoamerica

- **Center for Private Sector Studies for Sustainable Development in Mexico (CESPEDES in Spanish)** This has become an environmental reference institution in Mexico by securing collaboration conventions with diverse business organisms and universities for the establishment and operation of regional centers for environmental business management.

- **Business Council for Sustainable Development in the Gulf of Mexico (CEDES in Spanish) Gulf of Mexico.** Since 1996 this council has worked with private and public organizations to promote more sustainable industry within its focus area. For example, they developed the first phase of the Sub-Product Synergy Project by putting together a regional inventory of residual products with possible commercial value. It has also promoted carrying out a strategic planning study for the region in the long term called "Vision South of Tamaulipas 2025," to determine the primary socio-economic trends in the south of the state of Tamaulipas.

- **Business Leadership Program for Sustainable Development (PLEDS in Spanish)** with headquarters in Mexico. It brings together entrepreneurs and executives from 14 countries in Latin America from diverse industrial sectors.

- **Honduran Business Council for Development (CEHDES in Spanish**) In addition to bringing together a group of Honduran businesspeople interested in developing and protecting the environment, it has attracted such business groups as the "Foundation for the Great National Transformation Project" and the "National Committee on Competitiveness." It created the National Cleaner Production Center in Honduras, as well as the Center for National Research and Studies.

- **Network of Businesspeople Friends of the Environment (REAA in Spanish)** as part of the Regional Environmental Plan for Central America. Impelled by the Central American Commission on Environment and Development (CCAD), this network seeks to develop an environmental certification and accreditation system in Central America. It awards selected companies the Central American Prize for environmental quality and is supported by complementary norms and voluntary compliance mechanisms. It is hoped that this initiative may give rise to the Regional Center for Cleaner Production for Central America.

Source G. Espinosa and M. Rodríguez-Becerra, 20001, p.22; Hubert Méndez, SICA-CCAD, personal communication 2001

D. National Policies on Inducement, Standards, and Incentives

In some countries, the government, through the ministry of environment, provides environmental bonuses to those companies complying with environmental conservation requirements. In some cases this has meant the creation of regulatory organisms for environmental standards that bring together what has to date been the results of isolated experiences.

Some analysts in favor of greater freedom for business see in the environmental regulation mechanisms non-duty barriers to international trade. They argue, in addition, that the application of norms and regulations that are stricter in one country than in another causes the migration of the more polluting industries to countries with less regulatory capacity and less demanding legislation on the environment. Other analysts suggest that these regulatory and non-regulatory mechanisms have created a framework that encourages good urban, agricultural, and industrial development through the interplay of incentives and deterrents for cleaner production. The experiences acquired by the national centers for cleaner production indicate that the companies that have subscribed to programs for energy and environmental auditing have achieved not only a reduction in emission of contaminants, but that they achieve at the same time important savings in energy, materials, and processes. It should not be forgotten that the social and economic cost of environmental degradation and contamination of the soil, water, and air shows a growing tendency, along with the recurring cost of disasters. To a good degree the prevention of environmental impact, as well as the prevention and mitigation of disasters, are guarantees in the future for investors.

Nevertheless, it is important to reiterate that today almost all the countries in the region have one or more initiatives with the purpose of helping companies improve their environmental performance. The programs they are developing include national projects, projects targeting specific sectors, or in some cases geographic clusters of related companies.

Matrix 3.2. Achievements in Environmental Management Policies for Urban, Agricultural, and Industrial Development: Regulatory and Non-Regulatory Aspects

Sector	Regulatory Aspects	Non-Regulatory Aspects
Urban	Federal Environmental Protection Agency (PROFEPA-Mexico). Program to improve air quality in the Valley of Mexico, Guadalajara, Monterrey, Toluca, Ciudad Juarez, Mexicali, Tijuana 1995-2000. Potable Water Program, Sewers and Sanitation in Urban Areas (APAZU-Mexico) National Program for Territorial Zoning (PRONOT-Honduras) National Territorial Study System (SNET-El Salvador) CAPRE-CCAD CCRH-CCAD	Consumption taxes on fuel (Mexico, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama) Fee systems for urban services (water, waste, etc.) Sustainable Development Indicator System (INEGI-SEMARNAT, Mexico) Integrated Environmental Magement System Program (PROSIGA -CCAD)
Agricultural	Environmental Norms (NOM) Programs for Regional Sustainable Development (PRODERS-Mexico) PARCA-CCAD	Organic certification (Mexico, Guatemala Nicaragua, Costa Rica) Green Markets.
Industrial	Program for the minimization and integral management of dangerous industrial residue in Mexico 1995-2000 (SEMARNAT) National Cleaner Production Centers (Mexico, Costa Rica, Panama) National Strategic Environment Agenda 2000-2004 (Guatemala)	ISO Certifications Awards and prizes Energy and production process auditing National Environmental Funds (Mexico, Guatemala)
Disasters	National Civil Protection System – SINAPROC (Mexico) Center for the Prevention of Natural Disasters in Central America – CEPREDENAC (Central America)	Early Warning Systems (Honduras, Guatemala, Costa Rica) Insurance and re-insurance (Mexico, Costa Rica, Panama)

