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of the Central American Region”**

**Final Report**

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**Consortium**



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## Abbreviations

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ACICAFOC	Central American Indigenous and Peasant Coordination Association for Community Agroforestry (Asociación Coordinadora Indígena y Campesina de Agroforestería Comunitaria Centroamericana)
CABEI	Central American Bank for Economic Integration (BCIE - Banco Centroamericano de Integración Económica)
CAC	Agricultural Council of Central America (Consejo Agropecuario de Centroamérica)
CAFTA	Central American Free Trade Agreement
CATIE	Tropical Agricultural Research and Higher Education Center (Centro Agronómico Tropical de Investigación y Enseñanza)
CBM	Mesoamerican Biological Corridor (Corredor Biológico Mesoamericano)
CCAB	Consejo Centroamericano de Bosques CCAB-AP      Central American Council on Forests and Protected Areas (Consejo Centroamericano de Bosques y Areas Protegidas)
CCAD	Central American Commission on Environment and Development (Comisión Centroamericana de Ambiente y Desarrollo)
CCAP	Consejo Centroamericano de Areas Protegidas
CEPREDENAC	Coordination Center for the Prevention of Natural Disasters in Central America (Centro de Coordinación para la prevención de Desastres Naturales en América Central)
COPECO	Comisión Permanente de Contingencias (Honduras)
CORECA	Regional Council for Agricultural Cooperation in Central America (Consejo Regional de Cooperación Agrícola)
CRRH	Regional Committee of Water Resources (Comité Regional de Recursos Hidráulicos)
DGMA-SICA	Dirección General de Medio Ambiente of the SICA
EARTH	Escuela de Agricultura para la Región Tropical Húmeda (Costa Rica)
EFCA	Central America Forestry Strategy (Estrategia Forestal Centroamericana)
EIA	Environmental Impact Assessment
ERB	Estrategia Regional para la Conservación y Uso Sostenible de la Biodiversidad en Mesoamérica
EU	European Union
FEMICA	Federation of Municipalities of Central America (Federación de Municipios del Istmo Centroamericano)
GTZ	German Technical Co-operation

IADB	Inter-American Development Bank (BID – Banco Interamericano de Desarrollo)
IACD	Inter-American Agency for Cooperation and Development
IAI	Inter-American Institute for Global Change Research
ICAITI	Central American Institute for Research and Industrial Technology (Instituto Centroamericano de Investigación y Tecnología Industrial)
IICA	Inter-American Institute for Agricultural Sciences
IMDS	Initiative for Sustainable Development in Mesoamerica (Iniciativa Mesoamericana de Desarrollo Sostenible)
INCAP	Institute of Nutrition of Central America and Panama (Instituto de Nutrición de Centro América y Panamá)
IFF	Intergovernmental Forum on Forests (Foro Intergubernamental sobre los Bosques)
IPF	Intergovernmental Panel on Forests (Grupo Intergubernamental ad hoc sobre los Bosques)
IRWR	Internal renewable water resources
IUCN	The World Conservation Union (UICN – Unión Mundial para la Naturaleza))
LACFC	Latin American and Caribbean Forestry Commission (FAO)
MDG	Millennium Development Goal
NGO	Non Governmental Organization
OAS	Organization of American States (OEA - Organización de los Estados Americanos)
OIRSA	Regional International Organization for Agricultural Health (Organismo Internacional Regional De Sanidad Agropecuaria)
PACADIRH	Action Plan for the Integrated Management of Water Resources in Central America (Plan Centroamericano para el Manejo Integrado de los Recursos Hídricos)
PARCA	Environmental Plan for the Central American Region (Plan Ambiental de la Región Centroamericana)
PATH	Proyecto de Administración de Tierras de Honduras
PBPR	Proyecto de Bosques y Productividad Rural (Honduras)
PPP	Plan Puebla Panamá
PRACC	Programa Regional de Reconstrucción para América Central
PRRD	Regional Plan for Disaster Reduction (Plan Regional de Reducción de Desastres)
SIAM	Sistema de Información Ambiental Mesoamericano
SICA	Central American Integration System (Sistema de la Integración Centroamericana)
SG-SICA	Secretaría General del SICA

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UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFF	United Nations Forum on Forests (FNUB - Foro de la Naciones Unidas sobre los Bosques)

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## 1 Summary

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The present report is the fruit of a mission of two environmental experts, who have been fielded in Central America between the 24<sup>th</sup> of November and the 9<sup>th</sup> of December 2004. The mission visited Nicaragua, El Salvador, Guatemala, Costa Rica and Honduras, where interviews have been conducted with the representatives of the EU, major donors, governmental institutions and NGOs active in this field. The aim of the mission was, in parallel to the pre-programming exercises (teams of the regional, Honduran and Salvadoran ones have been met), to prepare an overview of the state of the environment in the region, to review the institutional and legal framework for the environment and to develop recommendations for mainstreaming environmental concerns in priority development areas for Central America (see the terms of references in annex).

Throughout the region, the environmental problems are the same, with local variations, and are characterized by a degradation affecting more and more persons. Starting with the natural disasters that affected the region 5-6 years ago, a growing concern has developed that nature conservation will not solve the whole problem. In fact, today the focus is more and more on the contamination aspects and its consequences for the social, economic and natural factors.

The **main problem seen by all persons met concerns water**. From the background of the person, the focus lies more on watershed management, drinking water production and distribution, agricultural and industrial (including for energy) needs, sanitation and water treatment, social conflicts, etc. but always putting water in the middle. The case of El Salvador is particularly dramatic: being a small country, the high population density and the limited water resources lead to a large dependency on the care taken by the neighbour countries of the resource. Here the concept of “shared watersheds” takes all its meaning, even in the often forgotten sense of “shared underground watershed”. The large attendance at the 3<sup>rd</sup> “Central American Convention on Water”<sup>1</sup> is significant in this respect. Not only is water availability a concern, its quality too. Contaminated water (rivers or lakes) is more and more a health risk and economic development hindrance. As recently cities have attracted most of the population and their development was poorly planned, the infrastructure to deal with water has not followed. Unfortunately the negative effects of inadequate water management are often displaced in time and space, which lead to poor attention to the problem. Next to the lack of knowledge about the exact water resources and its cost, the legal framework for water is inappropriate and any attempt to change it is blocked by opposing interests.

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<sup>1</sup> [http://www.ccad.ws/documentos/actividades\\_varias/foroagua/foro\\_agua.html](http://www.ccad.ws/documentos/actividades_varias/foroagua/foro_agua.html)

Linked to water contamination, is undoubtedly the excessively poor solid waste management reported in the whole region. If solid waste management is a local problem, this problem is repeated throughout the region. Solid waste is poorly collected, if it is done, usually receives no particular treatment and is often dumped in inappropriate places. The use of agrochemicals without any proper knowledge leads equally to water and soil contamination. Most of the large cities of Central America have grown rapidly which leads to a strong atmospheric contamination, particularly affected are Tegucigalpa, San José and San Salvador. Around 70% of this contamination is produced by vehicles.

Even if the last natural disasters have attracted attention to the poor state of natural resources management, very little has been done to change the situation. Sustainable and rational forest management is lacking everywhere with very few local and limited exceptions. This is not only due to a lack of knowledge and to weak institutions, but also to the advance of the agricultural frontier, and to the perception of forests as a “productive” sector. Today, most of the preserved forests are located in protected areas, hence the importance of their conservation.

Changing the “physical” environment cannot be done without changing the actors having an influence on it. Good governance from the institutions to good behaviour of the individuals is needed. The **CCAD** (Central American Commission on Environment and Development) plays an important role in this, even if this institution is not yet out of its infancy, with the exception maybe in the field of biodiversity. The challenge for the CCAD is to establish itself in a sustainable fashion, with its proper resources, hence being less dependent on foreign aid and political influences in the execution of its mandate. There is no doubt that its objective of harmonizing the legal framework is a priority and will need to involve other national ministries such as those in charge of the environment. Other regional bodies, like the CEPREDENAC (disaster) or CRRH (water) need to receive more attention. At the **national level**, the institutions dealing with environmental matters depend heavily on the foreign aid to execute their tasks, even if this field is more subject to donations and grants, a national contribution should always be a prerequisite. The use by the **private sector** of sound environmental practices should be encouraged. All projects should have their “environmental practices manual” next to its manual of procedure. Changes in attitude have to take place throughout the society in order to internalise the existing environmental conscience and to take a definitive step toward actions.

Environmental matters are an international concern; the environment itself is homogeneous in Central America and the related problems are shared by all countries. Thus measures in favour of the environment will continue to be internationally supported and more and more integrated at the level of the region. Nevertheless, actions in the field have to be locally developed but networked where actions of a general interest, like harmonizing the legal and



institutional framework and information exchange, will have to be pursued at regional level. The execution of environmental activities in the field (e.g. sanitation infrastructure or land husbandry) is mostly related to property aspects. Without a secure property right system throughout the region, the impact of the activities will be reduced. In order to reverse the adverse environmental trends, contribute to the sustainable development of the region and to insure proper living conditions to the population, it is recommended to:

1) Tackle the main technical issues:

a) Support the **water sector**, looking to:

- Ensure sustainable water supply and sanitation,
- Support the development of knowledge and the legal framework,
- Conserve and manage the ecosystems ensuring the availability of this resource

b) Fight **environmental contamination** by:

- Improving solid waste management
- Supporting clean technology development and dissemination

c) Foster sustainable **natural resources management** by

- Supporting the use of rational forest management
- Promoting the commitment to and effective application of international conventions

2) **Promote actors and processes**

- a) Support the development of environmental capacities of the national and regional institutions and the civil society and the proper information of the population
- b) Promote the “win-win” aspects of environmental development in the private sector
- c) Promote good environmental governance at regional level (in view of a future custom union (> CITES), harmonized rules and procedures)

3) Create framework conditions to **attitude changes** in assisting the internalisation of the environmental conscience and the step from conscience to action through changing the perception of the society and exchanging experiences.

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## 2 State of the Environment

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### 2.1 Key Environmental Issues

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Even if the Central American Region is far from being a homogenous region with respect to its biophysical conditions (mountains and seas, humid and dry areas, etc.) and development tendencies, the environmental problems are shared throughout the region. Environmental degradation continues to occur at an accelerated pace throughout the region, given the socioeconomic conditions of poverty of a vast segment of the population, the high dependency of the isthmus' economies on the exploitation of natural resources and the high vulnerability of the rural and urban populations to natural disasters.

The strong relationship between environmental degradation and socioeconomic conditions, combined with the high levels of urbanization in the region, indicate that the high social costs derived from the environmental problems can be a result of urban and industrial pollution.

Mesoamerica constitutes a biological, cultural and economic bridge. With 2% of the world's territory, it has nearly 12% of the world's biological richness, it has the second most important barrier reef chain in the world, with 1,600 km along the south eastern coasts of Mexico, Belize, Guatemala, and Honduras; humid tropical forests, semiarid woody lands, prairies and mountainous forests. The region also possesses 8% of the remaining world mangroves. Being a naturally rich area, the inadequate management of natural resources threatens terrestrial and marine biodiversity. A recent report of the UNEP<sup>2</sup>, states that 6 million hectares of forest cover were lumbered or burnt annually between 1990 to 1995, 822 vertebrates are actually endangered, and more than 300 million hectares of soil have been degraded, principally due to soil erosion caused by deforestation and excess grazing. Thus natural resources management is an important field for international aid.

The most economically depressed populations in rural and urban areas are found in zones of higher risk of the occurrence of natural disasters, in contrast with higher incomes groups. Such risks include droughts in southern Honduras, volcano eruptions in El Salvador and Nicaragua, flooding in Honduras, Nicaragua and El Salvador, and landslides and flooding in urban and urban peripheral neighbourhoods in all Mesoamerican regions. Natural disasters closely and intricately linked to climate variability have increased in frequency and intensity in the past decades. Regardless of the social and economic impact of these events, they can only be estimated; their association with poverty rank them high within the environmental problems of the region.

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2 UNEP, GEO for Latin America and the Caribbean: Perspectives of the Environment

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## 2.2 Physical Environment

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### 2.2.1 Geology, Topography and Natural Disaster Risk

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In strictly geological terms, Central America begins at the narrow Isthmus of Tehuantepec, in southern Mexico. That narrow section divides the volcanic rocks to the northwest from the folded and faulted structures of Central America. The southernmost geological limit of Central America is the Atrato River valley, in Colombia, South America, just east of the Panama border.

Geographically, Central America is an emergent isthmus in the middle of the American continent with an approximate area of 550 000 sq. km. It is constituted by 7 countries: Belize, Guatemala, El Salvador, Honduras, Costa Rica and Panama with coordinates starting in Belize of 18°51' north latitude, 88°32' west longitude and ending in Panama at 07°55' north latitude and 77°50' west longitude. The largest country in the area is Nicaragua and the smallest territory is El Salvador.

The geomorphological and topographic properties have conditioned the types of soils, climate and eco-regions. Elevations vary widely from high peaks, as that of the Celaque Mountain in Honduras of 2248 masl and fluvial valleys below 0 masl in Panama. It is a particularly unstable region of the earth's crust as it is located on the western edge of the caribbean plate subduction, which from the Miocene Epoch, about 25 million years ago, lifted the land from the sea. In the earliest stage, a peninsula and archipelago formed. Later, about three million years ago, the scattered islands coalesced to form a true land bridge, or isthmus, linking North and South America. Keeping pace with subduction and uplift have been volcanic eruptions — Central America has at least 15 active volcanoes<sup>3</sup> — and frequent earthquakes.

For the most part Central America is a rugged, mountainous area, with 109 large **volcanoes**, some more than 4,000 m high; Tajumulco Volcano, in Guatemala, is the highest at 4,220 m. Central America is one of the most active volcanic zones in the western hemisphere. Volcanic activity has produced a landscape dotted with majestic cones built from eruptions of ashes and lava, and beautiful lakes formed in collapsed volcanic craters called calderas.

The land surface slopes up rather abruptly from a narrow coastal plain along the Pacific Ocean to the mountain crests, and then descends more gradually to a broader plain along the

Caribbean Sea. Two major interoceanic passes are cut through the highlands of Central America, one in Nicaragua (from the mouth of the San Juan River to Lake Nicaragua) and the other in Panama (along the route of the Panama Canal). The Pacific coastline is about 2,830 km long, and the Caribbean coastline is approximately 2,740 km long. Several groups of small islands lie off the Caribbean coast, and some of them, such as the Bay Islands in the Gulf of Honduras, are inhabited.

The isthmus is also threatened by **earthquakes** given the presence of the Caribbean plate and the San Andreas Fault. Seismic activity is common to the area with the exception of Honduras, which lacks direct influence of the major faults of the region. This makes the country the less vulnerable to this natural risk.

Earthquakes along these zones can be divided into shallow focus earthquakes that have focal depths less than about 100 km and deep focus earthquakes that have focal depths between 100 and 700 km. The latter can be exemplified by the two most important quakes that occurred in the 70's: In 1972 in Nicaragua and in 1976 in Guatemala. In the past century alone, Managua, Nicaragua, has twice been destroyed by earthquakes (1931, 1972). The most recent, in 1972, took 10,000 lives. In 1976 some 25,000 people were killed in an earthquake registering 7.5 on the Richter scale and centered in the Motagua depression in Guatemala. This quake left 25 percent of the country's population homeless.

Another natural threat common to the region are **hurricanes**. The Hurricane season starts in August and tends to end by end of October. Coinciding with an unusual dry and unstable climatic year, in October 1998 Hurricane Mitch ravaged Central America, killing at least 11,000 people and displacing more than two million others. Nicaragua and Honduras absorbed the brunt of the damage, but El Salvador, Guatemala, Belize, and other countries in the region also felt the effects of the storm.

Hurricane Mitch and drought in 1998, earthquakes in El Salvador, Honduras and Nicaragua in 2001 stimulated a rapid increase of local level risk reduction management and measures. This promoted the activities of the Central American Coordinating Centre for Natural Disaster Prevention (CEPREDENAC).

### 2.2.2 Climate

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Temperatures in Central America, which is situated between the tropic of Cancer and the equator, vary principally according to altitude rather than latitude. Three main temperature zones are discernible. The *tierra caliente* ("hot country"), which extends from sea level to

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<sup>3</sup> Guatemala: Santa María, Pacaya, Fuego, Tacaná, Cerro Quemado; Costa Rica: Arenal, Rincon de la Vieja; El Salvador: Coatepeque, Ilopango, Izalco, San Miguel, San Salvador, San Vicente, Santa Ana; Nicaragua: Cerro Negro

an altitude of about 915 m, has average yearly temperatures of 24°C or more; the *tierra templada* (“temperate country”), from about 915 to 1,830 m, has a mean annual temperature of 18° to 24°C; and the *tierra fría* (“cold country”), from about 1,830 to 3,050 m, has average yearly temperatures of 13° to 18°C.

The Caribbean coast and eastern mountain slopes generally receive twice as much annual precipitation as the Pacific coast and western mountain slopes. The relative dryness of the Pacific slope is due to the presence of cold stable air caused by the cold California Current. This current, much like the Humboldt Current along the Peruvian coast, chills the air, thus preventing it from absorbing much water vapor and reducing the possibilities for precipitation. In contrast, the effects of the warm water of the Caribbean Sea allow the air to absorb abundant moisture, which is then carried by the prevailing easterly winds. Much condensation and rainfall occur as the winds flow up and over the high slopes of Central America. Rainfall is greatest along the Mosquito Coast of easternmost Nicaragua—San Juan del Norte receives about 6,350 mm of rain per year.

Periodic floods and drought are both posing significant risks for the food security and economic development of the countries. Drought, particularly in El Salvador, Honduras and the western part of Nicaragua, is a relatively frequent occurrence. Even normal rainfall years can result in an uneven distribution over time, resulting in dry periods and the loss of crops as seen in the Choluteca basin in 2002.

### 2.2.3 Hydrology

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The longest rivers of Central America flow to the Caribbean, and many small streams drain into the Pacific. Longer rivers include the Motagua of Guatemala; the Ulúa, Aguán, and Patuca of Honduras; the Coco, which forms part of the Honduras-Nicaragua boundary; the Río Grande and Escondido of Nicaragua; and the San Juan, which forms a section of the Nicaragua-Costa Rica border. Some of the rivers flowing to the Caribbean are navigable by small craft, but the streams flowing to the Pacific are too steep or too shallow for navigation.

Central America has three large lakes — Lake Nicaragua and Lake Managua in Nicaragua and Gatún Lake in Panama. Part of the Panama Canal, a great commercial waterway between the Atlantic and the Pacific, is in Gatún Lake.

Central America is a region that has plentiful water resources; however its model of development has created a serious crisis that threatens the access of a vast population in the region to these resources. An example of this crisis is the generalized scarcity and lack of accessibility of water in rural and urban areas of Nicaragua, Honduras and Guatemala. El

Salvador is a special case where its highly densely populated territory has been impacted severely by anthropogenic activities degrading water sources. In addition the geographic location of this country, being in the southwestern drainage of the isthmus and having the most reduced land area of the region, causes that most source rivers originate in Honduran and Guatemalan headwaters, which is the case of the Lempa, main source of water for San Salvador.

Settlements and urban development, usually located near water bodies, demand high volumes of water for three major sectors of consumptive water use: agriculture (irrigation and livestock), communities (domestic water supply) and industry. The water need for its different uses often leads to open conflicts. The situation is particularly acute in El Salvador.

Water requirements for energy (hydropower), navigation, fisheries, mining, environment and recreation, although they may represent a significant part of the water resources, have a negligible net consumption rate but an important influence on their management. Furthermore, as most countries do not provide separate figures for those items, they are not included in the regional computation of water withdrawal.

<b>Annual Water Use by sector in Central America</b>									
Agriculture		Domestic		Industrial		Total Use			
Km <sup>3</sup>	% of Total	Km <sup>3</sup>	% of Total	Km <sup>3</sup>	% of Total	Km <sup>3</sup>	% of LA & CA	m <sup>3</sup> per inhab.	in % of IRWR
9.4	77	1.8	15	0.9	8	12.2	5	428	1.7
Source: FAO- Land and Water Development Division 2004 <sup>4</sup>									

Water – in all its uses – represents a major issue and challenge now and in the future for the whole society. There is a strong conscience in the region about the environmental problems linked to water throughout its cycle: from its availability to waste water treatment and can even include the management of marine ecosystems.

There is a lack of knowledge about the exact water resources, even if all countries are making efforts to harness this knowledge (e.g. the contribution of the EU funded project FORGAES in El Salvador). Even though tremendous efforts have been made over the past few years to collect hydrological data (river flow, water table level), neither the extent and capacity of the water tables, nor its recharging potential are exactly known. Moreover, the exact cost of water is not known as this resource has been subject to a kind of mining

<sup>4</sup> <http://www.fao.org/ag/agl/aglw/aquastat/regions/lac/index4.stm>

exploitation without considering its replacement and water distribution is often supported by the government, often through development aid projects.

It is to be stressed that if the population see water as an increasing environmental priority, its importance is not internalized. Too often, water is taken for granted by its users (e.g. tap left open, overwatering of gardens, etc.).

Pollution is another concern to human water use manifested markedly by stakeholders throughout the region. Water contamination may be caused principally by municipal waste waters and by agricultural chemicals and organic fertilizers runoff. Contaminated water reaches the oceans or lakes expanding the pollution problem onto other ecosystems, bringing as consequence the loss of biodiversity in productive systems of the coastal zone.

Sanitation and used water treatment is thus a major environmental problem in the region. If it is said that in the Central Valley of Costa Rica, where San José lies, only 3% of the used water is actually treated, the extent of the problem speaks for itself. This not only represents a health hazard but also jeopardizes any further use of this water in addition of the contamination of the natural ecosystem.

Lakes too witness the impact of environmental degradation. Lake Managua in Nicaragua is completely eutrophic given the historic pressure of residual water, solid waste deposit, industrial wastes and others to an extent where restoration is most improbable. Lake Yojoa in Honduras is an excellent example of heavy metal pollution from the mining industry, and the accelerated sedimentation effect due to agriculture, livestock and energy generation activities. Concerns are growing about the ecological impact of the planned enlargement of the Panama canal on Gatún Lake particularly.

Next to polluted water, one major concern about contamination is the lack of proper solid waste management. Garbage can be found nearly in every open field at the proximity or within a municipality on rivers and river banks as well as beaches are littered with plastic bags and bottles. Cities are making tremendous efforts to collect garbage but often the services are not able to access the population and to have proper sanitary landfills. A large proportion of the population resorts to burning their litter at the first convenient place or to throwing it simply in a close watershed.

#### 2.2.4 Soils and land tenure

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Productivity has declined substantially on agricultural land forests in Central America. Almost 75 % of Central America's agricultural land has been seriously degraded.

All the Central American countries share the same problems and quality issues, all threatening food supplies for the population, particularly the poor. The impact of all human activities on soil includes: nutrient depletion (common in C.A hillsides and coastal lowlands), agrochemical pollution, soil erosion (of high incidence in the region), and vegetative degradation.

As before, the situation of the use of agrochemicals remains preoccupying. Not only is knowledge about the products and their use limited, but soil and water contamination also have an adverse effect on the economy (e.g. impossibility to turn to organic production, shrimp reproduction endangered, etc.).

Trends on land use transformation are also affecting fertile soils in El Salvador. Many families receiving remittances from their relatives working in the USA, shift from an agricultural based economy to a dependence on money received from abroad. Their desire to change status is an incentive to urbanize their agricultural land, reducing productive area in a country where land is scarce.

Land tenure and unequal land distribution are other critical issues in the area. Most countries have no countrywide land planning or cadastre, which acts as a brake on sustainable development. Very often, the municipalities (and projects) are delivering recognition of land use that serves as land title, without being an official cadastre document.

#### 2.2.5 Air

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Central America's urban centers experienced large population growth throughout the 1990s. This growth has in most cases resulted in an increase in the number of motor vehicles, thus leading to the growing problem of urban air pollution. In the countries of Central America, the number of motor vehicles on roads has increased up to 16% each year. For example, the number of vehicles in El Salvador has doubled since 1990 (there are now 500,000 automobiles). It is estimated that nearly 70% of all urban air pollution in the Central American region is caused by vehicular traffic. The chief polluters have traditionally been poorly maintained trucks and buses as well as private cars which run on lower quality fuels, such as leaded gasoline. However, Central American countries have recently phased out the use of leaded gasoline.

Costa Rica is a leader regarding air quality in Central America. In 1996, it banned the use of leaded gas and has since reduced its ambient lead levels by two-thirds. Furthermore, every motor vehicle in Costa Rica must now pass an annual emission inspection, and imported cars must come equipped with catalytic converters.