Source Adapted from the IDB, 2001 Gestion Ambiental en Mexico; G. Espinosa and M. Rodríguez-Becerra, 20001, p.22; SICA-CCAD, 2001, Girot, 2000.

The nineties marked an important stage in the construction of a regulatory and institutional framework for the environment in Mesoamerica, as shown by the chart with the synthesis of achievements in Matrix 3.3. Nevertheless, although there are legally established ministries of environment, there is a lack of major efforts for attacking environmental problems associated with urban growth, industrial development, and agricultural production.

E. Achievements in the Competitiveness of Environmental Management

The Mesoamerican region has enormous potential for improving its companies' competitiveness through greater incorporation of the environmental variable. Studies[2] indicate that there are opportunities to improve the business climate, increase exports of products with environmental and social attributes, and enter new markets for products and services with high environmental aspect content (such as, for example, ecology tourism, climate change markets, and regionally traditional products such as handcrafts).

It is hoped that advances will be made in competitiveness along several paths. In the institutional area, the region should broaden the array of already existing instruments in effect, such as: evaluation of environmental impact, de-contamination plans, voluntary agreements, audits, economic assessment of resources and regulations, negotiable emission permits, emission and environmental quality standards, and information systems. There is also a need for the design and application of new instruments (or better use of the existing ones) fully oriented toward domestic and international markets such as, for example: certification norms, "green seals," international norms, environmental insurance, promotion of heritage accounts that serve as a mechanism to provide incentives to environmental sustainability, development of clean production mechanisms, early citizen participation, environmental budgets, and private protected areas.

Advances in the institutional area suppose from the onset the reinforcement and expansion of administrative and supervisory capacity by national and local authorities, through the placing into motion of modern and efficient systems, adjusted to the tasks of preventing, protecting, and recovering environmental quality. Although it is true that many mechanisms and instruments have been evolving that will facilitate integrating more effective and efficient forms of appropriate environmental management, there exist many obstacles that need to be removed in order to really open up the region's environmental potential. As was mentioned in the previous section, there are important advances in this new area, although it is noted that there are many more opportunities to explore and exploit.

Advances in the area of marketing require a new direction for environmental authorities. This new direction has to be more entrepreneurial and must be coordinated, of course, with the private sector (especially the export sectors) and other government offices (science and technology for coordination of norms, housing for stimulus instruments).

Advances have already been noted in the countries in this so important and necessary direction, both in responsible management of resources and in business opportunities that under this new direction may be provided businesspeople in Mesoamerica.

[2] See, for example, "El Medioambiente y la Competitividad de Centroamerica." CEN-702, INCAE/CLACDS, 1999. Available at www.incae.ac.cr-clacds.

1. Certification, Green Seals, and Other Market Mechanisms

An important fountainhead of innovation for environmental management has originated in the business sector, particularly through the growing adoption of self-management and differentiation instruments. On the one hand, there exists international certification through the ISO-14000 norms, which, despite the cost, has allowed some companies to stand out as to environmental management systems.

In Mexico and Costa Rica alone there is a total of 29 companies certified by ISO140001. (See Chart 3.1). In various sectors, particularly the electronics and automotive sectors, this certification is becoming a sort of requirement for participation. There is an increasing number of companies that have adopted production processes that examine greater environmental performance for efficiency reasons in order to maintain access to markets that are increasingly demanding every year as required by their clients or in order to comply with regulatory duties or commitments to the community.

Chart 3.1. Numer of Companies Certified by ISO 14001, for Some Countries in Latin America, 1999

Region/Country 1.	Number of Certified Companies	Index Value *
Costa Rica	**2**	**22**
Argentina	**37**	**12**
Brazil	**65**	**8**
Mexico	**27**	**8**
Chile	**4**	**6**
Uruguay	**1**	**5**
Colombia	**3**	**4**
Peru	**1**	**2**

?? Index Value = (Number of Certified Companies)/GDP, Sorted into Range 1–200.

Source: INCAE, 2001

The level of adoption of standards such as the ISO14001, organic certification, and sustainable forest management are a good indicator of the degree of incorporation of the environmental "game rules" at the international level. Incorporating this orientation lets them obtain green seals and a "clean industry" reputation that favors their competitive position and makes legal compliance easier. In several countries it has allowed companies to endeavor to participate in environmental self-regulation.

As can be seen, in one form or another, attention to environmental aspects is beginning to become part of a substantial number of big companies and a growing number of medium, small, and micro companies.

a) Forest Certification

Another noteworthy initiative originating in the Mesoamerican region has to do with forest certification. The World Council on Sustainable Forest Management (the Forest Stewardship Council) is a world organization established in Oaxaca, Mexico, that provides certification to forest endeavors that comply with a series of standards for resource management, equitable benefit distribution, and environmental protection. During the nineties there was a particular upswing in the certification of association-type companies (cooperatives and communal enterprises) involved in forest production.

It bears emphasizing that Mesoamerica represented, with 417,432 hectares in 2000, practically one-fourth of all certified forests in the world (see Fig. 3.2 in Appendix 3). In that sense, the region has capitalized on existing agro-forestry activities in the region to capture emerging markets in terms of forest certification.

According to the Forest Program in Mexico in 1998, "Some 80% of the national forest surface is under the social property regulatory system; 15% is private and belongs to small owners of forests of less than 20 hectares, and 5% are national lands. The social property is comprised of communities and communal properties with an approximate population of 10 million inhabitants, of which more than 27% speak some indigenous language." (IDB, 2001 Gestión Ambiental en Mexico, p. 15).

The foregoing suggests that Mexico and Central America share similar features with regard to forest resources, since a large percentage of their production is in the hands of small and medium producers. At the same time second- and third-level organizations have arisen that bring together indigenous and campesino cooperatives and communities dedicated to agro-forestry, wood extraction, and non-wood products from the forest, such as UNOFOC in Mexico and CICAFOC in Central America. These two organizations have a cooperative agreement as of the beginning of 2000, which opens the road to joint initiatives under the auspices of regional macro-projects such as the Mesoamerican Biological Corridor and the Puebla Panama Plan (UNOFOC/CICAFOC/UICN, 2000; SICA-CCAD, 2001).

b) Organic Certification

Agriculture continues to be one of the most important sectors for Mesoamerican societies. Nevertheless, almost all of the historical production has been of commodity-type products, which are vulnerable to price variations and falls. Despite the combination of an ideal climate, work force and other comparative advantages and a strong need to avoid devastating commodity product cycles, the region has done very little to take advantage of its opportunities.

One of the more visible trends in agricultural markets at the world level is the strong orientation toward production that avoids the use of chemical fertilizers and pesticides. These "organic" products represent the fastest growing segment in industrialized markets, with growth rates close

to 20% per year. This growth level has held steady during the last decade and projections for the next decade are the same. In 2000, it is estimated that sales of organic production surpassed US $19.5 billion in the United States, Europe, and Japan and it is expected that this market will double within the next five to six years (NurnbergMesse, IFOAM, and Organic Trade Association of the US). The products benefit, in general, from strong overpricing from the producer to the end consumer.

Next Chart 3.3 shows some information about organic agriculture in some countries in Mesoamerica.

Chart 3.3. Organic Agriculture in Some Countries in Mesoamerica

Country	Organic Crop Area	Percentage in Relation to Traditional Agriculture
Mexico	**102,802 certified hectares**	**0.08%**
Guatemala[1]	**5,000 certified hectares**	**0.11%**
Belize	**1,810 certified hectares**	**1.30%**
Honduras	**1,800 certified hectares**	**0.06%**
El Salvador	**4,315 certified hectares**	**0.6 - 0.8 %**
Nicaragua	**2,784 certified hectares**	**0.04%**
Costa Rica	**3,000 certified hectares**	**0.07 %**

(1)There are 43,000 hectares of achiote (annatto seed) in the Reserva Maya, but they are wild crops that grow organically without being certified.