### 2.3 Biological conditions, biodiversity, ecology and nature conservancy

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Central America is essentially a land bridge uniting two previously isolated ecosystems. As a result, a mixture of both North and South American plant and animal species can be found. The lowland rain forest of the Caribbean and Pacific coasts resembles the tropical rain forest of South America. This is especially true below an elevation of about 1,000 m, with large numbers of palms, tree ferns, lianas, and epiphytes (air plants) reflecting the high rainfall and humidity of the region. Vegetation at altitudes of about 1,000 to 1,600 m shows ties with North America. The pine and oak forests of these highlands are like those of the Mexican highlands. High-altitude regions of Guatemala contain grasses like those of Mexico and the United States, and at about 3,100 m in Costa Rica are tall grasses similar to those growing above the tree line in the Andes Mountains of South America.

The same occurs for most of the animal life of Central America. The marley and opossum, the jaguar, ocelot, jaguaroundi, and margay, which are members of the cat family, have a South American origin. In contrast, the puma, gray fox, and coyote are of North American origin. The armadillo, anteater, and sloth have ties to the south, deer to the north. The large manatee, an aquatic plant eater, survives in the isolated lagoons of eastern Central America. The large green turtle and the iguana are used as food sources. Central America provides a habitat for numerous snakes such as the boa constrictor and the bushmaster. Parrots, the quetzal, toucans, and fish are common; notable are the landlocked sharks of Lake Nicaragua. Birds are especially abundant (e.g. Belize: 520 spp, Honduras 700 spp., El Salvador 522 spp) in all countries and share genetic and biogeographical regions. Central America hosts migrant species every year to avoid the harsh winters of the north, using the Central American corridor to reside and reproduce temporarily.

The main problem in the region is habitat destruction and the consequent extinction of species, many of which are not yet described by science. Habitat conversion has been severe in the Central American region in the last 50 years. The expansion of agriculture into semi-arid regions, forest cutting and depletion of wetlands has reduced the populations of many species. The loss of critical overwintering sites due to deforestation and other land use changes may threaten the survival of migrant populations. No systematic evaluation of habitat turnover and species depletion has been attempted, but figures available suggest a significant impact; several hundred vertebrate species are now threatened with extinction (UNEP 2000). The intensification of agricultural practices, forest replacement with plantations, new technologies for cultivating dry lands (a major reservoir of biodiversity) and the modification of the coastline suggest that these trends may worsen in the near future.

Local initiatives from national NGOs and government entities have focused on the protection of biodiversity through protected areas, environmental education programs and sound development practices.

The amount of land under some form of conservation and protection is continuing to rise. However, many types of ecosystems are still under-represented or not represented in protected areas. Furthermore, many protected areas, despite their declared legal status, lack proper management (e.g. Honduras with 3% managed protected areas compared to Costa Rica with 25%), and any real means of preventing degradation. Central America is recognizing the social value of biodiversity for local communities as it re-evaluates its biodiversity and natural resources as the basis for the generation of new products and hence socio-economic development.

Central America has 6,603 km of coasts, containing some 567,000 hectares of mangroves and 1,600 km of coral reefs. With an approximate area of 40,000 km<sup>2</sup>, 8% of Central America is covered by wetlands, found mainly in the coastal areas and interior lowlands. Moreover, it is estimated that 7% of the natural forests in Central America are mangroves being one of the most representative ecosystems of the region. More than 50% of this territory is located within cross border or shared watersheds and basins. All countries have ratified the RAMSAR convention in a commitment to preserve these ecosystems.

The minerals of Central America were an early lure for European settlers, especially the gold and silver found in Honduras and the highlands of Nicaragua. In addition, Honduras has significant deposits of lead, zinc, copper, and low-grade iron ore, and Nicaragua has large deposits of natural gas offshore in the Pacific. Large nickel deposits are in the vicinity of Izabal in Guatemala, and the country also has substantial reserves of petroleum, including those near Chinajá. Panama has considerable deposits of copper at Cerro Colorado. Nowadays mine stripping and fossil fuel exploration are posing a serious threat to protected areas, biodiversity and human lives, especially in Guatemala and Honduras.

## **2.4 Socioeconomic and socio-cultural conditions**

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### **2.4.1 Archeology, cultural heritage, values**

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The Central American region abounds with monuments and history, ranging from the pre-Columbian cultures of the Maya, Toltecs, Olmecs and other civilizations to the great colonial-era cities.

The major cultural heritage of all Central American countries derives from the prehispanic cultures that were established all along the isthmus, leaving behind outstanding hieroglyphic

writing, urbanization and archeological values. The two cultures amply spread through mesoamerica were the Aztecs and the Mayans. Both cultures and languages evolved more or less independently here while sharing a number of features. We can count up to 14 distinct indigenous ethnic groups speaking 39 languages, totaling about 6.7 million people (24 % of the total population of the region). Guatemala has the highest concentration of indigenous peoples (66 %), followed by Belize (20 %) and Honduras (15 %).

The Maya still occupy the same parts of Central America that were theirs in ancient times; the lowlands of Yucatan, Campeche, and Quintana Roo, Belize, parts of El Salvador and Honduras, and much of the States of Chiapas and Tabasco in Mexico. Their terrain varies from humid, semi-tropical forest with heavy annual rainfall, to semi-arid scrub bush, to mountains and upland plateaux. Much of it, especially in the north, has very few permanent water sources such as rivers and lakes.

Twelve hundred years ago, at the height of the Late Classic Period (AD 600-900), the total Maya population may have been as high as twenty million. They were agriculturalists, but lived in towns, villages, and cities clustered around paved plazas dominated by high pyramidal temples, as for example, Temple I, Tikal. All their activities were related to the environment and natural resources as is the case today. Particularly they had an almost adoration of the jaguar, macaws and bats.

Regarding values and principles, the Central American population is mainly Roman Catholic. Protestantism has recruited numerous followers in the past decades.

Concerning the environment, changes of attitudes are taking place but need to be more internalized by all stakeholders. The following table indicates a number of the transitions that should be made:

OLD	NEW
Environmental protection and economic growth seen as opposed	Sustainable development links environment/economic decision making
Focus is on local problems	Focus is on regional, global problems
Agenda driven by domestic consideration	Agenda responsible to international trade and climate for investment
Public looks to government to prioritise problems, find solutions	Public participation in identifying problems and developing solutions
Jurisdictional fragmentation leads to duplication and overlap	Jurisdictional co-operation strives to eliminate duplication and overlap
Mind-set is react and cure	Mind-set is anticipate and prevent
Command-and-control is instrument of choice	Broad array of instruments, including voluntary action and economic instruments, are utilised
Regulations prescribe technical solutions, inhibit innovation	Performance standards give industry flexibility, encourage innovation
Addresses large, easy-to-identify and manage point of pollution	Addresses diffused and difficult to manage nonpoint sources of pollution

#### 2.4.2 Socioeconomic aspects

##### Economy

Traditionally, Central American countries have been reliant on agricultural exports (e.g., coffee, sugar and bananas) to generate a large portion of their gross domestic product (GDP). During the past decade, however, most Central American countries have been developing new growth sectors in order to diversify their economies, such as non-traditional exports and so-called maquila industries (assembly of products, mainly textiles and apparel, for re-export). This transition has been particularly evident in El Salvador, where, in 2003, only 3.4% of the country's export earnings came from coffee, compared to more than half in 1988. In place of traditional industries, Costa Rica has been able to attract private investment, including large companies like Intel Corporation and Proctor and Gamble. In addition, remittances from Central Americans working abroad have increasingly contributed to the region's economies. Although most Central American countries have made great strides to diversify, agriculture still plays an important role in their economies.

In 2003, all Central American economies expanded year-on-year by an average of some 3%, following two years of average growth around 2%. Average growth for the period 1993-2003 has oscillated between 2% and 5%. However, per capita income ranges from €700 in Nicaragua to around €3000 in Costa Rica and Panama. Significant inequality also exists at national level with some 20% of the population living below the poverty line in Costa Rica and Panama and up to 50% in El Salvador, Guatemala, Honduras and

Nicaragua.. The region's main trading partner is the United States (accounting for some 40% of exports and imports) compared to the European Union which accounts for approximately 10% of the region's total trade. The region signed a Free Trade Agreement with the United States (CAFTA) in 2004, which has also been expanded to include the Dominican Republic. The Agreement is expected to boost the region's economic prospects once it is ratified by participating governments and implemented. In May 2004 the Central American countries and the European Union agreed that an Association Agreement including a Free Trade Agreement was their common strategic objective and in this regard a first phase of conducting a joint assessment of economic integration was in the process of being launched. The three "northern triangle" countries (El Salvador, Guatemala, and Honduras) have also signed a free trade agreement with Mexico.

Over the past few years, significant progress has been made in Central American economic integration, in particular the 2002 Plan of Action for Central American Integration, which foresees the establishment of a Central American customs union. To date some 90% of customs duties on products originating in the region have been harmonized. A final agreement to interconnect the electricity networks of the Central American countries was signed in December 2001, allowing for regional power trading among the member states beginning in 2006. This integration of electricity grids is only one of several initiatives funded by the Inter-American Development Bank's under the Puebla-Panama Plan, which seeks to promote regional development and integration of Central American countries with the southern part of Mexico.

### Tourism

Recreational activities in the region are as varied and diverse as the ecosystems and biodiversity. Urbanity offers shows of all kinds, cinema, videos, parks, hiking, religious activities, golf courses, musicals, gatherings of all kinds and more. Rural areas offer fishing and hunting, not only for recreation, but also as the basis as both food sources and recreational sports. In addition, coastal zones offer diving, snorkeling, picnics and others. All these activities vary in price and magnitude depending on the location and market offer.

Hence, the tourism industry is of extreme importance to the region's economy. Costa Rica, Belize and Panama to some extent have a worldwide promotion of their natural and cultural richness. Protected Areas Systems, like the SINAC in Costa Rica, serve all kinds of tourism at all prices year round. Other countries, having though one of the richest areas in biodiversity and spectacular sceneries, are not known as Central American tourist attraction, with the exception of the Bay Islands and Copán in Honduras, Tikal and Antigua in Guatemala.

This sector has increased rapidly and significantly in the region, and has become in some case an important source of revenue. Tourism in these countries in order to reach world class levels, has to overcome the following hurdles: 1) the high costs of flight tariffs given the regulatory structure of the intraregional market; 2) the quality and intensity of the promotional effort; 3) the weak regional positioning; 4) the lack of collaboration between the governmental and the private sector; 5) the infrastructure, particularly in beaches and rural areas; 6) the lack of incentives for a good environmental management; 7) the degraded environmental conservation areas; 8) the training problems; 9) the limited access to financial sources

### Population

With only 11 million inhabitants in the 1950s, half century later, Central America's population has more than tripled, reaching nearly 35 million. Half of these inhabitants are women; one out of five is indigenous and nearly one out of three is Guatemalan. 40% of the population is 14 years old or less. Half of the population is living in urban areas.

<b>COUNTRY</b>	<b>POPULATION No.</b>	<b>AREA (km<sup>2</sup>)</b>	<b>DENSITY p/km<sup>2</sup></b>
Belize	249,183	22,960	10.9
Guatemala	12,639,939	108,890	116.1
El Salvador	6,122,515	21,040	291.0
Honduras	6,249,598	112,492	55.0
Nicaragua	4,812,569	129,494	37.0
Costa Rica	3,710,558	51,100	72.6
Panama	2,808,268	78,200	35.9
Total	36,592,630	524,176	69.8

As mentioned before, significant emigration has taken place, mainly oriented towards North America with an important economic impact in the region. However, migration within the region is also an important phenomenon. The most significant regional flow of migration is represented by the number of Nicaraguan emigrated in Costa Rica, estimated being more than half million, of which the majority are illegal. Smaller flows occur between the other countries.

According to common trends, the population in the urban areas is increasing in comparison with the rural area population. Significant rural out migration is noticeable in all countries, where there probabilities of employment are low or none. These immigrants most likely become the urban poor, who without opportunity of employment most likely will end up being a delinquent. Social insecurity is common to all cities, a social condition that has become unmanageable by the competent authorities in most cases. This insecurity hinders economic investment and tourism, limiting development opportunities for Central America.

The demographic impact on the environment is critical. Pressure on natural resources as a source of food, energy and materials exacerbates. Urban planning, if existent, usually does not consider this situation. Suburban growth tends to occupy hillsides and other difficult topographic areas; elevation gradients tend to impede the delivery all basic services (water, sewage, solid waste management) by the municipality, hence, not all basic needs are met for the increasing the number of poor persons in the region. Tegucigalpa is a classical example of this phenomenon.

Crowding is another socioeconomic problem that hinders human health in all aspects. The lack of hygiene and care due to the absence of public services, consequently affect human health particularly children and juveniles.

## 2.5 Monitoring Environmental Indicators

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Indicators are a way of dealing with complex decisions in a decision making environment characterized by both lack of, and unstructured, information. They also offer a low-cost approach to dealing with incomplete information in a decision context with many possible impacts. Rural, urban and environmental indicators can be instrumental in flagging *when* and *where* a policy regulation or other means of intervention is urgent. Another function of environmental indicators is to monitor the impact of existing policies or projects and determine whether they are in line with policy objectives or whether adjustments are needed; for example, improved coordination with other sectors.

Choosing indicators is a difficult task as there is, particularly in the environmental sector, a considerable confusion about the objectives, the definition, the scope and the norms used to record the state of the environment.

Working at the level of Central America, we are facing two sets of indicators: global and nationals. The first deal more with a worldwide perspective and are very aggregative when the second can be very detailed.

The best-known environmental global indicators are those included in the UNEP<sup>5</sup> GEO Yearbook, which are mostly identical to the Millennium Development Goals relevant for the environment. These indicators cover the following themes:

- Atmosphere (climate change - ozone depletion)
  - Energy use per unit of GDP (MDG indicator no. 27 under Target 9, Goal 7)

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<sup>5</sup> <http://www.unep.org/geo/yearbook/103.htm>

- CO2 emissions, total
- CO2 emissions, per capita (MDG indicator no. 28(a) under Target 9, Goal 7)
- Consumption of CFCs (MDG indicator no. 28(b) under Target 9, Goal 7)
- Mountain glacier mass balance
- Natural disasters
  - Number of people affected by natural disasters
  - Number of people killed by natural disasters
- Forests (Deforestation)
  - Proportion of land area covered by forest (MDG indicator no. 25 under Target 9, Goal 7)
- Biodiversity (species loss / habitat loss)
  - Number of threatened species
  - Ratio of area protected to maintain biological diversity to surface area (MDG indicator no. 26 under Target 9, Goal 7)
- Coastal and marine areas (unsustainable use of living marine resources)
  - Marine capture as a measure of exploitation
- Freshwater (sustainable water use / access to improved water supply and sanitation)
  - Water use per capita
  - Water use as percentage of annual renewable resources
  - Proportion of population with access to improved water supply (MDG indicator no. 30 under Target 10, Goal 7)
  - Proportion of population with access to improved sanitation (MDG indicator no. 31 under Target 10, Goal 7)
- Global environmental issues (international environmental governance)
  - Number of parties to multilateral environmental agreements

These indicators are not very well suited to give a picture of the environment at “meso” level such as for Central America; moreover, UNEP GEO distinguishes between North and South America, which impedes any extrapolation for the particular characteristics of the Central American region. Some indicators are expressed in “per capita” terms, whereas others per “unit of Gross Domestic Product”, with the former giving an indication of population pressure on the environment and the latter of the pressure of the economic activity. Further it is to be noted that some of these indicators may give a wrong impression about the reality in the field: neither forest cover does give any indication about the degradation of these forests, which is common in Central America, nor the area of protected areas about the effectiveness of the protection.

As a complement to this, several national initiatives have taken place in Central America to define environmental indicators; work supported by the CCAD for the creation of



(National) Environmental Information Systems (SINIA) throughout the region. For example, Nicaragua<sup>6</sup> has prepared 57 indicators which cover:

- Biodiversity (7),
- Tourism (2),
- Fisheries (13),
- Soil and land use (3),
- Environmental contamination (6),
- Mining (2),
- Natural disaster risks (7),
- Energy (4),
- Forest (7),
- Water (8)

For similar categories, Guatemala prepared not less than 133 indicators<sup>7</sup>. These are classified for each theme by indicators for the state of, the pressure on the environment, the impact incurred and the response given. Although they are relatively complete, their application and permanent monitoring is difficult to achieve.

These examples give an overview of the wide range of possible indicators. Depending on the purpose, every theme can be detailed as, for example, about waste management<sup>8</sup> or forestry sustainable management<sup>9</sup>.

However, the main difficulty is not to select an indicator, but rather to define it and develop norms and standards for its measurement and interpretation. Once this is done, the main challenge is to apply it on a sustainable basis. Only the comparison in time can provide elements for the decisions makers. Thus confronted by the complexity of the environment and the cost of maintaining a monitoring system, the choice of the indicators is particularly important.

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<sup>6</sup> [www.sinia.gob.ni](http://www.sinia.gob.ni)

<sup>7</sup> Manual de Indicadores del Ambiente y los Recursos Naturales, MARN

<sup>8</sup> see Hazardous Waste Indicators Resources <<http://www.inece.org/hazwaste/indicators.html>>

<sup>9</sup> For example, the International Conference on the Contribution of Criteria and Indicators for Sustainable Forest Management: The Way Forward (CICI-2003), 3 - 7 February 2003, Guatemala  
<[http://www.fao.org/documents/show\\_cdr.asp?url\\_file=/DOCREP/005/J0077E/J0077E00.HTM](http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/005/J0077E/J0077E00.HTM)>

### 3 Environmental policy, legislative and institutional framework

#### 3.1 Environmental legislative and (national) institutional framework

All Central American countries have developed and modernized the environmental legislation and have ministries of environment and specific authorities in charge. Guatemala (MARN), Honduras (SERNA), Nicaragua (MARENA), Costa Rica (MINAE) and Panama (ANAM) have been developing and updating legislation related to environmental issues. El Salvador has recently created the ministry of environment as well as the General Environmental Law.

Country	Environmental Law	Year
Belize	Environmental Protection Law	1992
Costa Rica	Ley del Medio Ambiente	1998
El Salvador	Ley General del Ambiente	1993
Guatemala	Ley de protección y de Mejoramiento del medio Ambiente (reformada por la Ley del Organismo Ejecutivo (2000)	1986
Honduras	Ley Orgánica del Ambiente	1995
Nicaragua	Ley general del medio Ambiente y los Recursos Naturales	1996
Panama	Ley General del Ambiente	1998

All countries have developed legislation for environmental evaluation and control of development activities. Each country has its own modality of environmental control through audits, EIAs and others. Harmonization efforts are being implemented under the CCAD leadership on the CBM platform.

All countries share inefficiency in environmental law enforcement given the poorly endowed ministries of environment. These structures have been created recently and are made up of new and former departments transferred from other ministries. For example in El Salvador, the Protected Areas Department has been moved to the MARN from the Ministry of Agriculture, but the CITES office stayed at the latter. At the national level, the lack of concrete policies and real planning and limited resources (their budgets being sometimes far below the 1% of the national budget) has led to a characteristic institutional weakness of the environmental ministries in the region. In consequence, the activities of these ministries are often project-driven as they are looking for externally funded projects to cope with their task. Indirectly, the weak institutional structure has left an open door for unsustainable practices concerning the environment as a whole.

It is evident in that the Central American governments have voluntarily opted to sign international agreements and conventions in order to work on the conservation of the environment. Some international conventions and agreements have been ratified. Good examples of this is CITES, RAMSAR, Climate Change, Biodiversity. Moreover, several regional agreements have been signed between the Central American countries as the Central American Convention for the Conservation of Biodiversity and the Protection of Priority Wetlands, the Central American Convention on Climate Change, the Mexico-Central America Declaration on Sustainable Development, etc. Follow up of these joint international commitments is generally, but not always, the responsibility of the ministry of environment of each country, or in some cases related entities. In many cases, the continuity and implementation of most conventions is not done properly and in an opportune manner. An intense work of coordination and concerting of all stakeholders must be done by the Central American society.

Except for these international commitments, there is no compulsory regional legal framework as is the case in the European Union. All the work carried out at regional level is done through the national ministries, which meet within the Central American Integration System (SICA). Within the SICA several organizations are dealing with the environment, but principally it is the task of the Central American Commission on Environment and Development (CCAD) to veil for the environment.

### 3.2 The regional policies and strategies

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The CCAD is involved in the all the regional strategies and plans dealing at official level with the environment. The most known is the Environmental Plan for the Central American Region (PARCA). Developed by the DGMA-SICA<sup>10</sup>, PARCA defines the strategic guidelines for the CCAD in the medium and long term to tackle the environmental challenges of the region. Four thematic areas of work are defined:

- Forests and biodiversity
- Water
- Clean production, and
- Institutional strengthening for environmental management.

Each of these areas has underlying principles including the changing of attitudes to the use of natural resources, the participation of women, the reduction of the social and ecological vulnerability, the decentralization of the environmental management and the support to participation and social equity.

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10 General Direction for the Environment of the SICA

The operative objectives of PARCA can be summarized in two main areas:

- The strengthening of the CCAD and the national institutions in charge of the environment,
- The harmonization of the environmental management instruments in the region.

The plan equally foresees extra-regional activities for the CCAD in the field of climate change and the development of environmentally-friendly mechanisms, biodiversity, RAMSAR and CITES Conventions; international trade, the environment and regional competitiveness; political, financial and technical cooperation in environmental matters; and the Basle agreement.

PARCA is taken into account in other strategies including EFCA (forests) and ERB (biodiversity).

The Regional Strategy for the Sustainable Use and Conservation of Biodiversity in Mesoamerica (ERB) was presented by the CCAD in November 2003. The preparation of this document has been coordinated by the Biodiversity Technical Committee. This strategy, foreseen for a 10 year period, is seen as an integration of policies and cooperation between the countries and actors regarding biodiversity. This strategy follows five objectives:

1. to increase the knowledge of Mesoamerican biodiversity as basis for decision taking;
2. to develop initiatives for the protection, rehabilitation and sustainable use of ecosystems, habitats and representative and priority species for the region;
3. to foster the valuation and sustainable use of the biodiversity, recognizing its contribution to life quality of the mesoamerican society;
4. to strengthen the regional institutional framework and to harmonize the instruments for a real management of biodiversity in the region; and
5. to establish programmes in the region to take care of the threats to biodiversity.

The ERB is compatible with the PARCA y PACADIRH (water) and takes into account the Central American Convention for the Conservation of Biodiversity and the Protection of Priority Wetlands (1992) whose revision is recommended, and the Convention on Biological Diversity. Moreover, synergies exist between the ERB and the Central America Forestry Strategy (EFCA). The Regional Strategic Programme of the CMB (PERCBM) derives from the ERB.

The Central America Forestry Strategy (EFCA) was formulated in the framework of the FAO Latin American and Caribbean Forestry Commission (LACFC) under the auspices of the CCAD and the Central American Council on Forests and Protected Areas (CCAB-AP). It was approved by the Central American Ministers in October 2002. The strategic objective of the EFCA is (i) to support the countries of the region to implement the principles,

agreements and proposals for action of the Intergovernmental Panel on Forests (IPF), the Intergovernmental Forum on Forests (IFF) and their successor the United Nations Forum on Forests<sup>11</sup> (UNFF), as well as (ii) to position the forest sector as an important agent to contribute to the economic, social and environmental development of the seven countries. The EFCA aims at sustainable forestry that will contribute to poverty reduction, relieve water shortages, and decrease the region's vulnerability to natural disasters.

Its goals are ambitious – EFCA envisions in just 25 years, a region with between 45% and 60% of forest cover, with between 25% and 30% of that land protected within the Central American System of Protected areas; between 10% and 15% of it in sustainably managed forests. Further, the plan calls for between 10% and 15% of deforested land outside protected areas to be reforested with tree plantations or by secondary forests, which represents an average reforestation rate of some 50,000 hectares per country per year.

The EFCA will be developed in two phases. The first implementation phase (2002-2005) will have all the Central American nations revise, update, and begin execution of their Forestry Policies and their National Forestry Plans (NFP). The second phase will aim at the consolidation of opportunities for regional political dialogue and at the strengthening of national capacities for the definition of actions that will help execute the National Forestry Plans. After completion and revision of this second action plan, a third action plan for 2010-2025 will be developed.

The Central American Policy on the Conservation and Wise Use of Wetlands<sup>12</sup> intended to “Strengthen the conservation and wise use of wetlands of the region through action and cooperation among the countries for the well being of the present and future generations of Central Americans” in the preparation of which, next to the CCAD, the IUCN Regional Office played an important role.