Source : Ministries of Agriculture and interviews with organizations dedicated to organic agriculture in each country under study (INCAE/CLACDS 2001).

Chart. 3.4. Growth of Organic Agriculture in Mexico

Data	1996	1998	2000 (Oct) [2]	Average Annual Growth (%)
Surface (Hectares.) [1]	23,265	54,457	102,802	44.98 %
Number of Producers	13,176	27,914	33,587	26.35 %
Jobs Generated (Thousands of Shifts)	3,722	8,713	16,448	44.98 %
Currency Generated (Thousands of US $)	34,293	72,000	139,404	41.99 %

[1] Includes an area in transition of 25,074 hectares and 13,000 hectares. Not certified in 2000.
[2] More growth in the area with regard to the number of producers in 2000 is due to the entry of large vegetable producers during 1999 and 2000 (Gómez, 2001)
Source: Agricultura Orgánica de Mexico Datos Básicos (M.A. Gómez, L. Gómez - 2000) / Interview with Ms. Srta. Laura Gómez Tovar of the CIESTAAM of the Chapingo Autonomous University.

Today, less than 1% of total agricultural production (5% of exports) is certified to be organic. Nevertheless, it is important to point out that in the last two or three years, the region has achieved major advances in this area. In Mexico the certified area for organic production has multiplied four fold since 1996 and the number of jobs generated by organic properties has tripled in the same period. This movement does not solely respond to the tendency for consumers in developed countries to consume organic products, rather it increasingly reflects a drastic change in the behavior of consumers in the countries within the region itself (see Charts 3.3 and 3.4).

In the region there exist encouraging experiences with other types of certification including shaded coffee, coffee associated with bird protection, ECO-OK for coffee, citrus fruits, and others,[3] and a growing interest in social programs with fair trade that have had a rapid upswing in Europe, Canada, and the United States. All the projects appear to predict that these tendencies will gain strength in the future.

Although take-off has been slow, all the countries in the region have developed initiatives (many on a pilot scale) to encourage this type of differentiated product.

[3] ECO-OK is a program managed by the Rainforest Alliance. See www.rainforest.org

c) Tourism Certification

Costa Rica is using innovation to achieve more sustainable tourism through the development of programs targeted toward fortifying its position in the market, promoting more innovation and differentiation in the sustainability of its tourist industry. The Costa Rican Tourism Institute, the governmental authority for the sector, has created and implemented a program called "Certificate for Tourism Sustainability" (CST in Spanish).

This program's objective is to evaluate hotels (and in the future other tourist businesses) in accordance with an extensive set of parameters related to environmental and social performance. As hotels improve their performance in terms of sustainability, they receive increasingly more recognition. Close to 200 hotels are participating in the program.

Thanks to the results of this initiative, currently the ministries of tourism in Central America have already agreed to implement this program in all countries in the region. They are also launching a pilot plan in Mexico; likewise countries such as Ecuador, Peru, and Chile have manifested their intention of joining the program during 2002 and 2003.

The goal of this program is to become the marker against which sustainable tourism is universally measured, placing the region at the forefront of the sector with the most growth in the tourist market in the whole world (visit www.turismo-sostenible.co.cr).

V. Challenges and Goals

In this section some areas are presented that are considered to be of priority as a function of the previously detailed challenges and based on observation by regional experts from the authorities in the different countries, and the members of the Dialog[4]. The challenges facing the region in this area are multiple and complex. Nevertheless, there are certain challenges that appear to be more critical or transcendental and they are the ones detailed herein.

A. Natural Resource Management

There were notable achievements in Mesoamerica during the decade of the nineties with regard to regional integration processes for environmental management and for advances recorded in the construction of a legal-regulatory framework for environmental management. Although it is true that some countries have confronted delays and set-backs in their institutional development, especially in virtue of administrative reforms processed within the framework of modernization of the States, efforts have also been made toward regional integration with regard to the environment that have contributed to the formation of a common framework to channel environmental policies in Central America as well as in Mexico.

This does not imply that most of the region's ministries of environment face serious limitations of a financial and administrative nature. Faced with a regulatory framework and a number of international commitments under expansion, we find many institutions in a phase of administrative contraction. The effect of these State reforms and budget austerity policies has been to fortify the participation mechanisms, both for local governments and NGOs and businesspeople.

The CCAD is orchestrating the construction of guides to standardize the legal frameworks relative to the environment in the region. Many contributors, as in the case of the IDB, have supported institutional strengthening and the creation of environmental management mechanisms, as occurs in Mexico, Colombia, and Panama (Espinosa G. and Rodríguez Becerra, 2001). The boom in the nineties of a wide array of actors and agents with regard to the environment is doubtlessly an achievement, but we still confront serious challenges related to levels of coordination, decentralization, and effectiveness for environmental management. The vice-ministers of environment who answered the questionnaire distributed by the INCAE-CLACDS on the subject agree that the main challenges faced by the state entities in charge of environmental management are the financial limitations, lack of human and technical resources, and the lack of information and communication systems.

[4] It is important to point out that there was a very limited response by members of the Dialog. In order to compensate, the authors expanded the network of contacts in order to identify priorities.

Faced with this situation, it is clear that the growth rate for commitments related to the environment in the region has contrasted with stagnation and set-back in the assignment of human and financial resources for the nascent ministries of environment in the region. The creation of protected areas has increased considerably during the last ten years, as has attracting tourists and tourist visits to the countries in the region. Nevertheless, the tourist boom in some countries has not translated into more resources for the entities in charge of administering the natural heritage in the countries in the region.

1. Consolidating the National Protected Area Systems

Among the greatest upcoming challenges is the creation of new fiscal and financial mechanisms to sustain environmental management and management of protected areas in the region. After the boom in creation of protected areas by decree, many governments in the region now face serious challenges in maintaining them, since they lack human and financial resources.

It bears mentioning that some regional programs such as PROARCA-CAPAS, financed by USAID, supported institutional strengthening of the national protected area systems, with emphasis on the more threatened parks. The Regional Mesoamerican Biological Corridor Project is a major opportunity, in this case, for reinforcing the integration of protected areas into local communities through a bio-regional focus. The experiences with environmental service payments offer flattering prospects for some countries, particularly Costa Rica. A major challenge in the medium term would be to extend the reference and payment for environmental services in the other countries in the region.

Another challenge is that of reinforcing the democratization and decentralization processes for environmental management. Faced with the challenges of decreasing national budgets, there is a need for creative, flexible, and efficient mechanisms. There exist encouraging experiences about participative co-management of protected areas by non-governmental organizations, communities, and municipalities, as well as concessions of environmental services to mixed public/private consortiums and businesses. There also exist major advances in forest certification for association-type companies and cooperatives in the region. What is important and fundamental here is that these experiences should be systematized and deepened in the upcoming years.

2. *Ex Situ* Certification and Reproduction of Threatened Species

With regard to in-situ conservation, the Mesoamerican region is categorized as a source center of world importance for domesticated plant species. As such, it has an important role in ex-situ conservation of economically important domesticated species. This conservation has been the task of specialized institutions such as both CIMMYT in Mexico and CATIE in Costa Rica. Among others, there also exist safekeeping centers for collections of germ plasma and seeds.

Nevertheless, a good part of traditional knowledge from both indigenous and campesino villages about phyto-genetic resources has been shunned. There are major challenges and incitements to fortifying the capacity for assessing the agro-biodiversity heritage of Mesoamerican villages. In that sense, incentives should exist for those local organizations capable of taking custody of in situ reproduction of threatened species such as orchids and bromeliads. They should seek certification mechanisms for reproduction in captivity of threatened species (for both plants and wildlife).

As to this aspect, there exist encouraging experiences for both university research centers and private enterprises with regard to ex-situ conservation for commercial purposes, with the possibility of reducing the pressure on undomesticated species. In that sense, these activities should be sponsored as a means of conserving species in danger of extinction..

3. Short- and Medium-Term Goals

Next some goals and objectives related to this issue that should be pursued in the short- and medium-term are set forth:

a. Consolidate the Mesoamerican Protected Area System by strengthening state and private conservation systems and through the incorporation of new management and financing mechanisms to sustain demarcation and conservation operations.
b. Find more mechanisms for transferring part of the benefits provided by the areas (scenic beauty, protection of river basins, biodiversity refuges, reduction in vulnerability, fixing greenhouse effect gases) to the budgets in the same areas.
c. Articulate the Mesoamerican Biological Corridor initiative with the in-situ and ex-situ conservation initiatives in the region.
d. Develop national protected area performance indicator systems based on a base line differentiated by management category.
e. Strengthen public and private ex-situ conservation initiatives, favoring sui generis knowledge and intellectual property systems, to strengthen the participation of indigenous populations in the custody of agro-biodiversity in Mesoamerica.