In 1997, the Regional Committee of Water Resources (CRRH) and the Central American Commission for Environment and Development (CCAD) developed a proposal for a Plan of Action for the Integrated Development of Water Resources in Central America (PACADIRH). This Plan is now being revised. The objectives of the PACADIRH are:

- Public sensitization about the need for integrated water management,
- Coordinate the efforts to solve the water problems shared by several countries, and
- Foster measures of regional character in support of the national activities.

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<sup>11</sup> <http://www.un.org/esa/forests/>

<sup>12</sup> Política Centroamericana para la Conservación y Uso Racional de los Humedales

Support for regional integration and poverty alleviation are the first two criteria listed, among others, for the development of measures to be implemented in the context of the PACADIRH.

In 1999, the Central American Presidents signed the Strategic Framework for Disaster Vulnerability and Impact Reduction, which recognizes the social, economic and environmental character of vulnerability to disasters. The Strategy has a twin focus a) vulnerability reduction, and as such the risk, is considered from the development processes and all sectors and scales, and b) preparedness to better address emergencies and disasters, seen as a priority and complementary to the former.

The specific objectives are:

- To increase the level of security for the human settlements and infrastructure;
- To have a better land use planning in order to reduce vulnerability, and
- To include prevention and mitigation, risk preparation and management in sustainable development plans, programmes and projects.

Since 1993, the CEPREDENAC (Coordination Center for the Prevention of Natural Disasters in Central America) is coordinating the Regional Plans for Disaster Reduction (PRRD). The last Plan has incorporated the strategic framework and is oriented:

- At regional level, to ensure the consideration of risk and disaster management in the strategies of the SICA institutions;
- At national level, to strengthen the national prevention and disaster management systems through development of programmes.

The Regional Strategy for Contamination Prevention and Reduction has been developed in the frame of the PROSIGA project managed by the CCAD. This strategy has ambitious objectives:

- the prevention and reduction of pollution created by garbage dump and waste water, by the production of ordinary and dangerous solid waste and also by gas emissions and other air polluters;
- the strengthening of the traditional control and regulatory bodies in order to develop new management models where: prevention and mitigation are integrated; contamination production reduction at the source is supported, economic regulation instruments are incorporated, and the legal and institutional framework are newly formulated.

### 3.3 The major regional organizations

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The Central American Commission on Environment and Development (CCAD<sup>13</sup>) is the environmental arm of the SICA and is integrated by the ministers in charge of the environment in Central America. Created in 1989, the CCAD pursues the rational and optimized use of natural resources of the region, pollution control, and the reestablishment of ecological equilibrium, all directed to improve the quality of life of its population. As an example of its work, the Central American presidents presented a common position at the Earth Summit in Río de Janeiro in 1992: “The Central American Agenda for Environment and Development”. The awareness of climate change issues, environmental management, biodiversity protection, and more social participation have been fields in which Central America has advanced significantly in the past 5 years. The Central American Region Environmental Plan (PARCA), approved in 1999 by the Environmental Ministries, has been one of the principal instruments to direct all the work in these issues. The CCAD’s operational objectives are a) the strengthening of the environmental institutions and b) the harmonization of the instruments and actions in favor of the environment.

The CCAD is constituted by a rotating President, an Executive Secretary and regional technical committees made up of representatives of the national ministries in the different fields of activity. The task of these committees is to advise the Ministers’ Council of the CCAD and to execute the relevant activities at national level. These committees are:

- Climate change
- Committee on International Trade in Endangered Species CITES
- Committee of Institutional Communicators for the Environment
- Wetlands Committee
- Biodiversity Technical Committee
- Drought and Desertification Technical Committee
- Environmental Impact Assessment Technical Committee
- Central American Forest Council (CCAB)
- Central American Protected Areas Council (CCAP)
- Mesoamerican Environmental Information System (SIAM)

After many unfortunate encounters and conflicts, the civil society has a better dialogue with central governments and social participation platforms have been created in many forms and feasible processes of sustainable development. These include the Permanent Forum of Civil Society (in the CCAD), which has evolved into the Central American Forum of Civil Society, Environment, and Development.

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<sup>13</sup> <http://www.ccad.ws/>

The CCAD is in a phase of transformation in response to its weaknesses. These are linked to its structure:

- lack of own personnel (most of the work is done by the regional technical committee representatives and project personal);
- lack of own resources (mainly the Executive Secretary and its physical infrastructure is supported by the SICA budget);
- the absence of political will to have a common position from/for all countries (Conflicts of interests occur often and lack of consensus limits the scope of work).

Nevertheless, the CCAD is managing numerous projects financed by the donor community mainly in the field of natural resources management and environmental management, and has a strong position at regional and international level.

Another important regional organization, equally linked to the SICA, is the Coordination Center for the Prevention of Natural Disasters in Central America (CEPREDENAC<sup>14</sup>) created in 1998. Its aim is to strengthen the institutions dealing with disaster prevention and risk management in Central America. The major results and recognition in the region was given at the Forum Mitch+5 in 2003 en Honduras.

With its headquarters in Guatemala, CEPREDENAC is conformed of an Executive Secretary and several responsible of area. The main activities are oriented toward:

- the development of (national) plans and strategies;
- the exchange of experience, information and early warnings;
- the development of local capacities to manage disaster risks; and
- the strengthening of national institutions in managing emergencies.

CEPREDENAC is oriented toward the prevention of natural disasters and, to a lesser extent, the response to disasters when they occur. As such, the aspect of vulnerability and the occurrence of a natural event are brought together, and the social aspects linked to vulnerability are at the center of the preoccupations of CEPREDENAC.

At the moment, CEPREDENAC is recovering from an institutional crisis which resulted in its relocation from Panama to Guatemala. The main problem facing CEPREDENAC is its high dependency on external projects. As with other organizations, most of its efforts have been oriented toward post-Mitch activities. However, natural disasters in Central America are not only limited to hurricanes, but also include earthquakes, volcanic activity, inundations, tsunamis and drought as potential dangers for the region.

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<sup>14</sup> <http://www.cepredenac.org>



An organization relevant for the environment is the Regional Committee of Water Resources (CRRH)<sup>15</sup> created in 1966, which is linked to the SICA too. Its objective is to foster the development and the conservation of the resources derived from the climate, mainly water, and its sustainable use as a way to develop the countries of Central America and benefit their population. Recently, climate change has gained some importance for the CRRH.

The CRRH also focuses on the availability of water as well as its use. For the first aspect, water is considered as a resource from its availability, in quantity and quality and in its geographical and temporal distribution. Meteorological and hydrological (national) institutions are the main actors. For the second, the CRRH is considering the use and the users of water, thus giving a particular attention to the demand and its evolution. The institutions involved are those dealing in each country with water distribution.

To execute its tasks, the CRRH is composed of an Executive Secretariat, whose headquarter is located in Costa Rica. The CRRH is working through national committees, which are formed by the different (and numerous) institutions in each country, whose chairmen are the focal points for the CRRH Executive Secretariat.

The major challenge facing the CRRH is the number of institutions dealing with water in the Central American countries and their respective interests in the development of this resource, which have led to the freezing of many of the initiatives in this field.

The Central American Bank for Economic Integration (CABEI / BCIE)<sup>16</sup> was established in 1960 as a regional development bank and financial arm of the integration to foster economic growth with social equity and respect the environment. It offers credits for regional development projects, mainly in the field of infrastructure and industry. Its headquarters are located in Tegucigalpa, Honduras. Members of the CABEI are Honduras, Guatemala, Nicaragua, El Salvador and Costa Rica and also extra-regional countries such as Spain, Colombia, Argentina, Mexico and Taiwan. Several projects financed by the European Commission or the European Investment Bank are managed by the CABEI.

The CABEI has established a good reputation within and outside Central America. In its global strategy 2004-2009, the CABEI gives a high priority to the environment under its theme “Integration”: “Foster the rational management, conservation and use of the natural resources in the region” with emphasis on:

- Watersheds and water resources management;
- Environmental legislation, and

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<sup>15</sup> <http://www.aguayclima.com/>

<sup>16</sup> <http://www.bcie.org/>

- Carbon credits marketing.

The regional office for Mesoamerica of the IUCN (ORMA<sup>17</sup>) is a very active actor in the field of natural resources management in the region since 1987. The UICN-ORMA is built up of more than 80 organizations-members spread throughout the 10 countries of the region. This office is composed of different commissions (Ecosystem management, Education and Communication, Environmental law, Environmental, economic and social policies, Protected areas and species survival) and has its headquarters in San José, Costa Rica. The main topics are the application of the international environmental agreements, environmental impact assessment, water, wetland and marine resources management, environmental law, sustainable forestry, social aspects of environment, etc. The work of the IUCN is recognized internationally and supported by numerous donors.

The Tropical Agricultural Research and Higher Education Center (CATIE<sup>18</sup>) is a major player in the field of natural resource research, management and technical cooperation. Funded in 1973 as an emanation of the IICA<sup>19</sup>, CATIE is financed by the all the Central American and several Latin American countries. Its headquarters is located in Turrialba, Costa Rica. CATIE employs around 500 persons and has an annual budget of around 20 million dollars. CATIE's work is divided in two fields: Natural Resources and Environment and Agriculture and Agro-forestry. Next to the traditional topics developed as the management and sustainable use of plant's genetic resources, livestock development and crops (coffee, cacao, annual crops, banana, etc.), activities around forests, protected areas and biodiversity, global change, watersheds integrated management, competitiveness of environmentally sound enterprises and socio-economic aspects of environmental goods and services have taken an important place in recent years. CATIE's strengths lies in its close cooperation with national, regional and international institutions and organizations, and the effective integration of its three basic activities: research, education and project development, all of which focus on sustainable human development and natural resource conservation.

The Central American Indigenous and Peasant Coordination Association for Community Agroforestry (ACICAFOC<sup>20</sup>) is a broad, regional, community-based organization founded in 1994. ACICAFOC promotes local integration through social and productive activities, as a response to the social, environmental and cultural vulnerability of the region. It is directed

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<sup>17</sup> <http://iucn.org/places/orma/>

<sup>18</sup> <http://www.catie.ac.cr/>

<sup>19</sup> Inter-American Institute for Agricultural Sciences

<sup>20</sup> <http://www.acicafoc.net/>

to the indigenous, Afro-descendants and rural communities and seeks to develop their experience and knowledge.

ACICAFOR is comprised of local base organizations, cooperatives and federations working in ecotourism, agro-forestry, community forestry, agroecology, sustainable use and management of natural resources as well as payment for environmental services.

The Central American Institute for Research and Industrial Technology (ICAITI) has for objectives to:

- Investigate the use of the natural resources of the region and develop industrial production processes,
- Adapt and transfer technologies to the region,
- Reduce costs and improve the efficiency of the industrial sector,
- Develop norms at the level of Central America,
- Verify the quality of raw materials and finished products,
- Collaborate in the process of regional integration.

Through the development of clean technologies and the verification of the quality of the products, ICAITI contributes to environmentally sound practices and the rational use of natural resources.

Other regional organizations which have some activities related to the environment are the Institute of Nutrition of Central America and Panama (INCAP), the Agricultural Council of Central America (CAC), the Regional Council for Agricultural Cooperation in Central America (CORECA) and the Regional International Organization for Agricultural Health (OIRSA), the Federation of Municipalities of Central America (FEMICA), etc. EARTH in Costa Rica and Zamorano in Honduras are together with CATIE the main actors in the field of higher education and research in the region.

### **3.4 Integration of environmental concerns into the main sectors**

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The integration of the environmental concerns into the main sectors varies very much according to the sector concerned. All sectors dealing with productive activities (agriculture, industry, economy, finance) are oriented toward their internal goals and integrate environmental concerns only when it is compulsory (for example, EIA and mitigation plans for road construction). On the contrary, all sectors dealing with the natural and cultural heritage and the protection of society (tourism, health, meteorology, environment) are, *per se*, integrating environmental issues in most of their tasks. This dichotomy has been unconsciously demonstrated during several interviews.

Nevertheless, there is a growing interest from the private sector for environmentally sound practices. This comes not only from the legal requirements (e.g. EIA prior to the development of potentially contaminating installation) but also from the deterioration of the environment (e.g. reduction of coffee quality through the use of contaminated water during production) and the market driven demand (e.g. organic production).

Mainstreaming environmental issues in various sectors suffers from the transversal character of environment and its diffuse associated image. Even if the distinction between “brown” and “green” environment or between “technical” and “biological” helps to reduce this confused image, environment is often considered as a secondary topic, generating more trouble than help.

The **Central American Free Trade Agreement (CAFTA)** would open Central America to substantial changes in industrial and agricultural development, many of which could exacerbate the existing problems in the region. Unfortunately, CAFTA’s Environment chapter (Chapter 17 of the agreement) provides no real expansion or improvement of environmental protection. The basic requirement of the Environment chapter is Article 2, which simply requires that countries enforce their existing environmental laws. The agreement does not clearly require any country to adopt a set of basic environmental laws and regulations. The incomplete environmental framework in the region and the weakness in their implementation leaves the door open to environmental abuse by foreign companies. Nevertheless, the agreement proposes to negotiate a parallel agreement establishing an Environmental Cooperation and Capacity Building Mechanism. This has not yet been done. Article 8 of the Environment chapter establishes a framework for "Environmental Consultations" thus includes a process that allows citizens to make submissions alleging government failures to effectively enforce environmental laws, but the process does not provide for any clear outcomes or actions to ensure environmental enforcement.

### **3.5 Integrating environmental issues in development co-operation**

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Development co-operation is oriented toward sustainable development, where poverty alleviation plays a major role. This generates a wide range of support in all sectors of the society.

Even if environmental concerns have to be considered in the identification and formulation of a project or programme, more often they are limited to a declaration that the project has no incidence or has a positive impact on the environment. Even if more detailed information is requested (e.g. EIA for an infrastructure project), this study is not made public most of time.

During the execution of a project, very little attention is given to environmental issues if they are not part of the project activities<sup>21</sup>. Even projects that have nothing to do with any “fieldwork”, as for example a support to the judicial system, such projects could consider environmental topics in their every day life: supporting the use of environmentally sound materials for the office, introducing reuse and recycling at their level, supporting environmental friendly attitudes, etc. Unfortunately, projects more related to the management of natural resources often fail to consider the environment in its whole and as a fundamental component. It is not unusual for an agriculture development project to support the use of imported chemicals. In both cases, environmental issues are a secondary preoccupation in their day to day business; but much more there is a lack of knowledge or information about what it is possible to achieve.

Information dissemination is a very important factor. Most of the projects today have some kind of newsletter, which gives very little room to environmental considerations, if their goals are outside the environmental sector.

### **3.6 EU and other donor cooperation with the region from an environmental perspective**

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Most of the traditional multi- and bilateral donors are involved in environmental regional projects (see annex for a selection). Among them, the European Union is playing an important role; the contribution of EU Member States is non negligible too, but less oriented toward regional projects. The major problem with cooperation projects is to determine which project is an environmental project as some projects, like water supply and sanitation projects, may be classified under another group. This is clearly demonstrated by the project list<sup>22</sup> - a good example of transparency and good governance - of the Delegation in Nicaragua, where very few projects are classified as “environmental projects”.

The most important programmes and projects in the region are the following.

The “**Programa de Desarrollo de Zonas Fronterizas en América Central**” is financed by the EU on reprogrammed funds from the FOEXCA Programme and is managed by the CABI [ACR/1989/0012 (ex ALA/89/12)]. This programme just started and has a budget of EUR 54 million (40.5 million from the EU) for the five year programme lifespan. This

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<sup>21</sup> Moreover, each project could, parallel to its “manual of procedures”, develop a similar work for their environmental considerations. This in some case could be developed to an official certification according to the environmental norm ISO 14000. Such “project’s environmental manuals” could foreseen to request their suppliers to submit a declaration about the measures they are executing in favour of the environment. Evaluation – at any stage of the project – should consider producing a specific annex about the mainstreaming of environmental concerns into the project activities. Such chapter could eventually be replaced by a thoroughly conducted environmental review, if relevant. The results of such investigation should be made public

Programme is divided in two components: the integrated development of municipalities (5) and the management of multinational watersheds (*cuencas compartidas*)(4) situated in border microregions of Guatemala, El Salvador, Honduras and Nicaragua. The Programme will strengthen watershed authorities, municipalities' offices and civil society organizations which are supporting the development of activities oriented toward poverty alleviation, conservation, rehabilitation and rational use of natural resources, particularly water, in a regional integration perspective. In other words, the Programme is working from the regional level to the local one. The funds of the Programme can be used for projects in the field for (i) institutional strengthening, (ii) investment (e.g. basic services, natural resources management, etc.) and (iii) studies to resolve legal and norms conflicts across the borders. This project is directly oriented toward poverty alleviation and vulnerability reduction, thus having a potential positive environmental impact.

The “**Programma de Desarrollo Binacional en las Zonas Fronterizas Terrestres de Honduras y El Salvador**” [ACR/IB/2000/2052 N° 3232] is similar to the former with a budget of EUR 36 million (EU contribution: EUR 30 million), also managed by the CABEL. This Programme started at the beginning of 2003 and is foreseen to last until 2010.

The **Regional Programme for the Reconstruction of Central America (PRRAC)**, funded by the European Commission [B/-3130 (PRRAC)], was set at €250 million, to be committed between 1999 and 2002 and to be implemented within six years. This programme was addressed to Honduras, Nicaragua, El Salvador and Guatemala, which were the most affected countries by the hurricane Mitch. Even if a large amount of the activities are oriented toward water and sanitation infrastructure, thus having a positive impact on the environment, some projects are more directly oriented toward the environment, as for example the preparation of risks maps in the intervention area of the Programme in Nicaragua or the project for “Concientización y Educación Ambiental Integral, en el Ámbito Local y Cuencas Seleccionadas en El Salvador” (PROCEDAMO).

The financing proposal for the “**Programa Regional de Reducción de la Vulnerabilidad y Degradación Ambiental**” (PRRVDA) has been presented to the EU for approval in 2005 with a budget of EUR 20 million. This Programme intends to develop integrated approaches to the reduction of risks of a social or natural nature linked to water, focusing particularly on land use planning and watershed management. This Programme with a proposed duration of three years will be implemented in Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama by three regional institutions CEPREDENAC, CRRH and CCAD dealing respectively with disaster prevention, water management and environment.

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<sup>22</sup> [http://www.delnic.cec.eu.int/es/eu\\_and\\_country/cooperation\\_list/cooperation\\_list.htm](http://www.delnic.cec.eu.int/es/eu_and_country/cooperation_list/cooperation_list.htm)

Worth mentioning too is the project “Integración de los sectores civiles a la co-administración de áreas protegidas (Comanejo) y manejo de conflictos ambientales en Centro América”. This Project is executed by the IUCN with EU financing [B7-6200/2002/0652/CRI] for an amount close to EUR 900 000..

In addition, a major regional effort is being implemented by the **Mesoamerican Biological Corridor**<sup>23</sup> (CBM) project, which is currently in a consolidation stage and has the support of all Central American stakeholders. This large programme is financed by various donors, coordinated by the CCAD and executed in each Central American country by the Environment Ministry. The programme is based on the concept of connection zones between the protected areas of the region and integrates conservation and rational use of the biodiversity in the framework of sustainable development.

In addition, an “**Environmental Regional Programme**” is at the identification stage by **DANIDA**, which will be implemented by the CCAD. This Programme could already start in 2005.

The PPP “**Plan Puebla-Panama**<sup>24</sup>” was approved by the presidents of Mexico, Central American countries and the prime minister of Belize in early 2001, and is coordinated by the Inter-American Development Bank (IADB). It was presented as framework over a 25 years period for economic development, poverty alleviation, increase in human knowledge and natural resources. The PPP is divided in 8 initiatives, 1) Sustainable Development, 2) Human Development, 3) Natural Disaster Prevention, 4) Tourism Promotion, 5) Trade Facilitation, 6) Road Integration, 7) Energy Interconnection, and 8) Telecommunications Development. However, only two initiatives seem to be drawing time or resources from the IADB and the CABI: energy interconnection and road integration. Financing sources are sought for the others. The PPP is strongly criticised by the civil society active in social or environmental sectors.

The PPP “Initiative for Sustainable Development in Mesoamerica” (IMDS) is divided in two components a) Rural agriculture development and b) Environment. For this last component, the CCAD plays a major role in its implementation and present 15 projects as being part of it (see annex).

Next to these regional efforts, projects financed by the World Bank such as the Proyecto de Administración de Tierras de Honduras (PATH) and Bosques y Productividad Rural (PBPR) or the Plan de Ordenamiento Territorial in El Salvador are aimed at contributing to the

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<sup>23</sup> <http://www.biomeso.net/>

<sup>24</sup> <http://www.iadb.org/ppp/>

solution of the problem of land tenure. They play an important role in securing a sound basis for the development of environmental measures.



## 4 Conclusions and recommendations

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Faced with increasing environmental degradation in Central America, it has now become necessary to develop a new vision for this sector and ensure that it is adequately taken into consideration in the national and regional development plans and programmes throughout the region. This issue is much more emphasized now in the context of the process of stronger integration of the Central American countries and the development of various free trade agreements with third parties including among others CAFTA and the future Association Agreement with the European Union, which has become a strategic common objective. . So far, the environment was not considered as an important element in comparison with the social and economic pressures existing in the region after the end of the conflicts and after the various natural disasters. Even if a growing awareness exists regarding the importance and the potential role of nature for the development of tourism activities, the environment as a whole should be considered as an opportunity for socially and economically sustainable development. Besides nature, clean technologies and environmental cleaning (e.g. waste water treatment, plastic recycling) amongst others, offer opportunities for employment and business development. The aim is to reach a vision where the environment is not considered an obstacle to social and economic development but where society perceives the advantages of a clean environment as a condition for sustainable development.

Environmental issues are numerous and all of them are important in terms of their significance for the “future generations”. Nevertheless, managing them requires an approach focused on defined priorities. Environmental aspects can be viewed from three perspectives:

1. the environment itself, seen more from the point of view of the technical issues,
2. the poverty principles i.e. setting the focus on the actors and the governance or the processes involved in the management of the environment, and
3. the changes of attitudes needed to reach a positive impact on the environment.

The environment represents a unique possibility to bring together people of different opinions around a topic of common interest.

It is important to note that many of the following recommendations can be developed at local / national level; the problems are shared throughout Central America. This makes them a good entry point for the Central American integration. Activities dealing with norms, legal and institutional development should be tackled at the regional level. Those should be linked with activities in the field conducted simultaneously and in coordination in two or three countries, and aimed at sound environmental management. These fields of

activities have to be organized in such a way that they provide feedback to the regional normative activities, which should foresee corrective mechanisms.

Nevertheless, most measures in favour of the environment executed at field level may have a limited impact due to the poor security linked to property, in particular land tenure. Environmental activities in the field are subject to investments made in a long-term perspective and on large extensions of land (e.g. reduction of land vulnerability); hence the lack a proper cadastre system will have often a negative impact<sup>25</sup>.

## 4.1 The environment – technical approach

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### 4.1.1 Water

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Even if the work to be done to harness this sector is huge, all problems related to water are a subject of importance and will be more so in the future: it should be a priority for all actors to:

- Ensure sustainable water supply and sanitation,
- Support the development of knowledge and legal framework for water,
- Conserve and manage the ecosystems ensuring the availability of this resource.

It is necessary to pursue the efforts made by the EU and its Members States in **ensuring water supply and sanitation** to the population, which are directly linked to poverty alleviation. Major activities have been executed in this respect after the various disasters that occurred in the region, but the need is far from being covered. A special regional study of the water sector could be coordinated by the CRRH.

All citizens and persons responsible in the institutions should be aware of risks and the costs of not having a proper used water system. The major challenge is to convince people of the importance of this activity, as its effects are often insidious, latent and shifted in space and time. This can only be done in parallel with the development of used water treatment capacities. The efforts undertaken so far (Municipalities, NGOs, donors) are far from being able to give a proper response to the problem given its size. Nevertheless, activities in this field should be pursued, coordinated and supported, but a greater emphasis should be given to the sustainability of the systems established.

Throughout the water cycle, all actors involved (from local to supra-national) should participate in the definition of needs and potential, as well as in the coordination and implementation of activities. This should lead to the development of the **knowledge of this**

**resource** and its use. An important task would be to jointly involve public bodies, civil society, the local communities and the private sector in evaluating the real cost of water, ensuring its equitable distribution, quality and treatment after use.