B. Environmental Management of Agricultural, Urban, and Industrial Development

1. Strategic Management of Water Resources

Among the main challenges the Mesoamerican sub-region faces, issues arising from the "brown" agenda appear to be the most urgent. The urban growth rate in the region has surpassed by leaps and bounds the capacity of the central and metropolitan governments to satisfy the growing demands for potable water, sanitation, and energy. The relative stagnation of public investment in sanitation and roadway infrastructure during the eighties and nineties, particularly in Central American cities, is threatening these infrastructures, designed for smaller populations, with collapse (UNEP-GEO2000).

The deficiencies in used water treatment and the prevention and mitigation of risks from natural threats are one of the largest challenges to public health and safety in human settlements. Among the priority aspects defined by the SERNA in Honduras in the survey made of the Dialog participants is the mitigation of natural disasters and integral management of river basins. These aspects are directly related to the issues of risk management and territorial zoning that would allow for the mitigation of the impact by urban, agricultural, and industrial development in the region.

Water is another fundamental aspect that arises as a central element stitching together the relationship between public health, quality of life, and safety in the face of threats. It should still be remembered that the most frequent threat to the region is flooding, since when there is an increase in deforestation in high river basins and deterioration in wetlands downhill, combined with urban expansion toward high-risk areas, floods each year will take more and more human lives and destroy more and more public and productive infrastructure.

Therefore, mitigation of threats from flooding and drought continues to be a pressing challenge to environmental management in the 21st Century in Mesoamerica.

2. Integrated Management of Solid and Liquid Wastes

On the one hand, the Mesoamerican region has shown major advances in controlling atmospheric contamination, in particular in the Valley of Mexico, through implementation of drastic measures to control automobile and industrial sources of contaminating gases. Nevertheless, in other countries in the region a major challenge continues to be the management of solid and liquid wastes since more than half of the capital cities do not have adequate systems for disposing of liquid wastes. Much of the existing infrastructure for used water and liquid waste treatment has deteriorated and fallen behind. Doubtlessly, a major challenge for the region will be the design of sanitary sewer systems and treatment plants for the main cities and the tourist development areas.

These challenges could be addressed through regulatory-type measures, such as the elaboration and application of new laws, decrees, and regulations. In fact, the region has advanced substantially in regard to regulations. Nevertheless, many of the existing laws have not been regimented and environmental governability continues to be the subject of concern in countries such as Guatemala, Honduras, and Nicaragua. There do exist non-regulatory types of measures that have enjoyed a certain upswing in the past years, particularly with regard to organic and forest certification. Through this means mechanisms associated with improving the competitive advantages of the region, generating conditions for furthering innovative environmental management, cleaner production, and risk mitigation processes have occurred. Risk management has gained singular importance, particularly since the impact of disasters such as Hurricane Mitch and the 1999 flooding in the states of Campeche and Tabasco in Mexico. It is necessary to integrate risk prevention and mitigation measures in order to diminish the future effects of natural phenomena and disasters (such as hurricanes, droughts, floods, and earthquakes) through environmental management actions. In that sense, there should be an introduction of instruments available for forecasting, monitoring, planning, and territorial zoning and criteria for the integral management of hydrographic basins. These exercises should have broad community and local participation.

An analysis of the lessons derived from recent disasters leads to the conception, decision, and coordination of regional and local environmental management measures that could be incorporated into national, regional, and sector reconstruction plans in Honduras, Nicaragua, Guatemala, and El Salvador, in such a fashion that they optimize the sustainability of investments and human settlements in the medium- and long-term.

Prevention and mitigation measures that seek to reduce the vulnerability of populations to natural disasters cannot be limited to the level of policies and instruments; therefore, at least three goals to be developed in the medium-term must be identified:

3. Medium-Term Goals

a) Reduction in Factors Aggravating the Threats

Reducing the factors that magnify or intensify the natural effects of a disaster supposes an in-depth understanding of vulnerability creation mechanisms. However, many times the causal relationship between these factors is difficult to identify and measure. It may be inferred, for example, that inappropriate agricultural or livestock practices on mountain sides in the upper parts of river basins contribute to an increase in overflows and the volume of water transported in the fluvial beds.