It is important that water still be considered as a scarce resource once it is made available. If its production and distribution is a huge task, its rational and efficient use is of equal importance. The population should perceive the importance of water, at home as well as at work. Sensitisation campaigns should be accompanied by incentives or rewards for a proper use of water and with sanctions for its misuse. Even if the social fabric has been largely disrupted, water could be a way to develop social cohesion and social equity. It is of utmost importance that the user “internalise” the cost of water in order to reach a sustainable use of this resource.

Most of the conflicts related to water originate from differing interpretations of the various legal documents dealing with this resource: laws and regulations in the field of health, agriculture, land use, energy, etc. Most of the countries are trying to solve this with a new **legal framework for water**, the “water ordinance” which should replace the previous texts dispersed in the various laws. Unfortunately, this direct approach to the problem always failed. Without an appropriate and modern legal framework for water management, any investment in this sector will be faced with difficulties, now or in the future. This approach to one of the major problems of the region should be replaced by a step-by-step and participatory process focusing on common issues and not on the disagreement on particular topics<sup>26</sup>.

At the regional level, such an approach could be supported by the “Central American Convention on Water” of which the 3<sup>rd</sup> venue has been held in San Salvador from 30<sup>th</sup> November to the 2<sup>nd</sup> of December 2004. Such initiative is partially developed by the Regional Network for Water and Sanitation of Central America<sup>27</sup> or the Global Water Partnership Centroamerica<sup>28</sup>.

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<sup>25</sup> Activities in legalizing and insuring a proper framework for use and property right, even if they are not considered as environmental measures, should be supported as a condition to implement successfully environmentally sound activities.

<sup>26</sup> Such approach could contemplate:

1. identifying and bringing together the actors, mainly institutions at higher level, some major cities and NGOs dealing with all aspects of water (from protection of the resource to waste water treatment);
2. establishing a diagnostic of existing laws and regulations throughout the whole existing legal framework and their implying consequences;
3. developing a list of issues where a consensus or disagreement exist;
4. starting negotiations on improvements of the legal texts and coordination for the issues presenting a wide consensus;
5. document and publish the result of the work.

<sup>27</sup> Red Regional de Agua y Saneamiento de Centroamérica (RRAS-CA), <http://www.rrasca.org>

<sup>28</sup> <http://www.gwpcentroamerica.org/gwp/gwpca.htm>

Water is the common element of the humid, coastal and marine zones for which contamination represents an important danger. Its protection and rational use is necessary to maintain the potential and role of these zones in the ecosystems. The various actions initiated by the CCAD (coral reefs, protected areas, biological corridor) in this field should be further developed.

#### 4.1.2 Environmental contamination<sup>29</sup>

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Next to water, solid waste management is also of great importance throughout the region. A regional approach could foster its solution.

One major concern about contamination is the lack of proper solid waste management. The existing initiatives should be supported and amplified; a particular attention should be given to adapted and local solutions, looking for synergies between the different actions. This can be built on the already existing environmental conscience of the population concerning this topic<sup>30</sup>.

On the industrial side, “clean production” organizations<sup>31</sup> should be supported to ensure proper technology transfer: methods requiring less energy or water or producing less waste (e.g. production of energy from waste).

#### 4.1.3 Natural Resources Management

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Through the advance of the agricultural frontier and through uncontrolled logging, most of the Central American forests have been depleted or logged. Proper **forest management** should ensure the production of wood, fuelwood and non wooden products (medicinal

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<sup>29</sup> The **use of agrochemicals** remains preoccupying. Information diffusion about the danger of stocking, handling, using and residues should be developed. This information should reach all persons concerned, including small shop resellers; should be presented in an understandable way and should propose alternatives always when available. Moreover, Projects financed by the EU or its member states should not promote the use of agrochemicals that are banned in Europe or suspected of having a strong negative impact on the environment. Against atmospheric contamination, incentives schemes to progressively modernize the vehicle parks and to ensure proper vehicle maintenance should be supported. A synergy should be sought with the efforts to reduce greenhouse gases. Experiences in these fields should be disseminated.

<sup>30</sup> For example, the following measures could be envisaged:

- o In the frame of the decentralization process, framework conditions have to be developed for a proper domestic refuse management. Moreover, this could lead to some cooperation at regional level trough the URB-AL programme.
- o Capacity building and strengthening the solid refuse and waste water management: collect, treatment, potential for recycling, etc.
- o Regional planning for waste disposal
- o Experience exchanges at regional level between municipalities, NGO and enterprises, even European ones,
- o Sensitisation at all level of the economic potential of residues and wastes, hence development of pilot initiatives.
- o Development of incentives to the use of non contaminating or recyclable packaging material;

plants, mushrooms, wildlife) as well as the ecological functions of forests (water retention, soil protection). The recreational aspects and tourism should be considered here too.

Although co-management of conservation areas is quite developed, similar schemes should be supported and generalized for forest management based along the lines of the existing examples. The forest owners should receive incentives for implementing a sound management system and training to conduct it. Information about sustainable forest management and opportunities should be disseminated. Marketing intelligence should be given to the products (wood, fuelwood and other products) from recognised sound managed forests, natural or planted. This could in some cases involve support to the first or second transformation of the products.

Even if the principle may be contested on the grounds of being an incentive for the CO<sub>2</sub> producers (principally electricity producers from fossil energy) to contaminate more in exchange of their support to forest conservation in poor countries, **carbon-credits** represent a way for the forest owners of Central America to finance their management. Concerning climate change, the national “Clean Development Mechanisms” offices are concentrating their efforts mainly on mitigation in order to gain control principally of all aspects linked to energy. They could be supported to transform themselves as platforms for project identification and implementation and provide support to the private sector wishing to be involved.

In addition, the Alliance for Energy and Environment with Central America<sup>32</sup> should be developed as a centre for coordination and information about techniques, realisations and opportunities in Central America.

A large proportion of the rural population in Central America relies on local energy sources (fuel wood and charcoal) for domestic cooking. Some small agricultural transformation enterprises, which provide added value to the products (e.g. small restaurants) or increase their preservation (e.g. drying) may need large amounts of energy. It is thus important to support the production of renewable local sources of energy (bioenergy, small hydropower plants, etc.) and proper management of the fuel wood sources.

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<sup>31</sup> Most of the Central American countries have a centre for clean production such as Centro Nicaragüense de Producción Más Limpia (CNPML), le Centro Salvadoreño de Tecnología Apropriada (CESTA), le Centro Nacional de Producción Más Limpia (CNPML, Salvador).

<sup>32</sup> <http://www.sgsica.org/energia/>

## 4.2 The environment - actors and processes in place

The region is characterized by significant shortages of resources – in staff and budget<sup>33</sup> - of its institutions having the environment as mandate. Therefore supporting the **development of an environmental capacity**<sup>34</sup> in the institutions, as well as for civil society<sup>35</sup>, will contribute to a better efficiency in the environmental management.

For the private sector, the respect for environmentally sound practices should not be further considered as a hindrance to economic activity. The negative impact of the economic development on the environment should be **transformed in a “win-win” situation**<sup>36</sup>, where both sides are beneficiaries:

- (a) Regulatory bodies, the civil society and the private sector should work together to develop proper, adapted measures to ensure an environmentally friendly economic development. The creation and operation of platforms for such negotiation should be supported.
- (b) The environment in itself should be seen as a source of opportunities for economic development (private businesses for EIA, environmental cleaning, equipment, infrastructure, etc.). Joint-ventures between Central American and European companies could be supported.
- (c) Workable solutions to integrate the informal sector into the economy should be sought. The focus should be given to the informal enterprises as they are on the one hand, quite difficult to control in terms of environmental contaminating practices, and on the other as they are often excluded from the formal support to the industry,

<sup>33</sup> To avoid the institutions to be project-driven, as it is often the case in the environment sector, the donor community should insist on counterpart contribution when identifying and executing projects, even if these projects are financed by donations. Budget support is not the answer to the poor allocation of national funds to the environment. Moreover, regular changes in the staffing of the different departments (for economic or political reasons) undermine the continuity of the tasks undertaken. Work security for civil servants should be pursued in order to keep the “institutional memory”.

<sup>34</sup> Due to the large number of aid projects and programmes, particularly in the field of institutional capacity building at regional, national and local level, it is imperative that the EU establish a regular coordination between the Member States and a regular exchange of information with other major donors (IADB, OAS, World Bank, Norway, Japan, etc.). This is also necessary as usually, environmental issues are not the subject of national round tables.

<sup>35</sup> Most of the organizations dealing with the environment have their own network or “know” who is active in their field but there are no public lists of professionals in the different fields of the environment. Network of specialists throughout Central America should be supported in order to create a database or taskforce in every field.

<sup>36</sup> The participation of the private sector to the welfare of the environment should be favoured, through their different regional and national representative bodies (e.g. Cámaras de comercio). A close attention should be given to

1. the promotion of the introduction of clean technologies and know-how, which can be in itself a market and a field of work (e.g. clean technology fairs could be organised);
2. creation of legal sanctions and incentives ;
3. the introduction of sound management systems in accordance with the existing norms in a first stage, afterwards the development of ISO 14000 (environment management) certification, which could be linked to a quality management system (ISO 9000 series);
4. the development of specialized companies in the field of environmental services, environment valorisation, environmental engineering, monitoring and evaluation of contaminations, environmental auditing, industrial research, land use planning, environmental diagnostics and cartography, etc.

in particular from the access to financial resources, to marketing activities and to the know-how to improve their business, even more from an environmental perspective.

Advancing in the process of regional integration including implementing the proposed custom union, even if it is a slow process, will require some adaptation of the measures taken to implement the different regional and international conventions. Particular attention should be given to the implementation of the CITES convention as well as the agreements on hazardous and toxic wastes. It is indispensable to take actions in order to be able to control transport and trade of protected plants and animals as well as transport and disposal of toxic wastes once the borders are open. Central American integration should be reinforced through the networking of the different initiatives to comply with the international conventions adhered to. This work has been partly started through the “technical committees” of the CCAD.

Further, the efforts in EIA and harmonization of the institutional and legal framework in Central America undertaken by the CCAD should be pursued. In particular, beyond the harmonization of laws and regulations, efforts should support the development of realistic (and the adaptation) environmental norms and criteria and their harmonization<sup>37</sup>.

**Good governance at local level** is very important too. The right to information about the environment is contemplated in the 10th Article of the Declaration of Rio. Moreover, the EU is a signatory to the Aarhus convention on access to information, public participation in decision-making and access to justice in environmental matters. Unfortunately, no Central American country is party to the Aarhus Convention. The necessary institutional building needed in the region for the approval of the environmental legislations, their application and the prosecution of environmental offences calls for the implication and participation of the citizens. Their organization and empowerment<sup>38</sup> require the development of proper information systems and the capability to express a justified opinion.

### 4.3 The environment – values and attitude changes

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As problems and solutions are being identified, we can ask why the situation does not improve rapidly, with a growing awareness that everybody shows for the environment. What is missing is the **internalisation of this awareness** and thus taking the next step from

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<sup>37</sup> Improvement of the existing policies are needed; they should give concrete guidelines about:

1. the role, responsibilities and resources of the public and private sector structures;
2. the role, responsibilities and resources of the institutions at all level, including the civil society;
3. the mechanisms of participation of the local communities, NGO or the private sector;
4. the ways to resolve existing conflicts of interests;
5. the monitoring and evaluation of the measures taken, etc.

**awareness to action.** This can only be achieved by changes in attitude of the majority. Furthermore, changes can only be brought about in the context of the existence of (i) the proper messages being given through the proper communication media regarding environmental rights and duties and (ii) appropriate market regulations (e.g. organic production). Increased attention to these two ways to focus change on environmentally sound practices should be supported.

In other words, it is necessary to **renew the values** of the society and to mobilize it to look for alternatives to the environmental problems. This is the foundation of all environmental education programmes. Nevertheless, such programmes should not only remain a local effort but should be incorporated in the national school curriculum and development policies. Further, any action toward changes in the perception of the society should not be limited to the school level but has to reach out to the people and their concrete problems. This means that the message should reach the population equally through local groups: church, mothers associations, neighbourhood groups, etc.

The **exchange of experience** is a key element to persuade and convince people to change. Local experiences have to be documented, made accessible to all (languages, ways of communication, etc.) and disseminated. Any efforts to compile and disseminate lessons learnt in environmentally sound practices should be supported.

Communication plays a major role in creating an adequate environment to attitude changes toward the environment. Any message which calls upon a personal situation, a topic important to the person (e.g. water quality), changes in the advantages received (e.g. sanitation) or disseminates knowledge, should be geared toward the persons who are not aware of the importance of the environment. On the other hand, messages that are oriented to show the behavioural consequences, to evaluate these consequences, to demonstrate the perception of others and to motivate to have an active attitude will lead to changes. Environmental communication and education should be developed in accordance to the needs of recipient groups

#### **4.4 The Regional vs. Bi-/Trinational Approach**

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Priority should be given to activities offering potential for improving regional co-operation, hence regional integration. Measures that need to be implemented in the field throughout Central America are difficult to manage. Such measures should be limited to two or three countries, but not necessarily to the border region. The following reasons lead to this conclusion:

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<sup>38</sup> Citizen empowerment can only be reached if the information about the state of environment is available and its quality recognized. Keeping the information about the environment “up-to-date” should be supported.



1. it is more difficult to reach an agreement (at political, institutional and technical level) when the whole region is considered;
2. priorities and resources vary from country to country, hence activities aimed at equalizing the level of each country require more resources;
3. the risk of dispersing the effort is high, thus diluting the final impact of the activities;
4. more time is needed to develop activities, even simple ones, throughout several countries;
5. administrative and operational costs are high, when measures are developed in the whole region;
6. at any time, a successful activity can be extended to more countries, e.g. an early warning system for forest fires.
7. the particularities of each country can be better taken into account when a limited number of countries are considered; for example, Honduras and El Salvador have more in common than Honduras and Panama;
8. The interest to reinforce the integration within neighbouring countries is stronger than the integration in the whole region
9. Border communities are living daily the social and economic interdependencies and have more interest in developing joint activities; for example, they may be differently concerned with the application of the treaty of free trade
10. Natural ecosystems (forests, watersheds, coasts, reefs, etc.) are usually shared by two or three countries; the impact of the Mitch hurricane is an example of it.

In the past, such opportunities have been supported by the EU and have led to permanent development, as is the case of the Trifinio Pilot Project.

On the contrary, all measures oriented toward harmonizing the legal and institutional framework, developing coherent policies, coordinating similar efforts as well as the exchange of information should be pursued with the same intensity in the whole region.

In other words, activities dealing with norms, legal and institutional development should be considered from the regional perspective when activities in the field should be conducted simultaneously and in coordination in a reduced number of countries.

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## 5 Limitations of this document

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This report has been prepared according to the conditions given in the terms of references.

Some specific themes could not be discussed as they deserve, in particular the comprehension of the interlocutors of what “environment” means. For example, the activities conducted under the PRACC obviously have an environmental impact, nevertheless most of the projects executed under this Programme are considered as infrastructure measures.

**It was not possible** in the frame of this mission to analyse in detail the different aspects linked to land tenure, even if this represents a major obstacle to sound land management, thus having an indirect negative impact on the environment. The same applies to the marine ecosystems and coral reefs. Further, the issue of climate change has not received all the attention needed. These three topics would be better handled by specific missions.

Most of the topics approached in this report should be developed with more detail, particularly linking the regional perspectives to the national situations in order to establish a list of convergence and discrepancies between the different countries. The lack of country environmental papers limited this exercise. For this reason, this report should only be considered as a starting point for discussion and revision through a larger group of interested persons.

For various reasons (time allocation, organizational constraints), representatives of the private sector and municipalities could not be interviewed in the same way as institutional and NGOs ones. They are, from the point of view of the consultants, important stakeholders in a comprehensive solution to environmental problems.

## **APPENDICES**

## **TECHNICAL APPENDICES**

## **I      Environmental Maps of the Region**

(Please, see “pdf.” Files)

## **II Honduras Environmental Profile**

## HONDURAS ENVIRONMENTAL PROFILE

### PHYSICAL ENVIRONMENT

#### *Geography*

The Honduran continental territory is located at 12°58' (delta of the Negro River in the Gulf of Fonseca) and 16°02' (Punta Castilla) north latitude; and between 83°10' approximately (east of Gracias a Dios) and 89°22' (Montecristo Hill) west longitude. The insular territory extends up to 17°30' north latitude (Swan Islands) and 82°30' west longitude (Half Moon Reefs).

Honduras has an extension of 112,492 km<sup>2</sup>, with a perimeter of 2401 km, out of which 1,597 km corresponds to frontiers and 804 to coastline (IGN 1999). Insular land includes the archipelago of the Bay Islands, the Swan Islands, and the Half Moon Coral Reefs in the Caribbean; also the Zacate Grande and Tiger Islands of the Gulf of Fonseca.

Politically, the country is divided in 18 departments, including 298 municipalities, 3,740 towns and 19,937 villages (IGN 1999).

#### *Geomorphology, Physiography and Topography*

Continental Honduras has an extremely irregular morphology determined by a series of mountainous ramifications derived from the Sierra Madre, that crosses the Central American isthmus with its origin in Mexico. This mountain chain divides the country into three natural areas: i) lowlands of the Caribbean, ii) interior lands, and iii) lowlands of the Pacific. More than 40% of the territory has slopes higher to 30% and 70% higher than 15%.

Región	Location	General Characteristics	Climate	Mean Annual Precipitation	Temperature (°C)	Vegetation
Lowlands of the Caribbean	Coastline (621 km) up to 600 masl	16.45 % of national territory; plains	Tropical and rainy	2,000 mm	24 °C	Tropical
Interior lands	150 masl to 2000 masl	82% of the territory. Main cities included	Tropical savannah	1,000 mm	21 °C	Conifers
Lowlands of the Pacific	From Gulf of Fonseca to Dipilto Sierra	1.56% of the territory; irregular landscape	Tropical savannah	1,680 mm	26 °C	Dry tropic
Insular territories	Bay Islands, 65 keys, Zacate Grande and Tiger islands. From 0 to 600 masl	Territorial sea of 12 nautical miles	Very Humid Sub-tropical	2,000 mm	26 °C	Tropical
Source: SERNA 2000. Legend: masl = meters above sea level						



### *Hydrology*

The Honduran hydrology is constituted by 19 river systems born in national land and drain to both oceans. In the Caribbean Province 13 systems drain, with longitudes between 550 and 25 km, these watersheds represent 82.72% of the national territory and the Pacific Province through the Gulf of Fonseca drains 6 systems that represent 17.28% of national land. Many large reservoirs are located in the second largest watershed, the Ulúa River. The only natural lentic system, Lake Yojoa, is 17 km long and 5 km wide and has a maximum depth of 27.5 m. El Cajón Reservoir, an artificial lake, has a storage capacity of 7,085,000,000 m<sup>3</sup> and its main purpose is to produce electrical energy for the country. Many small and medium size hydroelectric power projects are currently being developed.

Numerous swamps and coastal estuaries provide brackish waters ideal for marine biodiversity proliferation. These ecosystems include the Ulúa and Aguan river deltas, the coastline between Tela and Ceiba, the Caratasca Lagoon, eastern lagoons of the Atlantic Ocean, insular swamps, and all the Pacific coastline.

The integrity of superficial water resources of Honduras suffer of biological pollution due to municipal waste waters. High indices of intestinal diseases and diarrhea are recorded in areas where sanitation systems (water and waste water) are absent. Deforestation has increased significantly soil erosion, hence, the sediment loading of rivers and streams, which has reduced critically the storage capacity of reservoirs, particularly El Cajón, that after a decade of foreign cooperation forest restoration projects and national counterpart execution, still has a threatening rate of sedimentation.

Hydrological resources can be classified as rural, urban and watershed unit. In the rural sector, the reduction of water availability given the extreme deforestation; expansion of the agricultural frontier, inadequate land use, overgrazing and the inappropriate urban and rural road construction, result to be the most important causes.

The accessibility to freshwater resources is usually limiting. In the Caribbean lowlands and the interior highlands, the elevation bank can go beyond 20m along medial and high riverbanks. Elevation banks of the Pacific lowlands are generally lower than 6 m. Flooding are frequent in the Chamelecón, Ulúa, and Aguán rivers.

Using a pool of holistic criteria The Interamerican Development Bank (IDB) prioritized the following watersheds to implement a Program denominated “Manejo de Recursos Naturales (MARENA)” whose main objective is to impel processes directed to attain rural sustainable development, through the strengthening of natural resources management, at the central and local level. This action will reduce poverty and physical economic, and environmental vulnerability that affect the critical areas of the country in the rural communities of 14 sub watersheds of the Ulúa, Chamelecón and Nacaome rivers. Ultimately this program will improve human quality of life and the sustainable development of all communities.

Another important project pertaining to solve the watershed degradation in Honduras is the USAID Integrated Watershed Resources Management. The purposes of this project are to: 1) improve the management of critical watersheds in Honduras, including protection of habitats containing important biodiversity, through the provision of technical assistance, training, and commodities to municipalities, communities, traditional and non-traditional academic institutions, private organizations (including, but not limited to, non-governmental organizations), and other environmental actors; and 2) improve economic growth from resources in the environmental sector through environmentally-sound, legal practices for municipalities, communities, traditional and non-traditional academic institutions, private organizations (including, but not limited to, non-governmental organizations), and other environmental actors. This activity will contribute to achievement of economic freedom, and more specifically improved Management and Conservation of Critical Watersheds.”

The Hydrogeological Map of Honduras was elaborated as a result of a study done by the National Geographic Institute (IGN), Water and Sewage National Autonomous Service (SANAA), Official Development Assistance of Japan (ODA) and the United Nations Educational Scientific and Cultural Organization (UNESCO). The aquifer recharge areas were classified given its location: a) coastal valleys; b) coastal plains; c) islands; d) intramountainous valleys; and e) mesas and mountain regions. Abundance was only identified in lowlands of the northern area. In the southern coast, highly populated (Gulf of Fonseca), the majority of wells are immediate to the mangroves and beaches and suffer saline intrusion, due to overexploitation of the water table (PROGOLFO 1998; DAI 2002). Underground water is used mostly by rural and urban communities without access to water systems, urban industries and by farmers during the dry seasons.

### *Soils*

In 1995 the Inter-American Institute for Cooperation on Agriculture (IICA) stated that only 23% of Honduran lands are suitable for agricultural development and intensive livestock, 3% extensive livestock; while 73% of the territory is apt for forestry and perennial plantations. Parting from the historical and current land use information (SERNA 1997, SERNA 2000, MARENA 2003), most productive land is agricultural.

Consequence of this land use tendency, the main environmental problem is soil degradation and loss, as a result of intensive deforestation, plantations and grazing on steep lands, or in humid lowlands not suitable for this activity. It has been determined that 70% of the annual plantations are established in forest areas, more than 60% of perennial plantations and 40-45% of the existent extensive livestock. Beyond these facts, the main source of land erosion and degradation is the action of economic forces and non-sustainable agricultural development applied in the past and present (SERNA 2000).

Currently Honduras has 23.4% of its population living under the poverty line (UNDP 2004), tending to increase, resulting in a persistent demographic explosion that exerts a severe pressure to all natural resources. The main economic activity of this population is centered on the auto consumption and national consumption production, with high production risks, that forces the expansion to new areas with the consequent soil, forest and water resources degradation.

Though there are no precise studies of the economic effect of the previous conditions, its notorious that the loss of soil productive capacity affects a large sector of the population. The cyclic scarcity of basic foods and the population low caloric daily ingestion (63%), mainly in rural areas, give evidence to the negative effects.

The absence of strategies and lack of land planning causing drastic changes in land resources. The principal areas of horticultural and grain plantations are found on land with slopes of 30%, lacking soil conservation measures, causing a high hydraulic erosion and transport of suspended solid material, deposited in water courses, becoming an important risk factor and causing sedimentation in reservoirs and other energy and irrigation infrastructure.

Watershed headwaters report high deforestation as a result of the agriculture activities and inadequate land use. Deforestation rates contribute to the systematic alteration of the hydrologic cycle, generating flooding, droughts, and high levels of erosion, with the resulting sedimentation of wetlands and the reduction of aquifer levels. Honduras has limited access to resources for agricultural sustainable production. The continuous use of traditional production systems, united with fragmentation of land into parcels, cause a rapid degradation of the soils resource. Additionally, the low vegetation and management quality of irrigation systems suggest the sub use of water and soil, given that in flat lands that are irrigated production could be increased.