Priority should be given to issues such as the management of hydrographic basins, maintenance of river beds with good hydraulic capacity, and the obstruction or blockage levels affecting the hydraulic capacity of the main rivers, lagoons, lakes, and dams. It should be remembered that the hydraulic capacity of river beds also depends on plant coverage at the headwaters. There,

protected areas have an important function in their capacity to regulate the flow and absorption of excess water during extreme events such as hurricanes. In particular, attention must be paid to the protection of mountain ecosystems such as cloud forests, cloud jungles, gallery forests, and marshy, estuary, and marine coastal wetlands. The role of protected areas in reducing vulnerability and increasing resistance is a key issue here.

b) Reduction of Vulnerability

Reduction of vulnerability should be based on an analysis of the geographic distribution of the population, which should include the processes behind the formation of human settlements and the urban growth patterns in effect in the region.

It is also necessary to identify the infrastructures that are most vulnerable to natural disasters, since the degree of exposure by populations to calamity depends to a good degree on the following aspects:

a. Its location in relation to the areas with the highest risk of being affected by natural threats as to the location of settlements, construction of housing, towns, and roadway infrastructure, or energy production in areas at high risk from earthquakes, flooding, land slides, or washouts.

b. In many cases the inadequate design of both living structures and public infrastructure makes them more vulnerable to earthquakes, floods, and land slides.

c. The precarious socio-economic conditions of the population that may increase its vulnerability to disaster, generating deprivation, epidemics and deaths.

The combination of the three previous factors generates what Maskrey (1993:5) calls progressive vulnerability, a phenomenon in which the poor location of settlements, deficient designs, and poverty are added to structural aging and obsolescence from lack of maintenance. All together they create unfavorable conditions that generate greater impact by a disaster.

c) Institutional Response and Levels of Authority

The success of the first two intervention aspects will depend to a great degree on the levels of involvement, the institutional framework, and the mechanisms for putting these conservation and vulnerability reduction measures into place. A clear legal framework and a precise definition of competency, mandates, norms, and regulations will allow the agencies in charge to properly apply these response norms in the face of the demands of an emergency. Institutional response extends to all levels of national authority (national emergency commissions, civil defense, ministries of environment and natural resources, and ministries of transportation, housing, and urban development), coordinating offices (commissions on sustainable development, local governments, municipal associations, city halls, and municipal development and emergency committees), and local organizations emanating from civil society (NGOs, CBOs, unions).

C. Improve the Environmental Quality of Competitiveness

The environmental aspects of a country's business climate are fundamentally defined by the rules the companies must follow with regard to environmental performance. To date, it has been believed that improving environmental standards blocks competitiveness and discourages foreign investment, but this now does not appear to be true, since business leaders are noting a strong, positive connection between environmental performance and competitive position. And the international markets are now rewarding environmental responsibility and positive attributes in the goods and services markets and also in financial markets.

Of course, explicit penalties are also being noted (product detention, elimination of "deficient" products from certain markets) as well as implicit penalties (lack of investment or marketing for countries or industries that have dubious reputations in the area). These are used to punish companies and countries that do not comply with international expectations.

It is clear that a transition by international markets to the supply of products and services with more environmental (and social) content or attributes is happening and the speed with which progress in that direction is being made is also clear. The countries in the region will feel these pressures even more as soon as there is progress made by the programs for economic diversification and rapprochement with the international market. The region must recognize that it has an almost unique potential to take advantage of these market trends, since its geographic location and endowment with natural and cultural resources give it a strong advantage.

Alignment of the environmental aspects of the region's business climate with the high expectations of international markets would lead to promoting the very necessary foreign investment by first class international companies.

Elaborating and delivering products and services with the attributes appreciated by the demanding international markets will ensure ongoing access to them and will offer the possibility of developing more specialized high value niches. In that sense, an environmental and resource utilization policy must go beyond a strictly regulatory focus and base itself upon a promotion and investment encouragement process in an environmental infrastructure and upon a process for creating markets and financing for sustainable development. Thus making economic growth compatible with environmental protection will be achieved.

D. Environmental Aspects of the Business Climate

It has been demonstrated at the international level that if demanding environmental standards are applied transparently and coherently, it is probable that the leading companies that may be considering investing in Mesoamerica will see them as an attractive feature of the business climate, providing stability and institutional clarity for environmental regulations, while

discouraging behavior oriented toward seeking "just the cheapest" by vendors and the competition.

It is also important to point out that environmental administration costs decrease in countries where there are many companies participating in the system. Economies of scale provide big reductions in the costs of environmental services such as waste handling (especially toxic waste), laboratory analysis, specialized analysis and auditing services, and certification.