The low coverage and quality of public and private technical assistance, directed to small and medium producers, has not allowed an improvement in production systems with respect to sustainability and profitability. On the other hand, the limited access to credit lines restricts small producers in the application of technological packages that are environmentally and economically sustainable. Among the experiences that are worth mentioning contributing to the resolution of the rural development is the Hillside Sustainable Agriculture Project (PASOLAC) that stimulated the validation and systematization of actions of sustainable production and the payment of environmental services for these activities (PASOLAC 1999). With a similar approach PAAR the Rural Area Administration Project (PAAR) was just transformed to a land planning initiative called the Project for the Administration of Honduras National Land (PADTH) which started in 2004. Other projects in course with relevance is the IICA/Holland/Laderas Project, the National Education Center for Work, the UNIR-Zamorano Project, in participative methodologies; the Support Program to Small and Medium Size Peasants in Northern Olancho (PROLANCHO), in aspects of financial and institutional sustainability. Additionally, the Local Management of Micro-watersheds of FUNBANHCAFE; The Deciduous Forest Development Project; and the Lempira Sur Project, honored in 1999 as the “National Environmental Prize” for its work during more than 10 years of research, developing productive techniques together with watershed management and forest regeneration.

There is no law that regulates the use and conservation of soil in a specific manner. SERNA manages 10 legal instruments related to the soil resource; Forced Expropriation Law; Creation Law of the National Agrarian Institute; Forestry Law; Agrarian Reform Law; Cadastre Law; Land Planning Law, National Cultural Patrimony Law; Agriculture Sector Modernization and Development Law; Law of Tourist Free Zones; General Environmental Law; Reforestation

Incentive Law; Reforestation and Protection of the Forestry Sector; and the Law of Coffee Culture Sector. Many of these laws agree in planning the integral land use parting from its capacity and potentiality and the definition for actions destined to order land tenure.(SERNA 2001).

Inadequate methods of agrochemical use and application is causing soil contamination. Excessive use and inadequate management especially in export products, is typical. This contamination occurs by the deposition in water bodies, by leaching and transport, lack of hygiene and safety measures of the workers who do not use adequate equipments and the dispersion of particles in the aerial spraying, which are inhaled by population living in nearby zones. Many intoxications have been reported due to this activity, most cases coinciding with export product plantations of the north (bananas) and southern areas of the country (mainly cantaloupe).

The Phytozoosanitary Law (Decree No. 157-94) and the general Environmental Law (Decree No. 104-93) establish the mandate of surveillance and control of all agrochemicals in the country; However, given the low operative capacity of the regulatory entities, the presence of forbidden pesticides by the World Health Organization has been permitted (Annex 1).

Impacts of the Current Condition: The soils with Forestry nature have been utilized by peasants and farmers given due to no availability to other fertile lands. The main consequences are: a) accelerated erosion, b) sedimentation of water bodies including reservoirs, c) loss of productive capacity of soil, and d) increase of vulnerability causing natural disasters.

Land pollution due to pesticides as well as by solid wastes and other wastes of domestic, industrial and agro-industrial origin, cause indirectly social and environmental impacts of considerable importance, that require detailed studies, assessments, and quantification.

During the last decade, people affected by pesticide intoxication increased, especially in the Atlantic coast where effects of “Nemagon” in workers and children were denounced. Affections of these substances go from alterations of the nervous system to cancer, being the most vulnerable groups children of workers or neighbors of the productive areas.

Another impact is the loss of biodiversity. In monocultures where high quantities of agrochemicals are demanded, the natural capacity of controlling disease and plagues is disappearing due to the loss or elimination of biodiversity, loss of habitat and the progressive accumulation of agrochemicals at different levels in the trophic chain.

The impact in natural disasters is evident. The National Reconstruction and Transformation Master Plan (Honduran Republic 1999), states that the damage to the agricultural and livestock sector caused by Hurricane Mitch is estimated in US\$ 2,052 millions, out of which the major effects were caused to resources including soil.

### *Climate*

The precipitation regime in Honduras is a direct and indirect consequence of the Intertropical Convergence Zone: storms in the westerlies of medial latitudes, tropical currents, atmospheric low

pressure systems in elevations and surface areas, sea breezes, mountain and valley breezes, cold fronts, cutting edges and tropical cyclones. In general, the country has a humid and dry climate. Its mountainous nature impedes great temperature variations, which leads to a humid climate in most of the territory.

The dry season is a product of the trade winds on the south, that when crossing the water limit in the Pacific, heat up and give a drought effect. Given its latitude, Honduras should have a humid and hot climate. However, it is modified its irregular topography and during the last decade, by the alteration of forests and climate disturbances produced by the phenomenon known as “El Niño” (technically known as ENOS-El Niño South Oscillation). This phenomenon are a result of the changes in marine currents, superficial ocean temperature and the behavior of the lower atmosphere over this zone. The dry season and heatwave in the southern and intramountainous regions, are associated to the strengthening and displacement of the North Atlantic Cyclone, located in the Bermuda Islands during this season favoring an increase in velocity of the tradewinds (Hastenrath).

The changes in climate in the country have been evidenced by catastrophic events such as Hurricane Mitch in 1998 and the heavy storms of 1999, bringing losses of human lives, loss and deterioration of infrastructure, loss of crops, and degradation of watersheds and the process of erosion and salinization of groundwater due to sea level elevation. The Central Government created the National Reconstruction and Transformation Master Plan to confront, with the effort of the Honduran people and with international co-operation, the dramatic reality left behind by Hurricane Mitch which has been unmistakably catalogued as one of the greatest and most acute calamities in Honduras’ history. According to the United Nations Organization, U.N., Hurricane Mitch was the worst natural disaster in Latin America in the last 200 years, leaving behind a death and destruction toll comparable to a devastating war. The last official figures register 5,657 deaths, 8,058 legally disappeared persons, 12,272 injured and 1.5 million harmed or displaced. According to the Economic Commission for Latin America and the Caribbean, (CEPAL), the total in damages in Honduras is US\$3,794 which is equivalent to 70% of the Gross Domestic Product. The estimated cost of reposition is US\$5,000, almost 100% of the GDP.

The impacts of droughts in the dry zones areas of the country brought as consequences hunger, deaths, waterborne illnesses, cardiovascular and respiratory diseases result of atmospheric pollution, extreme temperatures, harvest losses and forest fires. The climatic vulnerability associated to the complex topographic conditions of the country, as well as the economic and social vulnerability have made decision makers to begin a mitigation and adaptation measures process to reduce vulnerability in Honduras.

Under the United Nations Framework Convention on Climate Change (UNFCCC) (adopted and signed by 162 countries in 1992 at the Rio Earth Summit) Honduras prepared in 1995 the first communication to the convention, reporting gas emissions of Greenhouse Effect Gases. The national plan currently being implemented include measures related to biodiversity protection and coastal marine zones, forestry sector, agriculture, and hydrological resources.

### *Air*

Parting from the project of air monitoring developed by CESCO and the Swiss Cooperation, Tegucigalpa and other urban areas have proven to have poor air quality due to solid particles and pollutants (Pb, NO<sub>x</sub>, O<sub>3</sub>) emitted by various diffuse sources. During the period 1995-1999 monthly mean levels of indicators exceeded significantly the corresponding norms of the World Health Organization.

This project is a regional initiative and it is financed by the Swiss Agency for Development and Cooperation (COSUDE) and executed by the Swiss Foundation of Cooperation for Technical Development (Swisscontact) currently with another name. The main objective of the program is to improve urban air quality in Guatemala, Honduras, Costa Rica, Nicaragua, El Salvador, and Panama through training of professionals in the automobile industry sector, establishment of inspection and maintenance programs, and public awareness.

## **BIOLOGICAL CONDITIONS, BIODIVERSITY, ECOLOGY AND NATURE CONSERVATION**

One of the main barriers of conservation and sustainable use of biodiversity is the limited knowledge of presence, types and characteristics of floral and faunal species. Given the degree of ecosystem degradation, the high risk of losing this valuable resources persists, without even knowing their properties and characteristics.

A special interest has been designated to “emblematic” species, endangered or of commercial interest. The basic knowledge of its presence, distribution, and population state of some endemic species has been acquired, especially in the Bay Islands through the technical inventories realized by the Bay Islands Environmental Management Project (PMAIB) funded by the IDB. Localized biodiversity studies are the product of protected areas management plans managed and co managed by the Protected Areas and Wild Life Direction (DAPVS) of the Forestry Institute AFE-COHDEFOR. Taking into consideration the mesoamerican region relevance, its local endemism, and use pressure and population state, AFE-COHDEFOR prepared the List of Wild Life Species of Special Concern in Honduras, made official by the Resolution GG-APVS-003-98, on the 14<sup>th</sup> of December of 1998 (IUCN-WWF-SICA, 1999).

Floral species have been amply identified and catalogued by the National Autonomous University of Honduras (UNAH), collection that has described more than 30,000 specimens, including 8,000 species of vascular plants. Experts estimate about 10 to 15 thousand plant species. Report more than 400 tree species of the deciduous forest and 7 conifer species, with commercial potential, also more than 1000 tree and bush species with different uses (AFE-COHDEFOR, 1996). With respect to psychogenetic resources for agriculture, records exist of about 1,500 local varieties of 66 species of plants important for human nutrition and the food industry.

Knowledge of medicinal plants, their properties, active agents and traditional forms of use notably increased in the past decade. Marineros and Aguilar (2000) list several investigations undertaken, mainly in the UNAH, as well as the institutions and organizations dedicated to the rescue and quantification of ethno-botanical information.

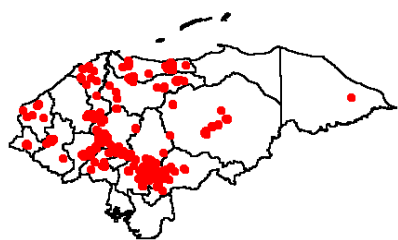
The Ecosystems Map of Honduras (PAAR/COHDEFOR/BM, 2002, The World Bank, et al. 2002, Vreugdenhil, et. al, 2002), identifies 70 ecosystems, which it breaks down into forests, shrublands, savannahs and wetlands. The Map was produced using the UNESCO physiognomic classification system (Mueller-Dombois 1974), which is fundamentally a species independent physiognomic, hierarchical vegetation classification system that takes into account ecological factors such as climate, elevation, seasonality and human intervention (Vreugdenhil 2001). Much of the territory is inserted in protected areas that coform the SINAPH, National Protected Areas System, created by the SERNA for institutional coordination and management.

During the last decade the national list of vascular plants, mammals, birds, reptiles, amphibians and fishes of Honduras is gradually getting shape, as well as the lists of marine invertebrates for the Caribbean. With this expanded knowledge, the need also arose to prepare an update to the list of species of special concern of Cerrato, 1997, and which we present in VOLUME IV: SPECIES OF SPECIAL CONCERN OF HONDURAS, 2002 UPDATE of this series. All endemic and rare species referred to in this study are listed in that document and its annex.

**Table: Number of species of vertebrates known to Honduras (2002).**

GROUPS	SPECIES	ENDEMIC
Fish		
Atlantic	194	0
Pacific	390	0
Freshwater	88	0
Others		
Amphibians	116	38
Reptiles	211	27
Birds	744	1
Mammals	229	3
Total	1971	69

It should be noted that the list contains rare species which are in fact well protected such as *Oreopanax lempirianus*, a species only found high on Mount Celaque but one which is in no immediate danger, given the protected status of the area and its difficult access. On the other hand *Rhyncholaelia digbyana*, the national flower of Honduras, is a Mesoamerican endemic, which is not



found in any protected area and is probably severely threatened in Honduras and throughout its range, due to excessive over collecting for ornamental purposes. The Honduran Emerald may be considered as one of the most endangered birds in the world, given the limited distribution of its habitat (no more than several thousands of hectares world wide) and its small population size (probably no more than a few hundred bird).

#### Map of plant species endemic to Honduras

Many species in important biogeographical regions such as protected areas are being threatened given the advancing agricultural frontier and illegal wildlife extraction. A good example of this problem is the Río Plátano Reserve where massive extraction of precious wood such as Caoba (*Swietenia macrophylla*). Uncontrolled commercial hunting of wild animals is also common. The

introduction of exotic species is threatening to undermine the complex ecosystems of the reserve. The absence of any management plan and the fact that there is almost no park staff to manage the 525,100 ha has compounded to problem. Most efforts to prevent the destruction of this Central American Amazon is done with foreign cooperation, mostly from KFW/GTZ, WWF; TNC with the AFE-COHDEFOR as government counterpart and research institutions as well as local NGOs.

### *Marine Environments*

Continental Honduras encompasses 804 km of coastline along the Pacific and Atlantic Oceans. Ecologically the Caribbean coastline belongs to the Mesoamerican Caribbean Coral Reef (WWF 1999, PMAIB 2002) having 4 of the regional subdivisions: Gulf of Honduras, Honduran Coast, Bay Islands, and Deep Ocean. The Caribbean coastline has extensive plains and sandy beaches, coastal lagoons and mangroves (1,458 km<sup>2</sup>); has an approximate area of 53,500 km<sup>2</sup> and characterizes for the presence of 200 isles among which the Cayos Cochinos and the Bay Islands outstand, both having extraordinary coral reefs (500 km<sup>2</sup>), sea grass banks (450 km<sup>2</sup>), and mangroves (150 km<sup>2</sup>) all considered with high ecological integrity (PMAIB 2002).

In the Atlantic western coast. During the half of the 20<sup>th</sup> century, an important demographic growth took place, urban and industrial along the Ulúa river. Promoting environmental degradation: deforestation, organic and chemical pollution and soil degradation. To the contrary, the difficult access to the eastern coast (La Mosquitia) has allowed that this one maintains high plant coverage and more favorable environmental conditions than the west.

The most important ecosystems in the Pacific Coast are the estuaries with mangrove forests. These cover an area of about 500 km<sup>2</sup>. drain by 5 main rivers. More than half of the original mangrove of this coast were destroyed during the last 50 years, given the transformation in land use through time (aquaculture, livestock, and agriculture), wood extraction and leña, sedimentation and other anthropogenic factors. Natural disasters such as hurricanes have also taken a toll over this system (UICN 1998, DAI 2002).

Marine resources are of high importance to all population in both the Pacific and Atlantic coasts. The Caribbean practices both industrial and craft fishing activities. The industrial fisheries count with the largest fishing fleet of the Central American Region. During the last 2 years, fishing banks have become scarce and efficiency has diminished drastically, leading to the closure of many processing plants leaving many unemployed people, particularly in Roatan. Along the northern coast, artisanal fishermen land Caribbean spiny lobsters (*Panulirus argus*); white shrimp (*Penaeus schmitti*); blue crabs (*Callinectes sp.*); queen conchs (*Strombus gigas*); coquina clams (*Donax denticulata*); and marshclams (*Polymesoda placans*), while industrial-scale fishermen land pink shrimp (*P. notialis*), white shrimp, spiny lobsters, and queen conchs. In the Gulf of Fonseca, a few mollusk species are landed, and extensive shrimp farming is practiced. Mollusks are gathered by hand and no rakes or dredges are used. The artisanal boats are almost entirely wooden dugout canoes, while industrial-scale vessels may be 21-27 m long, constructed of steel or fiberglass; most are made in the State of Louisiana. Fishermen harvest spiny lobsters (Phillips et al. 1994) and queen conchs (Appeldoorn and Rodriguez 1994) throughout the Caribbean region.



An estimated 50 fishermen from the Bay Islands currently seek lobsters and conchs using only mask and fins. Since fishermen seek mostly lobsters, they dive in shallow rocky areas. A good day's catch for a fisherman is about 5 pounds of lobster tails(5) and 2-3 conchs. Fishermen sell most of the lobsters, but they eat some lobsters and the conchs. Lobster and conch fishing is not allowed on the northwest side of Utila, the north side of Roatan, and the northwest side of Guanaja because the Honduran government has set aside the areas as wildlife refuges, but it is allowed elsewhere

## **SOCIOECONOMIC CONDITIONS, SOCIOCULTURAL AND HUMAN HEALTH**

Honduras is considered the Mesoamerican frontier - a unique archaeological record including sites and artifacts much like those from all time periods in Mesoamerica, as well as features more closely tied with cultural groups in Nicaragua and Costa Rica, traditionally viewed as outside of Mesoamerica. The diverse and rich archaeological record reflects these ties making the pre-history of Honduras unique in Central America. Parts of western Honduras are considered part of ancient Mesoamerica, defined by the occupation of Maya culture. Understanding Honduras unique cultural history is facilitated by visits to the country's numerous archaeological sites. Copán, for example, is one of the most heralded sites in the extensive "Mundo Maya" and for good reason. The area was settled by about 1200 B.C. and abandoned by the end of the ninth century, soon after it reached its peak. During that time, Mayan sculpture reached its zenith -- particularly in the carving of stelae and altars -- and the city boasts more sculptures than any other site in the Maya World. Visitors to the nearby town of Copán Ruinas can easily hire guides to explain not only the ruins but the surrounding area as well.

Most of the cultural heritage values of Honduras are being preserved by many undergoing projects that contribute to their sustainable development, such is the case of the PMAIB in the Bay Islands and the Sustainable Coastal Tourism Project (World Bank)., whose development objective is to use a learning and participatory approach to develop and manage sustainable tourism along the North Coast mainland and offshore Bay Islands of Honduras, both of which have significant cultural and natural diversity. The project is designed to foster participation by economically and socially disadvantaged groups whose traditions and lifestyles are tied to local cultural and natural assets in the development of cultural and eco-tourism. The project finances culturally appropriate economic development activities through innovative subprojects in local communities, including indigenous communities. Activities in support of cultural and ecotourism include training and technical assistance for marketing. In addition, the project prioritized the restoration and preservation of Trujillo, Central America's oldest coastal town and a significant cultural heritage site. Working with the Spanish Cooperation Agency, the project has restored sites and buildings around the Trujillo fort to preserve areas of historical interest and attract tourists.

Honduras strong cultural heritage is based on its ethnic diversity a mixture of indigenous European and African races plus six main indigenous Indian groups. The current proportion of the groups that constitute its population are: mestizos (mixed Amerindians and European) 90%, Amerindian 7%, black 2%, white 1%. White descendants from British colonizers can be found in the Bay Islands, where mixtures among the different ethnic groups have arisen a wide variety of phenotypes. The official language is Spanish, heritage of the Spaniards that conquered the territory in the 1500's.

Amerindian dialects are also part of their cultures and English is spoken in the Bay Islands. There also are small minorities of European, African, Asian, Arab, and six main indigenous Indian groups: the Miskito, Pech or Paya, Chorti Maya, Lenca, Jicaque or Tolupán, and Tawahka. Yet another group in this diverse mix is the Garífuna people, only black tribes that arrived the country as Spaniard slaves brought from Saint Vincent islands.

Vestiges of post-conquest indigenous cultures continue to be manifested out in the country's Black Carib, Miskito, Pech, Lenca, and Chortí Maya populations; inhabitants whose ancestors were purported to be the builders of great temples found in Honduras' interior at Copán, and sites yet to be excavated in the unexplored forests of the Moskitia region. All Honduran population, ethnic or not, depends directly on the natural resources available in their living environment. They use techniques for sowing and harvesting traditional crops, cooking traditional foods, and a wide variety of artistry including firing of rustic ceramics (exported to foreign countries) and weaving of colorful baskets, hats and mats made of natural fibers.

Most Hondurans are Roman Catholic, but Protestant proselytizing has resulted in significant numbers of converts. Indigenous groups also practice their own religions, often with a unique mix of African and Christian spirituality. The cathedrals or "iglesias" built during colonial times are not just historical landmarks but used on a daily basis. Visitors are welcomed but asked not to take pictures or disrupt services. Of the newer churches, the most famous is the Basílica de Suyapa just 7 kilometers southeast of Tegucigalpa. This church is the home of La Virgen de Suyapa, patron saint of all of Central America.

#### *Recreational and landscape*

Colonial Honduras learned through many decades how to interact with nature without modifying the landscape, blending with the environment. Most rural population remains with this lifestyle, traditionally building humble rural houses surrounded by trees and wild life. With development, some communities located on key geographic positions and with promising economic activities, have become larger modifying the natural scenery completely into urban areas. Urban areas have completely modified ecosystems that were rich in biodiversity and humid forests. For example Tegucigalpa, has records of abundant wildlife are described in books of the 1960s and 70s, as well as large extensions of oak and pine tree forests. Nowadays no wildlife is detected and forests have been reduced to green areas. This urban phenomenon is shared by all large cities in the country.

Though urbanity is taking its toll on the environment, Honduras still has large extensions of untouched irregular landscape that still have healthy ecosystems. Natural sceneries tend to be spectacular and attract tourists of all kinds and places. Much of the recreational activities of the country are related directly to its natural resources. Hunting, fishing, diving in the Caribbean reefs, rafting in large rivers, hiking in protected areas, rural tourism, beach tourism, hotel tourism, horse back riding and many other activities. The array of possibilities is unlimited, and the infrastructure and logistics are moderately or highly developed for most of them.

#### *Socioeconomic aspects*

Since it initiated a program of structural adjustment and liberalization in 1990, Honduras' economic performance has improved significantly. Among the most important economic modernization measures adopted are the following: 1) A reduction in import tariffs and export taxes, to radically

reduce the effective protection for national production and open the way for the participation of Honduran producers and consumers in global markets; 2) Exchange rate liberalization and the establishment of a more competitive exchange rate in real terms, compared with the overvalued levels of the eighties. 3) The modernization of banking and insurance regulation with new laws and the creation of a National Banking and Insurance Commission as a regulatory entity; 4) Reforms to the Central Bank legislation to focus its functions on monetary and exchange rate administration and a large reduction in the minimum reserve requirement; 5) The liberalization of the bank lending rate; 6) Reduction of corporate and personal income taxes to a maximum rate 25% (compared to the previous maximum of 42%); 7) The creation of fiscal incentives (free zones and special regimes) for key sectors, such as duty free industrial zones (*maquila*) and tourism; 8) Reforms in the legislation of the agricultural, mining and forestry sectors (World Bank/PIAF 2001).

Investment and poverty have had the following trends during the last decade. As a result of this reform program, Honduras maintained an investment level greater than 20% of GDP for every year since 1993 and private investment has normally been greater than 15% of GDP. Among the noteworthy results are: a significant increase and diversification in exports. This, together with a successful renegotiation of the external debt, has significantly strengthened the country's external macroeconomic balance, permitting the accumulation of international Reserves greater than three months of imports.

However, the macroeconomic results in terms of growth to date have been less promising. In spite of the introduction of modern technologies in some of the more dynamic sectors, such as *maquila*

**Annual average population growth, real GDP and per capita GDP**

	1978- 80	1980- 85	1985- 90	1990- 95	1995- 97	1998	1999	2000
Population	2.8	2.8	2.9	2.9	2.6	2.6	2.6	2.6
Real GDP	2.6	1.7	3.1	3.6	4.3	2.9	-1.9	4.7
Real per capita GDP	-0.2	-1.1	0.2	0.7	1.7	0.3	-4.5	2.1

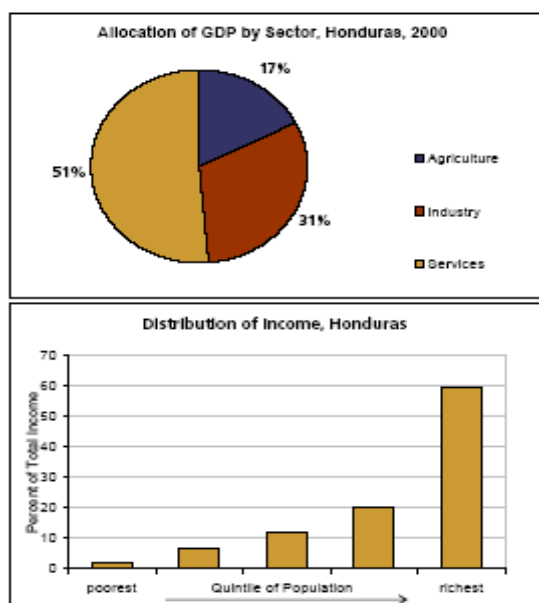
Source: Central Bank of Honduras. Note: Hurricane Mitch had a negative impact on the GDP in 1998 and 1999. The real GDP figure for 2000 is provisional.

and aquaculture, the average productivity of investments has been disappointing. From 1990-97, Honduras had annual average GDP growth of 4%, scarcely 1.5% higher than the population growth rate (Table 1). The years 1998 and 1999 were severely affected by Hurricane Mitch; but in 2000 there was an important rebound in growth, with a 4.7% rise in the GDP. For 2001

there is a forecast of lower growth, of 4%, since it is expected that the economy will be negatively affected by the US recession and continued high international prices for fuels and low ones for coffee (World Bank/PIAF 2001).

In addition, Honduras still has a high level of poverty. Sixty six percent of the country's households (approximately 747,000 households) were situated below the poverty line in 1999 and 2004 (UNDP 2004). Even more worrisome is the high level of extreme poverty. Almost 49% of households were situated below the extreme poverty line in the same year.

Data indicate an improvement in the poverty situation during the past decade, with a reduction of nine percentage points in the amount of households below the poverty line (from 75% in 1991 to 66% en 1999). In the same way, the percentage of households living in extreme poverty was



Source: Earth Trends 2004

reduced by five per cent compared with the figure of 54% observed in 1991. Nonetheless, this rhythm of improvement cannot be considered acceptable. Facing the persistence of such a high poverty level, the Honduran Government has developed a Poverty Reduction Strategy (ERP for its Spanish initials). The ERP has received the support of the World Bank and was prepared in the context of the negotiations for participation in the debt reduction initiative for Highly Indebted Poor Countries (HIPC). The ERP proposes a series of macroeconomic, microeconomic, sector and social policies aimed at reducing the extremely poor proportion of the population to 25% and the poor population to 42% by 2015.

### Tourism

Honduras is known around the world mostly for its archaeological ruins, even though it has more natural attractions such as long beaches, coral reefs, virgin forests, great rivers, rich cultural richness, and others. Tourism development has been deterred due to information ventilated internationally about violence, unsafe environments, armed conflicts within the country and neighbor countries. According to INCAE Business School, the lack of governmental support to the industry has been a key factor to its slow development.

The current tendencies of this decade based on principles of sustainable development, has made the actual Nationalist Government to develop a Tourism Strategy and a Tourism Incentive Law, to aid national and international investors develop tourist potential sites in a sustainable fashion. In 2002 tourism revenue for the country was US\$ 341.5 million (IHT 2002).

### Aspectos Económicos

Aspectos	Unidad	2000	2001	2002
Ingreso de Divisas	Millón US\$	259.8	274.6	341.5
Egreso de Divisas	Millón US\$	106.7	156.6	ND
Relación Turismo/Exportaciones	%	10.2	10.8	ND
Gasto Promedio Diario por Turista	US\$	52.8	49.1	60.1
Estadía Promedio por Turista	Noches	10.4	10.8	10.6
Empleos Directos	C/U	20,915	30,449	34,207*
Empleos Indirectos	C/U	34,858	39,765	43,006*

\* Estimaciones

Coastal tourism has developed in environmental and social sustainable manner, giving a significant opportunity to improve the national economy, without degrading natural productivity nor the natural ecological systems.

Besides the archeological sites, scuba diving is another highlight in the tourism industry. The Bay Islands Coral Reefs are now of worldwide interest, to the point of having direct flights form Milan, Italy and Miami, USA coming in to Roatán every Saturday. Impact of this

activity on the reefs has been reported lately, though most tourists dedicated to this activity are environmentally friendly in their actions. Motor water vehicles, solid wastes and irresponsible tourists and islanders are some of the causes of the loss of ecological health of the reefs. Another important pressure impacting on live coverage is land development in the island, done without control and vigilance by the local government, even though the regulatory legal framework exists.

#### *Agriculture, Forestry and Fisheries*

With an annual GNI per-capita income of US\$ 970 in 2003, Honduras is one of the least developed countries in Latin America. The backbone of the economy is agriculture, mainly the subsistence farming of corn and black beans, although there are some large-scale export-oriented operations in the coffee, banana, livestock breeding, and fisheries sectors. The country's GDP was US\$ 6.8 billion in 2003 with agriculture accounting for 13.5 percent of the GDP, industry 30.7 percent, and services 55.8 percent. Industrial development has been limited, and historically, the economy has been dependent on coffee and banana exports. However, the important coffee industry has suffered from low world prices, and banana production has yet to reach pre-Hurricane Mitch levels. In recent years, the economy has been diversified with the development of non-traditional exports such as cultivated shrimp, melons, and tourism, and with the establishment of a growing textiles industry. Honduras also has extensive forest, marine, and mineral resources. The country imports machinery and transport equipment, industrial raw materials, chemical products, fuels, and foodstuffs (ICDF 2004).

#### Agriculture

The agricultural sector was one of the most damaged by Hurricane Mitch, but its recovery has been remarkable. Twenty-three million dollars were invested into rebuilding the agriculture sector through an Emergency Plan. As a result, most agricultural exports have successfully regained their pre-Mitch standings. According to Miguel Angel Bonilla, a vice minister of agriculture, "Most agricultural exports such as shrimp and melons have leveled back to normalcy since Mitch, but the bananas and plantains are more fragile and have taken longer to recover. Honduras is still not exporting 50 percent of the amount of bananas it was exporting before Mitch.

Production of basic grains has fully recuperated by 90 % to 120 % with respect to previous years. The following products have also recovered well: sugar cane (88 %), African palm (100 % and rising), melons (100 % and rising), and cultivated shrimp (95 %) (SAG 2002).

The largest shrimp farm in the world is located on Honduras' Pacific Coast. Grupo Granjas Marinas is an international world-class shrimping company that specializes in white shrimp of the Pacific. The company owns a production area of 26 square miles. In 1999, the U.S. government gave the Honduran Ministry of Agriculture and Livestock the go-ahead to export shrimp to the United States. Honduras' shrimp exports had been restricted in the past because of environmental regulations. The restrictions were lifted when Honduras demonstrated that its environmentally sound shrimping practices do not endanger species like the giant sea turtle. Honduras is now free to export all categories of shrimp to the United States. The boom in Honduras' shrimp industry has boosted it to the country's third largest export sector.

Before Mitch destroyed Honduran banana plantations, Honduras was exporting bananas; after Mitch blew over, Honduran banana producers were unable to meet the demands of even the domestic market. Although a few small farms were less damaged and managed to continue exporting as usual,

the banana sector overall was almost destroyed. Chiquita exported its first post-Mitch banana shipment in Nov. 1, 1999, one year following Mitch. Banana exports from January to July of 1999 reached only \$17 million as compared to \$130 million in the same period of pre-Mitch '98. In relation to the nontraditional African palm, the publication Honduran Highlights reported in its June/July 1999 issue that African palm exports were rising to record levels before Mitch struck. Honduras' African palm growers have nearly doubled production since 1990 and are rapidly becoming one of the country's largest nontraditional export sectors. In 1990, most of the 19.6 million kilos (43 million pounds) of African palm produced in Honduras remained in the country for local consumption. By last year, however, exporters were selling nearly 30 million kilos (66 million pounds) of African palm oil and other derivatives on the international market. The growth is attributed to three factors: an increase in global consumption, rising international prices and expansion of local plantations by more than 40 percent."

Coffee, on the other hand, has surpassed its pre-Mitch export levels, a trend that the Honduran Coffee Institute (Instituto Hondureño del Café) has enjoyed. The coffee export production for 1999-2000 is 3.5 million sacks, an increase from 2.7 million sacks in 1998-1999. Since the hurricane, 33 miles of irrigation canals have been completely reconstructed and cover 4.5 miles, and an additional 84 micro irrigation systems were constructed. More than 8.5 square miles of highways in zones of coffee farmland have been rehabilitated. An investment of \$7.8 million went toward 144 projects to repair roads and bridges in these zones. Honduras is now the 10th largest exporter of coffee worldwide.

### Forestry

As in much of Central America, Honduras's once abundant forest resources have been badly squandered. In 1964 forests covered 6.8 million hectares, but by 1988 forested areas had declined to 5 million hectares. Honduras continued to lose about 3.6 percent of its remaining forests annually during the 1980s and early 2000s. The loss is attributable to several factors. Squatters have consistently used land suitable only for forests to grow scant yield food crops; large tracts have been cleared for cattle ranches; and the country has gravely mismanaged its timber resources, focusing far more effort on logging than on forestry management.

In 1986 the Forestry map determined a deforestation rate of 80,000 ha/yr. The map prepared by the National Watershed Management Program (OEA-COHDEFOR) in 1990 showed a deforestation rate of 87,596 ha/yr. In 1996 the deforestation rate officially established by the Forestry Action Plan (PLANFOR-AFE-COHDEFOR) was of 108,000 ha/yr. The previous numbers predict an accelerated deforestation rate with significant fluctuations.

The major forest cover exists in the departments of Olancho and Gracias a Dios, showing a higher density in the department of Gracias a Dios (72% of total area) and a greater extension in the department of Olancho. A detailed map of ecosystems prepared by a Regional Central American project, with support of the CCAD, NASA, USAID/PROARCA/CAPAS/, CATIE and with World Bank and the Netherlands financing. The research was based on satellite imagery and verified on the field. This initiative implemented uniform methodology that will allow standardize, integrate and compare all data generated at the regional level.

Deficient forestry updated inventories is a limiting factor to determine forest density and establish logging categories based on the existence of areas of minor, medium, and high productivity.

However, AFE-COHDEFOR determined that the productive potential of conifer forests is 245,360 (21.9%) and of 153,120 (13.7%) hectares of deciduous forest.

AFE-COHDEFOR established that of the total volume of wood extracted from Honduran forests between 1996 and 1999, only 8% (3,001,700 m<sup>3</sup>) was utilized for industrial production; 12% (14,341,600 m<sup>3</sup>) were consumed as fuel by small and large local industries and the other 80% (28,930,900 m<sup>3</sup>) were utilized as leña for domestic uses.

Forestry exports are mainly constituted by: serrated wood 47.2%, transformed wood 44.1%. resin 84%, ad seeds 0.4%. The concentration of its market in the USA, the world recession and the entrance of China to the market has caused problems to increase the surplus value to Honduran forestry products. In the 2001 exports were less than 50% of the exported value of 1997.

Pressures such as illegal logging (mostly in Olancho) for precious woods, forest fires, inadequate agricultural practices, political and administrative aspects, plagues and diseases (Pine beetle: *Scolytidae-Dendroctonus mexicanus*), and lack of cadastre.

### Fisheries

Fishing resources are the principal base of local economy, in the Caribbean and the Gulf of Fonseca. Additionally, fisheries contribute significantly to the national economy by export profits on products such as shrimp, conch, lobster and fish. Both oceans have marine resource and distinct use patterns and modalities, that characterize each area.

The Atlantic coast, the local income from shrimp, conch and lobsters is only surpassed by tourism. The best fisheries in the northern region are: 1) the coastal and craft fishery in the coastal platform 3 nautical miles from the coastline. The Fishery Law contemplates up to 5 miles, but the limited autonomy and capacity of used vessels restrict the yielding zone. Coastal lagoons and bays are the best areas. 2) Industrial fishing is realized from Cabo Camarón to Cabo de Gracias a Dios, at depths that range between 20 to 80 feet. 3) Industrial fishing of lobster, conch and scale fish is done in fishing vessels of Rosalinda, Thunder Knoll, Gorda, Lagarto Reefs (over the 15° N latitude) and Half Moon all in the 15° parallel; and the banks of Misteriosa and El Rosariom north of the Swan Islands on the route to Great Caiman.

Gulf of Fonseca fishing is artisanal, scale fishing mainly along the gulf, while shrimp fishing is done near Nicaragua and the gulf entrance. Shrimp post larvae fishing, for the commercial rearing farms, is done mainly in the estuaries. Bay fishing is illegal, as well as in river deltas and lagoons, and its furtive fishing the one undertaken in neighbor country waters.

Common problems encountered in fisheries are: overexploitation of all marine and freshwater resources, lack of order and regulation of marine resources, sedimentation and contamination of coastal ecosystems.

In the Caribbean governmental institutions are undertaking investigation on marine resources to find management solutions to all encountered problems. Some of these are the Department of Biology of the UNAH, The Aquaculture and Fisheries Department (DIGEPESCA) of the SAG, SERNA through its Biodiversity Direction (DIBIO), and the Study Center and Contamination Control (CESCCO). The non-governmental sector in particular the Marine Science Institute Of Roatán

(RIMS) of the Anthony's Key Resort, and International Global Vision in collaboration with BICA, all in Roatán. The Mesoamerican Reef System (SAM), and the Bay Islands Environmental Management Project (PMAIB).

In the Gulf of Fonseca Granjas Marinas San Bernardo, the Aguas de la Lujosa Laboratory, sponsored by the National Aquaculture Association of Honduras (ANDAH). Also the Defense and Development of the Flora and Fauna of the Gulf of Fonseca Committee (CODDEFFAGOLF), PROMANGLE Project of the AFE-COHDEFOR, and PROGOLFO of the UICN/DANIDA project.

*Utilities, infrastructure, transportation*

#### Water and sanitation.

During the last decade, Honduras made significant progress in service access and sustainability, due to the activities of water and sanitation committees based in rural and marginal urban communities. These have received capital and technical assistance from public agencies and NGOs. These institutional arrangements have made it possible to increase coverage without incorporating new customers into the traditional urban services (run by SANAA and the municipalities). As a result, potable water coverage in Honduras (77% in 1995) compares favorably with that of its regional neighbors. It is higher than the Latin American average (73%) and much higher than its neighbors Guatemala (54%) and Nicaragua (55%). In a similar fashion, sanitation coverage has increased rapidly due to latrine building programs supported by agencies like the Honduran Fund for Social Investment (FHIS) and the estimated figure of 82% in 1995 exceeds the Latin American average (80%) and that of the neighboring countries in the region, excepting Costa Rica (World Bank 2002).

#### Electrical energy

This is another sector that has registered rapid growth coverage in recent years. According to ENEE's statistics, coverage (individual and legal connections) rose from 33% of households in 1989 to 52% in 1999. However, official coverage is the second lowest in the region, exceeding only that of Nicaragua. According to the Household Survey (EPHPM), when taking into account illegal and collective connections, coverage had reached 69% in 1999. ENEE has embarked on programs of rural electrification and formalizing of informal services, which, according to its projections, will raise formal coverage 62% of the population by the end of 2001. It is probable that total coverage is close to 80% of households, very close to the Latin American average (82%). However, per capita electricity consumption is still the lowest in the region, with the exception of Nicaragua.

#### Telecommunications.

Coverage has grown notably in recent years but continues to be less than that in the majority of neighboring countries. The number of lines rose 15% per year in the last five years of the nineties, from 160.8 thousand in 1995 to 279.2 thousand in 1999, and the number of fixed lines per hundred citizens increased from 2.7 in 1995 to 4.42 in 2000. This is greater than Nicaragua's level and close to the achievement of Guatemala. Nonetheless, it is much lower than the levels of El Salvador and Costa Rica. Still only 14% of households have a telephone. There is a high level of unsatisfied demand manifested by long waiting lists (estimated at 425 thousand in 1999), as well as the explosive growth of the cellular market since 1996. Even though the rate per minute is greater by a factor 15 than that of fixed telephones, at the beginning of 2001 there were 172 thousand cellular telephones in service.



### Transportation.

The percentage of the road *network* that is paved is similar to that of its neighboring countries (close to 20%), excepting Guatemala, where the figure has reached 27%. Precise data is unavailable for the proportion of the population without access to bus service in the populated area where they live. However it is indicative that of the people in the bottom fifth of the population, 63% say they have no available means of transportation and less than 25% say they use the bus as their principal means of transportation. These data indicate there is still a great problem of access to transportation for poor Hondurans.

## **ENVIRONMENTAL POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORK**

The General Environmental Law, created and approved in 1993, is the unique normative body of ample scope on natural resources management and the environment at the nation level. Characterized as a framework law, this judicial body encompasses the rector principles of the environmental law of the country and complements in procedural and normative details with its General Act. This law states three fundamental doctrines for the development of other regulations: 1) the declaration of the public profit of natural resources protection, conservation, and their restoration, which should be yielded in accordance to ecological, economic, and social functions in a sustainable manner; 2) Social participation of the country's environmental management, the establishment of links between national and local authorities to promote conservation and sustainable use of all natural resources and the environment.

As of 1996 the principal responsibility the Environmental Law enforcement is delegated to the Natural Resources and Environment Ministry (SERNA), under which the institutional and administrative structure is developed to respond for this purpose. Laws, Acts, agreements, resolutions that regulate different aspects related to the natural resources and the environment management and the various related laws, adhere to the Río Declaration on the Environment and Development and the provision of the Agenda 21.

The government institutions delegated to enforce these regulations are mainly the Natural Resources and the Environment Ministry (SERNA), The Agriculture and Livestock Ministry (SAG), The Honduran Forestry Development Corporation (AFE-COHDEFOR) and the Health Secretariat.

However, limitations and obstacles tend to appear such as: 1) the existence of a scattered legal framework which causes an effect a scattering effect on administrative framework and allow conflicts between responsible institutions; 2) the application of a natural resources regulatory framework based on a sector-based approach (forestry, water, soils, climate, wildlife, and minerals), creates a some ambiguity with respect to the environmental topics and problems of integral and systemic nature.

Two of the most important laws pertaining to natural resources management were approved last year. These laws were the Land Planning and Human Settlement Act (November 2003) and the Water and Sanitation Law. Still in revision are the Water Law, the Law of the Energy Sub-sector, and the most polemic one the Forestry Law.

During the 1997 and 2000 period, the Republic of Honduras adhered and ratified the following international treaties: United Nations Convention on the Desertification (Legislative Decree 35-97 of the 28<sup>th</sup> of April 1997); The Kyoto Protocol over a Clean Development (Decree No. 37-00 of the April of 2000); The Interamerican Convention for the Protection and Conservation of Marine

Turtles ( Legislative Decree 101-99 of the 13<sup>th</sup> of July 1999; Agreement on the International Program for the Dolphin Conservation (Decree No, 535-99 of the 6<sup>th</sup> of April of 1999; The Biological Diversity Agreement ratified by Honduras on the 21<sup>st</sup> of February of 1995; The United Nations Desertification Convention ratified by a Legislative Decree 35-97, of the 28<sup>th</sup> of 1997. Convention of the World, Natural, and Cultural Patrimony ratified by Honduras through the Decree-Law 673. also CITES, RAMSAR, Biodiversity and Prioritized Wild Areas in Central America, Climate Change, and others. Much progress has been attained in the follow up process of all this agreements and conventions. Unfortunately the process has been slow due to the puzzle of institutions responsible for each one of them. Weaknesses are evident.

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## **ANNEX 1**

### **La “Docena Sucia”, y más**

Es conocido que el primer grupo de los 12 plaguicidas mas dañinos al ambiente, que fueron paulatinamente prohibidos en diferentes países del mundo, desde inicios de los años ochenta, recibió el calificativo de los ambientalistas como “La Docena Sucia”. Hoy en día los listados de productos agroquímicos cuya importación y uso no esta recomendada por diferentes organismos internacionales es mucho mayor.

Por ejemplo, actualmente los plaguicidas prohibidos o de situación especial en Honduras, de acuerdo a la Ley Fitozoosanitaria y su reglamento, son los siguientes:

<b>Genérico</b>	<b>Año</b>	<b>Observaciones</b>
Aldrin	1991	Prohibido
Dieldrin	1991	Prohibido
DDT	1991	Prohibido
Dinoseb y sus Sales	1991	Prohibido
Fluroaceraamida	1991	Prohibido
Clordimefron	1991	Prohibido
HCH	1991	Prohibido
Clordano	1991	Prohibido
Cihexatin	1991	Prohibido
EDB	1991	Prohibido
Heptacloro	1991	Prohibido
Compuesto de Plomo	1991	Prohibido
Amitrole	1991	Prohibido
BHC	1991	Prohibido
2,4,5-T	1991	Prohibido
Lindano	1991	Prohibido
Dodecaclor	1991	Prohibido
Toxafeno	1991	Prohibido
Dibromocloropropano	1980	No se Permite su Importación
Captafol	1997	No se Permite su Importación
Dicofol	1997	No se Permite su Importación
Bromuro de Metillo		Restringido, no para venta al Público, uso cuarentenario.

### **III Guatemala Environmental Profile**

## **GUATEMALA ENVIRONMENTAL PROFILE**

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### **PHYSICAL ENVIRONMENT**

The country of Guatemala has a small territorial extension but with a natural and cultural diversity that is unique throughout the world. Its position as a bridge between two massive continents, its variety of water conditions and terrestrial shapes, its latitudinal amplex, pluvial and weather, among other factors, are responsible for the existence of assorted physical settings in the zone, conditions that are apt for the evolution of varied ecosystems and species as well as for the development of diverse social economic activities, jointly with the other countries in the Central American region.

#### **Geographic Setting**

The Republic of Guatemala borders to the north and west with Mexico, to the east with Belize, the Caribbean, and Honduras and El Salvador, and to the south with the Pacific Ocean. Its territory is 108,889 square kilometers, and it is located between the nearctic and neo-tropical biographic regions

#### **Geology and Topography**

Guatemala is one of the few places in the world in where three tectonic plates converge within a limited space: Cocos, Caribbean and North American. The country is crossed by the Caribbean and North American plates, thus originating an extensive system of the Motagua, Polochi and Jocotan – Chamelecon faults, from which several secondary systems are derived

All of the Departments in Guatemala are exposed to seismic threat, although with different levels of risk, ranging from the lowest risk level in the extreme northern portion of the country, to the southern coast, central high plane areas, as well as the zone in the Motagua Fault, that records the highest seismic activity and the greatest magnitudes (FLACSO, 1996).

The territorial topography is mainly irregular, with altitudes ranking from sea level to 4,220 meters above sea level (masl) at the crater of the Tajumulco volcano, same that is the highest point in Central America

The country is crossed by the Los Andes mountain range that is divided into 2 branches – Sierra Madre and Los Cuchumates. The first originates in the central highlands of the country and has a series of secondary systems that reach into the territories of Honduras and El Salvador. The second branch forms a system that crosses the country from the Mexican border to the Atlantic Ocean. In addition to the mountain ranges the country has a series of valleys and highlands, woodlands and plains, all derived from the different geological processes that originated the national territory, forming 11 physiographical provinces.

Guatemala has a volcanic chain totaling 37 volcanoes that cross the country from west to east.

## Climate

Due to the intercontinental position of the country and having two ocean masses in its proximity, separated by the mountain range system that crosses the country from west to east, there are several climates and micro climates grouped in the six climate regions – Northern plains, Northern Cross Section Strip, Meseta and Plateaus, Bocacosta, Pacific Coastal Plain and the Eastern Zone (According to the Institute of Seismology, Vulcaneology, Meteorology, and Hydrology)

The mean temperature at sea level is 27 °C for the Pacific Ocean and 28.2 °C for the Atlantic and from sea level the annual mean temperature descends 1°C per each 100m increase in altitude. The relative humidity varies from 60 % in the east to 85 % in the north, with a national average of between 79 and 80 %.

Between 915 and 2,440 masl, the zone with the greater part of the population, the days are warm and the nights are cold, with an average annual temperature of 20 °C. The climate in the coastal region is of a tropical nature – the Atlantic has higher humidity than the Pacific, with an annual average temperature of 28.3 °C.

The seasonal rains are from May to September with an annual rainfall in the northern of between 1,525 and 2,450 mm; the mountains in the southern part of Guatemala City receive nearly 1,320 mm as a yearly average. The annual average precipitation throughout the country is 2,034 mm, varying from 500 to 6,000 mm, generating an annual metric water volume of 127 km<sup>3</sup>.

The climate conditions in the country are greatly affected by abrupt changes that generate impact and create vulnerability in 4 main areas – social as well as environmental – and therefore different initiatives are being implemented with specific actions to reduce the gases for the greenhouse effect in the different industrial sectors that generate the same. These 4 main areas are used as a series of indicators to measure the progress of the diverse strategies that are implemented, and are health, agricultural production, forest resources, and water resources

## Hydrology

Because of its mountainous topography, the country is divided into three superficial water runoff regions: Pacific, Atlantic and Caribbean and Gulf of Mexico. The following chart shows the general characteristics of the national runoff regions.

Runoffs of Guatemala				
Runoff	Area (Km <sup>2</sup> )	% of area in the country	Number of Runoffs	Average Water volume (M <sup>3</sup> /seg.)
Pacific	23,990	22	18	393
Caribbean	34,259	31	7	628
Gulf of Mexico	50,640	47	10	1,672
Total	108,889	100	35	2693
Source: MAGA, 2001.				

0.9 % of the national territory (950 km<sup>2</sup>) is occupied by continental waters – lakes and lagoons.

The current problem regarding the water resource mainly focuses on the reduction of precipitation, while relating these problems to the effects of the climate changes on this resource; used as an indicator through the effects caused by the reduction, such as decrease in underground water, contamination of the resource, and the effects of the latter on the health of consumers

### **Soil**

The territory's condition distributes the capacity for land use as follows: 34.4% for agricultural crops; 17.0% non-tilling agricultural crops; 41.2% non-agricultural crops; 7.1% with a protective forest vocation, and 0.3% of the surface is covered with water bodies (MAGA).