Some goals to develop in the medium term are:

a. Ensure that environmental supervision programs are transparent and are applied equitably to domestic and foreign companies, based on a coherent and comprehensible norm. This situation also should and must be communicated to the companies.
b. Encourage development of industries that are critical to environmental services. The priorities include: certified reference laboratories, a market for auditing and impact evaluation, and certification and verification services.

E. Certification and "Green Seals"

The international markets have already decided for the medium term that certifications and third-party certifications are the preferred mode for demonstrating that products or processes possess favorable environmental attributes. Today Mesoamerica is at a disadvantage due to a lack of national mechanisms to facilitate this type of certification. The most critical priorities are oriented toward the functioning of a national body of standards to supervise local accreditation and to administer the relationships with international entities such as ISO. Although this organ may exist in almost all the countries in the region, it is only functioning in Mexico adequately and sufficiently updated to comply with the needs of the private sector. Opportunities exist, what is needed is the right information about advantages and risks and the financing necessary for adaptation and certification. Some medium-term goals are the following:

a. Expand the programs for adapting to international standards, especially for organic agriculture, tourism and ISO14001 (with emphasis on the medium-size export company).
b. Establish programs to finance the adaptation and transition costs for products and industries when the benefits are known. This could be through ministries of economy and agriculture or through the financial sector (design of specialized instruments).
c. Strongly promote the use of the Certificate of Tourism Sustainability (CST) because it is the most strongly used standard at the international level at this time and also because it is an initiative that was created and implemented within the region. The progress of this program at the international level greatly favors the competitive position of the regional tourism sector.

VI. Conclusions and Recommendations

Mesoamerica is a region endowed with an extraordinary natural and cultural heritage. One of the regions with macro-biodiversity in the world, it houses a large number of life zones and unique ecosystems. It is a source center for agro-biodiversity of supreme importance at the world level and its rural population continues managing domestic species that maintain an important intra-species diversity. Its endowment of forest resources has allowed it to supply both domestic and industrial consumption needs and innovative export markets. Its water resources doubtlessly will be a critical element during the upcoming decade in countries such as Mexico and El Salvador. Its distribution and management are marked by contrasts and the growing urban population in the region doubtlessly will contribute to increasing pressures caused by demand for water for agricultural, domestic, or industrial purposes. Its increasing deterioration due to contamination of surface waters, salinization of soils and aquifers, compounded by growing hydro-meteorological threats, will make strategic management of hydric resources a pressing need in the next decade in Mesoamerica. The recurring impact of flooding and land slides continues to take lives and destroy productive infrastructure. Risk management on all scales also will arise as a great challenge in the future.

The 1990s have marked important progress in institutional construction with regard to the environment in Mesoamerica. All the countries today have a ministry of environment, and many have developed new legal frameworks for biodiversity, forests, and water. Going beyond the focus on command and control based on the legal frameworks, some countries in the region have experimented with focuses based on market instruments such as certification, incentives, and payments for environmental services. This, combined with growing participation by the civil society, local governments, and private enterprise, provides options for appropriate environmental management. The creation of national authorities on environmental standards that can supervise local accreditation and administer the relationships with international entities such as ISO appears to be an upcoming step in several of the countries in the region. Although this organ exists in almost all the countries in the region, it is only functioning in Mexico adequately and sufficiently updated to comply with the needs of the private sector. Another priority is the encouragement of programs and initiatives that promote and finance certification for critical industries. In addition, strategic alliances between local conservation initiatives and industries and urban consumers through the payment of environmental services have been identified. This allows for linking natural resource and energy consumption patterns with local conservation and protection capacity.

Finally, the Inter-American Dialog on Environmental Policies should provide an important forum for defining the direction for the upcoming years with regard to environmental management in the countries in Mesoamerica. There exist great obstacles and limitations, since many of the ministries of environment created during the 1990s suffer chronic deficiencies in financial and human resources. The gradual increase in international conventions on the environment have combined with budget contractions in most of the countries. This has forced

many governments to explore new alliances and institutional arrangements in order to delegate responsibility and opportunities to local governments, rural communities, non-governmental organizations, and private enterprise. This dialog may provide an opportunity to catalyze these alliances and provide them a regional support framework so that Mesoamerica may capitalize upon the undeniable achievements of the past years with regard to environmental policies.