The demand for land is persistent and it can be observed that the rural households have a high dependency on forest products and agricultural production, thereby provoking land occupation for farming use, reducing the forest coverage and increasing the space for human settlements. This reduction of the forest cover is an extremely important indicator that points out the expansion of the agricultural frontier as well as the actual and current use of the land

### **Air**

During the last two decades, Guatemala City has undergone a rapid and disorderly growth toward the municipalities that form\*\*\*\* up the total department, with the subsequent limitations of infrastructure, basic services, and an overwhelming increase in vehicular traffic. The consequence of this growth has been the considerable deterioration in the air quality at national level. It is therefore necessary to exert a strict control of the main source of atmospheric contamination – the automobile load\*\*\*\*. There are multiple indicators to monitor the quality of air by measuring the different levels of airborne contaminants such as Total Suspended Particles (TSP), Particles Under 10 micros (PM<sub>10</sub>), Nitrogen Dioxide (NO<sub>2</sub>), among others.

### **Biological Conditions, Biodiversity, Ecology and Conservation of Nature**

Because of its privileged geographic position, Guatemala possesses a wide variety of natural ecosystems that range from coastal – marine in the Pacific and Atlantic to the high – mountain bush lands in Huehuetenango. 29.36 % of the national territory forms part of the Guatemala Protected Areas System (SIGAP) in where the majority of these systems are represented as samples of the important biological and cultural diversity of the country

### **Flora and Fauna – Wildlife**

The biological wealth of the country is distributed into 14 land eco-regions that have different natural communities and characteristic species. Regarding the flora species, there are 7,754 plants that are registered, 1,171 of which are of an endemic nature. In terms of the diversity of fauna species, there are at least 209 species of reptiles of which 6 are marine turtles that are registered as under severe danger of extinction. As for the remaining vertebrates, it is estimated that there are 651 fish species, 189 mammal species, 498 species of resident birds and 205 migratory bird species. This natural diversity, along with the wide ethnic assortment in the country has in turn generated different, distinct and varied forms of interaction and use of wildlife species as well as an intense domestication that is fundamental for the diet of Guatemalans and of many other countries. The

current practices based on the intensive, extractive, and unsustainable use of this natural patrimony have increased their degradation and depreciation. We must keep in mind that one of the main indicators is the reduction of the different wildlife species, be it flora or fauna.

### **Marine Resources**

The coastal area of Guatemala shelters a wide variety of Marine Ecosystems that sustain and facilitate economic activities linked to port services, tourism, aquiculture, and commercial fishing. They also provide environmental services that protect the coastline and stabilize the sediment, reason for which their destruction creates a hard impact not only on the environment but also on the national economy.

## **Social Economic, Social cultural and Human Health Conditions**

### **Archeological and Cultural Heritage**

The national territory conserves the footprints and remains of the pre-Colombian era and of the colonial stage, the most important being Tikal, Quirigua, Zaculeu, Aguatec – Dos Pilas, Yaxha, Mirador Rio Azul, Caminal Juyu, and Mixto Viejo. The Spanish influence is added to these manifestations of pre-Colombian culture, expressed in the language, religion, art, and architecture. The architecture of Antigua Guatemala stands out with its Spanish baroque buildings and the city has been declared a patrimony of mankind

The country's culture is tightly bonded to its original ethnic roots, representing another factor with great potential for the national tourist offer.

There are enormous differences between the modern style of the city and the customs and traditions of the different and distinct groups of Mayan descendent that are mainly settled in the highlands or plateaus in the central region of the country

### **Recreation, Landscapes and Visual Aspects**

The wide variety of natural ecosystems that are found throughout the country provide an ample range of landscapes that represent different opportunities for recreation

The tourist and recreational offer of the country provide the opportunity to carry out multiple activities, uniting the efforts of the different sectors with tourism potential, such as the cultural, environmental, and social sectors

## **Social Economic Aspects**

### **Economy**

The country's economy is based on the use and beneficial exploitation of the natural resources on behalf of the agricultural, livestock, forestry and hydro-biological sectors. The contribution of the farming and livestock sectors to the national GDP is 23.5 % and represents 83 % of the total exports.



Within the industrial sector, the majority of Guatemalan industries operate in the small commercial scale. The main export products are: coffee, sugar, bananas, shrimp, fish and lobster, textiles, and beef

### **Tourism**

Tourism has become a very important economic line, being a large generator of foreign currency, second only to the coffee income. During the 90's, the number of visitors surpassed half a million per year (Segura, 1997). Ecological tourism in 1998 reached approximately 300 thousand visitors to the protected areas.

Only Tikal, the main archeological center in the country, was visited by almost 150 thousand visitors. According to the Bank of Guatemala, the number of tourists that entered the country in the year 2000 totaled 830 thousand persons, 290 thousand of which were from El Salvador. The number of tourists that enter the country constitutes the best indicator in this item line.

It is expected that tourism, along with forestry, agro-industry, clothing and textiles will be the future driving power of the national productive economy.

### **Agriculture, Forests and Fishing**

Agriculture continues to be the activity that mobilizes the national economy, in spite of the crisis undergone by the activities that most contribute to the generation of employment and the income of foreign currency from international trade, coffee crops being the most affected. During the 90's, the beef industry moved from the southern region of the country to the northeast, mainly to the Peten, clearly representative of the pressure that is exerted on new land, with forests, for fomenting and developing this economic activity

In the last part of the 90's, a new activity awakened the interest of the economic sectors in crisis, forestry; and although it currently participates on a minimal scale in the GDP, this participation is expected to increase in the measure that new forestry areas become linked to the industrial activity and to future environmental services markets.

In regard to the fishing sector, the main intake from the sea is mainly crustaceous, fish and mollusks. On a lesser scale, calamari is exploited and other species with high potential, such as tuna, have not been fully taken advantage of. Large scale fishing for export represents 82 % of the total activity.

### **Population**

Guatemala is a multiethnic, multilingual and plural-cultural country with 23 ethnic-linguistic groups. The indigenous population represents 43 % of the total population in the country.

The total population of the country is 11.4 million, of which 61.4 % live in the rural area and 50.4 % is constituted by males who also form 80.1 % of the economically active population (EAP) in the country.

During the last 2 decades, the population density varied from 55 inhab/km<sup>2</sup> to 105 inhab/km<sup>2</sup>, with regional extremes of 1,209 inhab/km<sup>2</sup> in the metropolitan region and barely 9 inhab/km<sup>2</sup> in Peten.

### **Infrastructure and Transportation**

Infrastructure has been developed throughout the country in support of economic activity. It has been represented by building roads, seaports, airports, railroad lines and telecommunications, with 14,118 kilometers of highways and secondary roads of which 355 kilometers have been paved (blacktopped) in the year 2000. The main routes that cross the country are from east to west, the Pan-American and Inter-American highways. The main ports are Puerto Barrios on the Caribbean and Santo Tomas de Castilla, Puerto Quetzal, Puerto Champerico and Puerto San Jose on the Pacific

The railroad network is 1,139 kilometers long, the majority of which belong to the Ferrocarriles de Guatemala enterprise that is managed by an international corporation. The country has two international airports with several other small airports to handle domestic commercial and private air traffic. As of 1998, the country privatized the majority of postal, telephone and telegraph services.

### **Water and Sanitation**

The supply of potable water to the 331 municipalities comes from 70 % of surface water and 30 % of underground water; 66 % use gravity distribution systems, 18.5 % use pump systems and 15.2 % are combined systems. By the year 1999, the Municipal Water Corporation of Guatemala City was obtaining 55 % of its water from surface sources and the remaining 45 % from wells

It is estimated that the metropolitan area's demand for water is 8 m<sup>3</sup>/sec., with a current deficit of 1 m<sup>3</sup>/sec for the Municipality of Guatemala. The lack of measuring devices in the majority of municipalities, low price for the service, and up to 70 % arrears in collection does not allow recovering even the costs for the adequate operation and maintenance of the systems.

As previously mentioned, the availability of water resources greatly surpasses the current and even the potential use, and presents a problem mainly with decrease in the resource, contamination and its subsequent health effects

In the sanitation sector we can point out that of the 331 municipalities in the country, only 24 have treatment plants for potable water and of these only 15 are in working condition; in other words, only 4.5 % of the municipalities. There are a total of approximately 49 registered plants for treating sewage water although 6 are out of order, others are only partially or inadequately functioning and only 15 are currently running.

Of the 223 urban centers with over 2 thousand inhabitants, only 24 apply any type residual water treatment (the majority are primary treatments), the rest discharge the residual water directly into the rivers (MSPAS-OPS, 2002). This is the origin of water contamination problems, and one of the most important indicators to observe is the number of chloroforms that are present in the water.

There is no policy for making an efficient use of the water, therefore the trend toward wasting this fundamental resource

## **Public Health**

The problems in the health area are due mainly to the contamination of water resources and the close relationship between poverty and the access of public services (SNU, 2003). There have been several projects to improve the coverage of potable water service, although according to public data, the same rates still prevail, the service is at a standstill and the only sector that is being covered in the population growth. Cholera, that had been totally eliminated, has reappeared in the country and the number of cases is on the rise, especially in the poorer areas of the country

In the year 2000, acute diarrhea episodes were the second cause of disease and the second cause of mortality, surpassed only by acute respiratory infections and pneumonia.

## **ENVIRONMENTAL POLICIES, LEGISLATION AND INSTITUTIONAL FRAME**

The environmental legal framework in Guatemala is derived from its political constitution: Article 64 states the national interest of conservation, protection and improvement of the patrimony and the creation of park reserves; Article 97 deals with environmental protection and ecological balance on behalf of the state, municipalities and inhabitants, and many other Articles refer to matters of an ecological nature. But, in spite of the policies and regulations, there are voids that deter and impede integrated and coherent actions for protecting the natural resources that are being subjected to degradation. This is the case of the soil and water resources whose use is regulated by a series of legal instruments, of a diverse nature and hierarchy, and that present regulatory voids and are difficult to apply and enforce in the actual practice. During the last five years, several Water Law and Land Law projects have been submitted although these have not gone beyond the stages of technical version and consultation.

The emission of environment-related laws and regulation increased as of 1986: Law for Improving the Environment, Law of Protected Areas, Forestry Law, Law of National Reserves, and others. This has produced a series of changes in the environmental juridical framework and acknowledges the country's institutionalism, creating new entities that are responsible for environmental management - INAB, CONAP, CONAMA, and MARN.

Until 1999, there were 46 international environmental treaties in force in Guatemala that are automatically integrated into the national norms, and the competent institutions for executing the international commitments regarding environment are MARN, CONA, MAGA and INAB as part of the latter.

The projects have been the most important instrument for Environmental Management in the country and the majority of environmental projects have been alternative projects. Another of their characteristics is that they emerge from different sources and therefore not all projects are registered in an information center, thereby complicating their interpretation and analysis.

The environmental projects have subsidized geographic areas that have little or no government presence. According to the "Institutional Strengthening of Environmental Policies" (FIPA/AID), nearly 100 projects have been executed between 1995 and 2003.

#### **IV State of the Environment - Panama**

## STATE OF THE ENVIRONMENT -PANAMA

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The National Environment Authority of the Republic of Panama (ANAM) has a legal, technical and administrative platform as well as an inter-institutional coordination that can provide the necessary information which allows an understanding of the environmental reality, and the social and economic environment of the country related to the framework of sustainable development.

### PHYSICAL ENVIRONMENT

#### *Climate*

Panama's meteorological conditions bring about five types of climates that favour the formation of clouds (cumulus nimbus), responsible of intense rainfalls. The annual rainfall average volume in the country is 223.8 billion m<sup>3</sup>. From this total, 83.9 billion m<sup>3</sup> are registered in the Pacific coastline and 149.8 billion m<sup>3</sup> in the Caribbean. The prevailing climates in Panama are: very humid Tropical, humid Tropical, dry Tropical, humid Temperate and very humid Temperate, while interesting climate parameters are: solar illumination (5.5 cal/cm<sup>2</sup> /day), Temperature (27 °C), Annual Evaporation (2,000mm), Annual average Rainfall (3,000mm) and annual relative humidity (75%).

There are two main seasons: the rainy season from mid April to November, and the dry season, from November to March. Temperatures range between 21 and 34.5 °C with an average of 27.5 °C.

#### *Hydrology*

The country has 52 hydrographical watersheds and about 500 short distance rivers, with courses generally oriented to the coastlines.

The water runoff to the Pacific covers 70% of the national territory. About 350 rivers flow into this coast, with an average longitude of 106 km. The water runoff is distributed into 34 hydrographical watersheds, among which the most important ones are those of the Tuira River, the largest watershed with 10,664.4 km<sup>2</sup> – Chucunaque, Bayano, Santa María, Chiriquí Viejo, San Pablo, Tabasará and Chiriquí. Two international watersheds are also located in this water runoff: the Coto River watershed, between Panama and Costa Rica, and Juradó River watershed, between Panama and Colombia.

The water runoff to the Caribbean occupies 30% of the national territory. 150 rivers flow into this coastline runoff, with an average longitude of 56 km. It has 18 hydrographical watersheds, among which the most important ones are the Chagres River, with 3,315.2 km<sup>2</sup>, and Changuinola, with 2,991.9 km<sup>2</sup>. The watershed of the Sixaola River, at the border between Panama and Costa Rica, is 2,706 km<sup>2</sup> long and has an enormous agricultural, hydroelectric, commercial and intra-regional tourist potential. It has a high biodiversity and is a priority area of the Mesoamerican Biological Corridor.

Among the most important lakes, due to their magnitude and use, are the reservoirs of Gatun and Alajuela, that supply the water for the Panama Canal operation and for electric power generation; and the reservoirs of Bayano and Fortuna, that concentrate the greatest hydroelectric generation potential in the country. Natural lagoons are small, such as the Maman, in Bacas del toro, with an area 1.7 km<sup>2</sup>.

### ***Soil***

The USDA-SCS soil classification system establishes that only 25% of national soils, equivalent to 1,891,755 hectares are suitable for agriculture activities, the rest should be oriented to forest-farming and forest activities. Nevertheless, the inappropriate use of soil in cattle raising activities cause soil compression, reduce fertilization efficiency, affecting micro and meso fauna and reducing the water retention capacity. Likewise, the increase in soil acidity favours aluminium concentration and reduces phosphorus availability.

The use of fires to control undesirable weeds and ecto-parasites, and to accelerate the sleeping period of some pasture seeds, reduce the content of organic matter and favour hydro erosion, resulting in the loss of soil nutrients and changes in soil structure. Nevertheless, already in 1990, 38.9%, equivalent to 1,066,582 hectares of the country's land were being used for farming activities

### ***Air***

Air quality has been affected by several anthropogenic factors such as: deforestation, forest-fires, inappropriate use of agrochemicals, and an increase of the vehicular fleet, fuel quality, and chimney emissions. In addition population growth and its increasing concentration in urban areas have caused a considerable rise in air pollution. It has been estimated that 90% of urban area emissions come from the transportation sector, while the rest comes from fixed sources.

A disorderly urban growth that does not segregate service, industrial, residential and recreational uses contributes to the generation of noise that affects communities greatly. According to measures taken in the avenues with the greatest vehicular traffic, the districts of Panama, San Miguelito and Colon, can be considered critical areas, since they register sound levels above the established standards in force in the country.

The National Environment Authority of the Republic of Panama (ANAM) created the National Climate Change Program (Programa Nacional de Cambio Climático (PNCC)), that includes sub-programs of Vulnerability and Adjustment, Mitigation, Compliance and Awareness. The Mitigation sub-program has established a portfolio of Clean Development Mechanism projects (CDM)

## **BIOLOGICAL CONDITIONS, BIODIVERSITY, ECOLOGY AND CONSERVATION OF NATURE**

### ***Flora and Fauna - Wildlife***

According to the *First Report on Natural Wealth and State of Biodiversity of Panama*, Panama ranks 19<sup>th</sup> among the 25 countries with the greatest natural wealth of flower plant species, and is number 4 in North and Central America. However, despite this abundant biological natural wealth, approximately 5,308 species of flora and fauna are in danger. Specially, the group of plants that

includes more than 5,000 endangered species (ANAM, 2000). On the other hand, there are about 80 species of vertebrate animals highly threatened, the group of birds registers a total of 205 species at risk (CCAD, 1998), mammals have 10 species at risk, reptiles, 48, and amphibians, according to the *General Report of updated lists of flora and fauna species in Panama 2002*, a total of 1,607 species have been determined as endemic in the country. In addition, there are 188 endemic species at a regional or border level, 143 with Costa Rica and 45 with Colombia.

At the time of this report, more than 90% (1,500 spp.) of the endemic species of Panama are plants, from which 302 were reported between 1999 and 2003. The remaining 6.6% is distributed between mammals (6 spp.), birds (12 spp.), reptiles (23 spp.), amphibians (29 spp.), fresh water fish (23 spp.), and sea fish (4 spp.). Regarding the 188 species with regional and border endemics, 9 mammal species have been determined for Costa Rica, 71 bird species, 31 reptiles and 32 amphibian species; and for Colombia, 22 bird species, 12 reptile and 11 amphibians.

In order to protect biodiversity at all levels Panama has established 50 protected areas through the adoption of laws, decrees, and municipal resolutions to confront this situation. Between 1998 and 2003, protected areas increased in 2%, and the National Parks of San Lorenzo, Santa Fe and the Natural Monument of El Gaital have been incorporated to the National System of Protected Areas.

#### ***Coastline resources - maritime***

Panama coastline is 2,998 km long and borders both the Pacific and Atlantic Oceans, with a highly productive sea life and important coastal resources. The Caribbean Coast borders 1,287 km, the continental platform is narrow, and has 250 km of coral reefs and numerous habitats, among them mangrove swamps, estuaries, coral reefs, and sandy beaches. The Bocas del Toro archipelago is located to the west, with more than 50 keys and to the east is the San Blas archipelago with more than 300 coral islands.

High urban development characterizes the Pacific coast, since approximately 80% of the country's population is located in this area. It covers 1,700 km and a broad platform that reaches up to 150 km of this coast, the coastline has different characteristics. In the Province of Chiriqui the coast is low, sandy, with a ribbon and arrow like coastline, Veraguas it is high and rocky, the Azuero Peninsula is high, rocky type combined with small coastline plains; in Punta Chame there are river-marine and low muddy coasts, and the area from the city of Panama to Punta San Lorenzo in Darien, the coasts are high.

Studies carried out in the year 2000 for the creation of the Punta Pacifica islands, indicate that the greatest source of contamination of Panama Bay is due to the downloads of waste waters and solid wastes discharged by the population into the rivers and coasts, which represent 30% of the bay's contamination..

## **SOCIOECONOMIC, SOCIOCULTURAL AND HEALTH CONDITIONS**

### ***Population***

The Republic of Panama territory covers an area of 75,517 km<sup>2</sup>, located between the northern latitudes 7° 12' 07" and 9° 38' 46" and western longitude of 77° 03' 07". It borders the Caribbean Ocean to the north, the Pacific Ocean to the south, and with the Republic of Costa Rica and Colombia to the East and West, respectively.

The Isthmus is located in the low latitudes of the tropical region. The country is divided into nine provinces, 75 districts or municipalities, five indigenous regions (Kuna Yala, Emberá, Kuna de Madugandí, Ngöbe-Buglé and Wargandí), and 620 corregimientos.

The population census of the year 2000 registered 2,839,177 inhabitants in the national territory, which represents a population density of 37.4 persons per km<sup>2</sup>. This population is divided into: 1,432,566 men and 1,401,611 women, for a male index of 102.2 for every one hundred females.<sup>5</sup> 62.6% of the population lives in urban areas and 37.4% in rural areas. Approximately 83% of the population is located in the Pacific Ocean Coastline, traditionally the most populated and developed region of the country, while the remaining 17% lives in the Atlantic Ocean Coastline.

The transit zone function, inherited since colonial times, originated a heterogeneous mix of human groups. Besides the autochthonous groups, kunas, emberá- wounaan, ngöbe-buglé, bokotás, teribes and bribí, the population includes Hispanic, Caucasians, Asian and afro-Antilleans. Since 1904 the dollar became the legal national currency, and the high labour demand originated by the construction of the Panama Canal, contributed to this ethnic diversity since the establishment of this Republic in 1903.

### ***Socio-economic Aspects***

According to the National Statistics Direction and the Census of the General Comptroller's Bureau of the Republic, Panama's population reached 3,003,954 inhabitants in 2001. From which 62.6% live in urban areas and 37.4% in rural zones.

During the 1999-2004 period, the Panama economy has confronted a difficult situation due to exogenous and domestic factors that have affected its performance. Such has been the case, for example, of the global crisis related to the events of September 11, 2001, in the United States, the increase of the Oil bill and the problems that the most important economies of the region have faced: Brazil, Venezuela and Columbia.

As a result, as of 2001, the total Gross Domestic Product (GDP) has grown less than 1%, while the GDP per capita has gradually fallen since 1998, even reaching negative values in the last years. This situation affects the entire socioeconomic and environmental situation, since it could lead the most vulnerable groups to an uncontrolled exploitation of natural resources as a way of survival.

### ***Tourism***

The country has a potential to attract ecologic-historic tourism, strengthened by the on-going remodelling of the la Catedral neighbourhood, the construction of the Biodiversity Museum: Puente



de Vida - Panama, the tourism centre of Amador, and international quality beach and sea tourism in Bocas del Toro, Coiba and the Las Perlas archipelago.

Statistic reports of the Panama Tourism Institute (IPAT) 2001- 2002, indicate that Panama is being consolidated as a tourism destiny among priority markets such as the ones of the United States, Europe, Canada and Latin America.

### ***Agriculture and forests***

Since 1992 organic agriculture is being promoted, through an agreement of the Ministry for Agriculture Development and the Japanese International Cooperation Agency (JICA), resulting in the organization of 26 groups in the provinces of Chiriquí, Veraguas, Coclé, Herrera, Colon and Panama, that promote the exploitation of crops free of chemical products. Other projects geared at reducing the excessive use of agrochemicals include the use of plasticultrue (greenhouses, meshes to stop insects) and located irrigation (dripping and micro sprinkling), which promotes a more efficient use of water especially in those areas that face water supply problems.

75% of the country's land is forestry land and more than 2.5 million hectares undergone deforestation, mainly to develop agriculture activities. According the *Final Report of the Forest Coverage and Land Use of the Republic of Panama: 1992-2000*, forest areas went from 36,951.60 km<sup>2</sup> to 33,645.91 km<sup>2</sup> during this period, which represents a net loss of 3,305.69 km<sup>2</sup> of forest area. In opposition to this trend, to December 2002, the total reforested area, both private and public, at a country level reached 51,634 hectares o 516.34 km<sup>2</sup>.

Forests are managed by the National Environment Authority, and anyone interested in undertaking forest activities must comply with all established requirements, such as forest inventories, management plans and environmental impact studies.

It is well-known that deforestation has an impact on water quality and availability, biodiversity and soil erosion. Currently there is no quantitative information that can account for the impacts brought about by deforestation. Nevertheless, some policies and measures have been adopted to mitigate this process.

### ***Fishery***

Industrial Fishery includes shrimp, anchovies and herring. Shrimp is fished along the Pacific Coastline, but the main unloading areas are the fishing port of Vacamonte, port Pedregal (Chiriquí) and port Mutis (Veraguas).The use of trawling nets, captures besides shrimp, all the smaller size species, diminishing their potential.

Thus, fishing molluscs and crustaceous reached 25 metric tons in 2001, above the ones fished in 1999 and 2001.

Records of the Panama Maritime Authorities indicate there are 240 shrimp boats that captured about 3,365 metric tons in 2002, which is the equivalent to 24.9 million balboas.

Traditional fishery has had commercial purposes, and generally uses wooden or fibre glass boats with a capacity of less than 10 tons. These boats generally have an off board motor and use fishing techniques such as cages, nets, hooks and line. The use of cages and nets, specially, has harmful

effects for the environment, since they affect the habitat and biomass of the fisheries. There are 6,116 traditional fishing boats in the country and 18,348 traditional fishermen according to the information on fishing permits and licenses. In 2002, traditional fishing reached 206 metric tons, the largest one since 1991, equivalent to 6.1% to industrial production.

### ***Infrastructure and transportation***

The housing deficit in the country reached 207,602 housing units. The provinces of Chiriquí and Panama with a housing deficit of 91,132 (43.9%) and 22,167 (10.7%) respectively, and concentrating most of this deficit followed by Colon, with 18,819 houses (9.1%), and Veraguas with 18,812 (9.1%). The remaining 27.3% is distributed among the other provinces and regions.

The rainfall sewage system of most of the urban zones in the country does not have the appropriate capacity to receive and transport the water volume caused by heavy rainfall of most of Panama. In addition, there is a lack of maintenance of sewage entries and drainage obstruction due to trash carried by the water, which has a negative effect on the transit and urban life. The limitations of coverage of sewage networks in the urban areas have resulted in the proliferation of septic tanks. A lack of maintenance of these tanks also generates problems that contribute to the degradation of the urban environment.

The Urban Development Plan of the Pacific and Atlantic Metropolitan Areas proposes a road structure with a reticular pattern. 1999 and 2003, the Ministry of Public Works carried out 252 works in roads and vehicle and pedestrian bridges, with a total investment of B/.524,226,543.88, and a total longitude of 956.19 kilometres of avenues and roads repaired. Before the end of the year 2004, the Government expects to culminate the construction of the second bridge over the Panama Canal, with a total cost of B/.103.9 million, a longitude of 1,057 metros, two six lane access highways and 22 kilometres long, at a cost of B/.87.2 millions. With this highway the idea is to decongestion the present bridge with a multimodal transport system both in the Pacific and Atlantic sectors that have port facilities in Balboa, Vacamonte, Cristóbal and Telfers, and the air facilities of Tocumen, Marcos A. Gelabert (Al-brook), Howard and Enrique Jiménez. The system is complemented with transportation roads, trans-seismic land communication of the railway and the Panamá Colón and Panama Canal highway.

### ***Water quality and supply***

The increase in the demand of goods and services that need abundant water generates important pressure on the availability and quality of this resource. Population concentration and the country's economic activities in the Pacific watersheds influence the deforestation process, the trend of misuse of land and an accelerated erosion and sedimentation and contamination of water sources as well as an alteration of the hydrological regime of watersheds..

93% of the urban areas and 73% of the rural areas have potable water service coverage. However, in many urban sectors water supply comes from concessions granted. The water from concessions goes mainly to agriculture (47.5%), water dwelling (22%), industrial (19.2%), hydroelectric (5.4%), household (4.4%) and tourism (1.5%) purposes.

The main contamination source of water resources is household waste waters without previous treatment dumped into the superficial courses of rivers and streams.

### ***Electricity***

60% of the electric power produced in Panama comes from hydraulic generation. Water demand for this activity reaches 7,250 m<sup>3</sup> /year and is concentrated in the provinces of Panama (Bayano), Chiriquí (La Estrella, Los Valles y Fortuna) and Veraguas (La Yeguada). The Bayano Central utilizes 56.4% of the total volume of water used to generate electric power. The total water accumulated for electric power generation between 1994 and 2000 was 10,606 m<sup>3</sup> /year.

Currently electric power generation capacity almost matches consumption, what has lead to carrying out feasibility studies for new private projects, in compliance to the Law 6 of February 1995, which authorizes private sector participation in the generation of hydroelectric power generation, provided that these development projects do not contaminate the environment and Law 6 of 1997 that creates the Energetic Policy Commission.

15 thermoelectric plants have been installed in Panama with a total installed capacity of 770.77 MW, which represent 34% of the generation in the previous year (1763 GWh). Thermo generation increased in almost 20% in 2001 and 3% in 2002, compared to historical trends. One of the mains concerns are emissions from chimneys, therefore, existing projects are being adjusted and new ones are required to comply international standards..

### ***Public Health***

At the regional level, health indicators place Panama in a privileged situation. Nevertheless, the fall of national income derived from the world economic crisis has resulted in a greater demand of health services of the public sector that requires more resources from increasingly restricted budgets. This situation has mainly affected the Social Security, (Caja de Seguro Social) that services almost two million persons, among members, pensioned and beneficiaries..

On the other hand, the persisting inequality and deterioration of the human settlement conditions affects health conditions of lower income and rural sector groups. Indigenous groups represent 5.4% of the total population, and are one of the most vulnerable groups.

In 2001, 770 health facilities operated at a country level. 7.5% of these health facilities were hospitals, 29.6% health centre and policlinics and 62.9% sub centres and health posts. These facilities had 7,491 beds, from which 86.8% were state facilities and 13.2% private ones. Panama's installed capacity is 2.5 beds for every 1,000 inhabitants, very closet o the World Health Organization recommendation, which is 3 beds for every 1,000 inhabitants..

### ***Education***

Panamanian Society has achieved important advances in education. In 2001 830,159 students enrolled in official and private education centres, at a national level. From this total, 48.2% was for primary education; 28.2% for secondary education, and 14,1% university level education, 7.3% was preschool level and the remaining 2.1% to non university, supplementary and special education.

The cost per student in preschool and primary education was B/.678.43; for secondary schooling B/.531.46, and university education was B/.1,253.32.

Although the average years passed by the population is 7.5, and there is a registered decrease in the illiterate population from 10.7% in 1990 to 7.8% in 2000, illiteracy among indigenous communities affects 40% adults, while in the province of it reaches 23.0%; in Bocas del Toro 16.9%, and in Veraguas 15.2%.

The ANAM in close coordination with the Ministry of Education covers this area. Some key consultancies have been carried out in the design of tow strategies, one for formal environmental education and a second one for non-formal environmental education. The *Formal Environmental Strategy* was formulated, with the support of the National Enron mental Program (PAN), which includes actions to strengthen the incorporation of cross-sector axis of Environmental Education to the National Education Plan and study Programs.

## **ENVIRONMENTAL POLICY, LEGISLATION AND INSTITUTIONAL FRAMEWORK**

### ***Environmental Policy and legislation***

The National Direction for Environmental Quality Protection and the Regional Administrations of ANAM have requested several companies a total of 124 Environmental Management Programs at the national level, as a result of complaints submitted against contamination caused by waste waters, atmosphere emissions, noise, smells and harmful effects on the population's health, among other causes.

ANAM, jointly with the National Secretariat of Science, Technology and Innovation (SENACYT), has prepared a National Strategic Plan 2003- 2006, that promotes the development of national capacity in science and technology, and research and disclosure of information related to biodiversity.

The regulation of Law 24 of July 7, 1995, on wild life, is currently undergoing the validation and approval process at the Executive Body. The Panama Wildlife flora and fauna species list has been updated, including the list of endangered species and the assessment of the state of conservation and the impact of human activities on biodiversity

Under the perspective of joint management of protected areas, a co-management system has been established, oriented to the developing mechanisms that will facilitate an effective participation of communities in the conservation and management of these territories that are of such a great important for natural resources..

Successful experiences of co-management have been achieved through planning for protected areas between local communities and the National Environment Authority, such as: a) the creation of the Natural monument of Cerro Gaital and the National Park of Santa Fe, in Veraguas; b) elaboration of management plans for the la Amistad National Park, Volcán Barú National Park, Marino Isla Bastimento National Park, the San Pond Sak of International Importance and the protected areas of

the Cuenca del Canal; and c) the co-management agreement of protected landscape of the Galeta island, with the participation of ANAM, the University of Panama, the Panama Technological University and the Tropical Research Smithsonian Institute.

Another mechanism established by the General Environment Law is the administration and public utilities concession, which is currently being regulated, and that should conclude by the end of 2004.

The *ex situ* conservation of botanical gardens, zoo breeding places and tree nurseries has been used as a method to conserve genetic resources and species with a high commercial value and those whose conservation status requires urgent measures to restore and conserve populations, such as the Águila Arpía Project, implemented by the Peregrino Fund.

The use of genetically modified organism that could have a harmful effects on biodiversity, Law 48 of August 8, 2002 was approved, which establishes the National Bio security Commission. This law includes bio security aspects related to the introduction, production, and transportation of genetically modified products.

The Ministry of Education has played a fundamental role in the application of first level environmental education learning guides, for first to sixth grades, and the maritime book in the country's public schools. This education effort has been supported by ANAM with its publications and by providing training for 1,713 teachers on the content of these guides.

Trainings on bio diversity issues provided by ANAM have been reinforced through the implementation of different instruments such as: the Environmental Education Strategy for the Mesoamerican Biological Corridor of the Panama Atlantic Coast; the formulation of the Formal Environmental Education Strategy in 2003, in coordination with the Ministry of Education, the elaboration of the Non-Formal Environmental Education Strategic Plan.

Since 1999 to this date grants amounting to B/.220, 800 have been received, specifically for the Environment World Issue, to work on the priorities established in the Bio Diversity National Strategy and its Action Plan. On the other hand, there has been a limited national contribution from private companies to fund scientific research and pilot projects for sustainable use of resources that should also translate into higher earnings, both for these companies as for the State itself.

The national forestry policy was approved by Executive Decree Number 2 of January 11, 2003 and published in Official Gazette 24,724. The National Environmental Authority is currently obtaining the funding through international cooperation agencies in order to draw up the National Plan for Forestry Development

Decentralization is another component of this policy and it is accompanied by a deconcentration process in where the local governments, grass root organizations and entrepreneurs, among others will receive the faculties to participate in the management and use of natural and plantation forests as well as in other activities that are linked to the forestry sector. As a compliment to this objective, territorial reordering (zoning) will be propitiated according to the country level.

Promoting the evaluation of goods and services that are generated by the forestry resources is another strategic objective that seeks to contribute with essential elements in order to determine the value of this resource and thus improve its economic efficiency. The importance of improving the competitiveness of the forestry industry is acknowledged, supported by technological, infrastructure and juridical improvements and strengthening its juridical security

Significant legal progress was made during the period from 1999 to 2004, specifically regarding the evaluation of Environmental Impact Studies, such as:

Executive Decree 59 March 16, 2000, through which the Process for Evaluating the Environmental Impact in the Republic of Panama is regulated.

The Operations Manual for the Environmental Impact Evaluation that was approved through Resolution AG-292-01 on September 10, 2001.

In view of the clear and evident contamination of the water resources in the country, ANAM promotes coordination among the environmentally related agencies through initiatives such as:

Master Plan and Feasibility Study for the Sanitation of the Panama City and Bay. Project of----

Characterization of the Aqueduct and Rural Sanitations Systems, IDAAN.

Census of Contamination Sources of Water in the Main Industrial Zones (districts of San Miguelito, Arraiján and La Chorrera), ANAM.

Calendar of Fulfillment / Resolution 0026- 2002 for Characterization and Adjustment of Residual Water Norms of the National Environment Authority.

Residual Water Norms, ANAM.

Resolution of Permits for Residual Waters, ANAM.

Projects for Potable Water Treatment Plants in Pacora, Farallón, Mesoriental de Azuero Region, Chame, Bejuco and Coronado, Parallel line of Chilibre, Toma de agua de Soná. IDAAN.

Monitoring Program of the Panama Canal Water Basin, Panama Canal Authority and National Environment Authority.

### ***Environmental Institutional Frame:***

According to the General Environment Law, the environmental management organs are:

National Environmental Council:



Advisor body of the Executive Body, in the process to integrate the national environmental policy to the economic and social development policies in the country.

Inter. – Institutional Environment System:

Harmonizes and links the sector policies with the environmental policy to avoid conflict or voids in competency.

National Consultative Commission:

Consultative organ of ANAM for making transcendental national and sector decisions.

Provincial, District and Regional Environmental Consultation:

Organs for consultation and analysis of environmental issues, with observations, recommendations and proposals for the Regional Environmental Administrator.

A reengineering process has been developed and has been ongoing for 4 years under an organizational structure that was formalized through Decree 207 of September 7, 2000. This is formed by 7 levels: political, coordinator, advisor, fiscal, auxiliary and technical and operational support, with 13 regional administrations.

This organization establishes a difference between the roles of *rector entity* on issues of natural resources, and of *administrator entity* of the use of forest, water, protected areas, and protected wildlife resources, and whose administration is assigned to ANAM by laws that are complementary to Law 41 – General Environment.

ANAM is organized to assure a decentralized management through its Regional Administrations, procuring the participation of public and private sectors in the environmental management of the country through the Inter. – Institutional Environmental System and the Environmental Consultative Commissions.

Progress has been achieved in the design of two management systems:

System for Management Control, that reports quarterly economic, financial and technical indicators of the ANAM management, thus contributing to the decision making process at the political level. This system is operated by 25 functionaries distributed among the National Directions, Regional Support and Administrations, with assistance from the Environmental Planning and Policies Direction and the technical support of the Technological Information Unit.

System for Project Control, that reports monthly indicators regarding the physical and financial execution of the 22 projects executed by ANAM, information that is supplied to the Project directors and coordinators, Ministry of Economy and Finances, General Comptroller of the Republic and the Budget Commission of the Legislative Assembly.

The organic and functional structure of the National Environmental Authority (2000), establishes the Biodiversity Conservation Department with which the conditions to formalize and perfect the inter-

institutional and inter-sector coordination are created, thus emerging the National Biodiversity Commission that has been functioning since 2002.

***Sector Coordination***

ANAM has made significant progress in implementing the EIA process. The process has been divulged and is the spearhead of the environmental management that is being carried out. The process has promoted the Inter-institutional Environmental System, pioneer in the relationship between ANAM and the remaining institutions. The advance of the process allowed the establishment of the RUAS and the incorporation of government institutions into other environmental management activities (quality, contamination, clean technologies, etc.). Although the environmental unit's network is not yet operating at optimum level, it does not affect the EIA process due to the existence of an effective bilateral coordination between ANAM/DINEORA and the respective stakeholder institution, according to the sector that corresponds to each of the projects. This is the first consolidated process and project in A



## **V State of the Environment – Costa Rica**

## STATE OF THE ENVIRONMENT – COSTA RICA

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### PHYSICAL ENVIRONMENT

Costa Rica's republic measures about 51,000 km<sup>2</sup>, rests between the Caribbean Sea and the Pacific Ocean. In addition, Costa Rica is characterized by its impressive beautiful scenery, its consolidated protected areas system, social and political stability, high education level and the efficiency and quality of its services.

The strategic geographic position, located in western hemisphere heart, the people's positive attitude towards commercial transactions, infrastructure, easy access to international markets and the quality and cost of its human resources, make Costa Rica a place of opportunities to establish commercial operations.

#### Geographic Location

This country is located in the southern part of Central America, in the region known as neotropic. It has an extension of 51100 square kilometers (of which 24 % are wild protected areas), limits north to Nicaragua, south with Panama, west with the Caribbean Sea and east with the Pacific Ocean. The country is divided in seven provinces: San Jose (the capital city)(4,959 km<sup>2</sup>), Alajuela (9,752 km<sup>2</sup>), Heredia(2,656 km<sup>2</sup>), Cartago (3,124 km<sup>2</sup>), Puntarenas (11,276 km<sup>2</sup>), Limon(9,752 km<sup>2</sup>) and Guanacaste(10,140 km<sup>2</sup>).

#### Geology and Topography

Costa Rica's geographic location locates the country in the so called Pacific fire belt that gathers the majority of the world volcanoes. One hundred and twelve volcanoes exist in the country, 10 of which have some activity like sulfate, fumaroles and sporadic vapor or lava eruptions in some of them. Also it has thirty two craters of impressive characteristics, which is an important tourist resource. The country's orographic system has three potent mountain range masses: the Talamanca Cordillera with a longitude of 320 kilometers, the Central Volcanic Mountain range with 76 kilometers, and Guanacaste Volcanic mountain range with a longitude of 112 kilometers total. Rally the main mountain range is Talamanca, that is really the northern extension of Los Andes mountain range, which t its southern part has the country's highest peak Cerro Chirripó Grande with an altitude of 8619 meters.

#### Climate

Costa Rica's climate is pleasant the whole year, hotter in coastal zones. The temperature in mountainous areas are not cold, especially during the day, The annual average temperature is between 31.7°C in the coast and 16.7°C in the inner parts.

The rainy season (or 'green') goes from may to November, with almost no rain from December to April, having an annual precipitation average that goes from 1,100 mm to 4,500 mm, with a relative humidity that goes from 60% to 85%, depending on the time and the zone.

Costa Rica has a diversity of climates product of the action of the dominant winds and because the territory is small. In order to characterize better the country's climate, six regions were designated:

a) Central Valley, b) North Pacific, c) Central Pacific d) South Pacific, e) Caribbean Watershed and f) North Zone.

The problematic in this aspect is focused on the climatic change, which can be observed in rises of maximum temperature, minimum and average and percentile variations in daily precipitation, the greatest indicator of these effects is the comparison of climatic changes scenarios, with the purpose of indicating the combine effect.

### **Hydrology**

The country has 34 hydrographic basins, grouped in three provinces: Caribbean, San Juan and Pacific, this last one is divided in Central, South and North a potential disposition of water estimated in 112 Km<sup>3</sup>. The Rio Grande Tárcoles basin is of main importance because it provides water to three main province capitals of the country, San Jose, Alajuela, and Heredia, which group 35 municipalities in an extension that represent only 4.15% of the total territory. However it is where the main population concentration of the country is found, approximately 63% of the national population.

### **Soil**

The last estimated, which excludes Protected Areas (24%), 37% of the country's soil have the capacity of being used in agricultural and cattle activities without risk. The real use of the national territory has been determined by economic policies, deficiency of proper planning based exclusively on the increase of agricultural and cattle productivity, producing serious effects like the degradation of aquifer recharge areas, soil erosion in some zones, pond sedimentation, and some damage to coastal ecosystems. Fertility is the main indicator used for the soil resource, since it provides a possibility of future comparison according to its variations.

## **BIOLOGICAL CONDITIONS, BIODIVERSITY, ECOLOGY AND NATURE CONSERVATION**

During the last decades, all the people in the country have realized that Costa Rica's biodiversity is an important part of national heritage and consequently they have worked in creating an exceptional national Conservation system to assure the survival of endangered species and a Biodiversity National Institute to classify and study the country's flora and fauna. The country has a total of 11 conservation areas, with a total of 107 management units.

### **Terrestrial Flora and Fauna**

Approximately 9000 types of different flowering plants grow in the country, including more than 1,300 orchid species. Almost 850 bird species have been identified, which constitute a greater number of species than those found in the United States, Canada and half of northern Mexico together. The country also host 209 mammals species, 383 types of amphibians and reptiles, almost 2,000 butterfly species and at least 4500 types of night moth and butterflies. Though Costa Rica covers only 0.3% of the earth surface, almost 5% of the planets plant and animal species are in the country. It is link of the Mesoamerican Corridor Chain (CBM), project with the purpose of encouraging the XI century macro project, the America's Biological Corridor.

### **Marine Resources**

A total of approximately 834 species of fish exist described for the country (marine and freshwater) (Bussing, 1998). When analyzing data, it can be observed that emphasis has been set on terrestrial species, for that reason a void exists in the knowledge of marine diversity. Thus, it is urgent for initiatives for the management of marine resources to be implemented, realizing an inventory that shows the total marine diversity of the country. The coastal zones host a great number of ecosystems that support part of the national economy, through various important activities, like fishing, tourism and others.

## **SOCIOECONOMIC, SOCIOECONOMIC CONDITIONS AND HUMAN HEALTH**

### **Archaeological and Cultural Heritage**

Costa Rican culture reflects a mixture of many races that exist in the country. The main influence is European, which shows in aspects as the official language –Spanish–, churches architecture and other historical buildings. The Indian influence is less visible, but is present in the tortillas that are part of the typical Costa Rican food and ceramic crafts that are sold in the roads limits. An important aspect of Costa Rica's cultural heritage is its love for peace and democracy, since for a long time politics is dominated by the democratic system and not dictators. The country accounts for more than a century of democratic tradition and more than 50 years without an army. The army was abolished in 1948; the money that the country saves not having an army is invested in a better life level of its people, which helps for social peace and makes Costa Rica a pleasant country to visit.

### **Recreation, Landscape and Visual Aspects**

The country has various recreational activities that are part of a tourism offer, Costa Rica has created a conservation and resource use conscience, being the visual aspect and landscape a potent component to include in different national strategies and policies.

### **Socioeconomic Aspects**

#### Economy and Agriculture

It is not hard to realize that agriculture is the base of Costa Rica's national economy. Coffee was historically the most important holding source of the country and Costa Rica produces one of the best coffees of the world, but in past years products called “non traditional” have taken a great importance. The second traditional product in importance is the banana, of which enormous plantations are found especially in the Atlantic zone of the country. Some others are also important as pineapple, sugar, oranges, rice and ornamental plants.

Although agricultural is the base of national economy, tourism has gained a lot of importance as an income source for the country in the last years and continues to grow, creating new work sources and encouraging biodiversity conservation that tourists want to see.

#### Tourism

The country receives more than half a million tourists per year, being tourism an important economic source, Costa Rica's tourist offer is based on the conservation of natural resources, being mountains, national parks, coral reefs, among others. Presenting tourists the opportunity to do

different activities, cultural, sports and social, in a natural environment allowing the active participation in the process of conserving the biodiversity.

### Population

Costa Rica has a population of 4 million people, even though the majority are descendants of spaniard immigrants, many families come from different parts of Europe, Asia, Africa and of course Central America. Thus, it is not surprising to see many white people, mainly in Central Valley. In some other zones, most people are mestizos, while some important part of the people from the Caribbean coast have African origins and in the Talamanca zone Indian of different types exist.

### **Transportation and Infrastructure**

Costa Rica has one of the most advanced telecommunication systems in Latin America, with telephone and fax service in all the country. Every day a greater number of people and businesses are connected to internet. Also there is mail service in great and a variety of mail businesses.

It is easy to travel across Costa Rica. Public transportation is really low cost. Almost all cities and towns have bus services. The quickest way to travel through the country is by air, different airlines exist for this purpose that offer daily domestic flights to the main tourist sites.

Costa Rica's government invests an important part of its budget to improve the minds and bodies of their citizens. This policy consequently has resulted in more educated and healthy people. The country has accomplished a literacy range and life expectancy similar to those of Occidental European nations and North America. The country has a Security Social System over 50 years ago, also hospitals, schools and even universities all over the country.

### **Water and Drainage**

In Costa Rica it is estimated that once satisfied the use of water for evapotranspiration, ecosystems and other processes, the potential offer of superficial water is equivalent to 75,000 m<sup>3</sup> per year. However, to this offer it must be subtracted water loss because of pollution, inefficient use, geophysical conditions, non controlled waters, within other factors. An 80% of potable water that is consumed in Costa Rica, is given by the rocky mantles of saturated subterranean waters. The problem in discussion with this resource is focused in contamination, thus the Ministry of Environment and Energy and the Ministry of Health define regulations for residual water drainage. These regulations include water quality standards.

### **Public Health**

Water is potable in almost all the country and some regulations are pretended for the reduction of water pollution, so that the diseases produced by this resource does not report an alarming incidence, with the possibilities that the cases can be solved and taken care efficiently by the public hospital assistance system.

## ENVIRONMENTAL POLICY, LEGISLATION AND INSTITUCIONAL CONTEXT

Costa Rica has a recognized prestige for its environmental policy for biodiversity protection. **The Ministry of Environment and Energy (MINAE)** is the strategic institution for sustainable development. in environmental matters. It encourages and supports investigation, the conservation and rational use of fossil fuel resources, mining, and energy resources. It executes the rectory in policies formulation, planning strategies and executing actions related to sustainable human development. Specific legislation exists in the form of decrees and regulation concerning the industry of different products, but in general, the Environmental Legislation in Costa Rica has a controlling and restrictive view. The only law that has a preventive perspective is the one concerning the Law of Energy Rational Use, with which energy saving is encouraged through economic incentives and national recognition. In the international context, Costa Rica has signed a series of agreements concerning environmental protection. Among the most important are: the Convention for Climatic Change, Montreal Protocol, Basilea Agreement, international Convention for the Commerce of Endangered Priority Central American Species of the Wild Flora and Fauna (CITES), the agreement for the Conservation of Biodiversity and Protection of Main Wild Areas in Central America, the regional agreement for the management and Conservation of Forest Natural Ecosystems and Development of Forest Plantations.

In the national context, different programs and projects exist, undertaken by the government and different institutions with the purpose of enhancing norms and different strategies executed in the most vulnerable sectors, some of them are: Project Ecomarket. La Gamba project, Pocotsi Project, the main purpose of these projects is to order and encourage planning to obtain a sustainable use of resources, environmental services and promote production through technical assistance.

## **VI State of the Environment - Belize**

## STATE OF ENVIRONMENT – BELIZE

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### PHYSICAL ENVIRONMENT

#### *Geography, Topography, and Natural Disasters*

Belize is located in northern Central America, bordered by Mexico on the north, Guatemala to the west and south and the Caribbean Sea to the east. Including its territorial waters in the Caribbean, Belize's geographic coordinates are 15° 53' to 18° 30' north latitude and 87° 15' to 89° 15' west longitude.

Using an offshore territorial limit of 20 km. (12 miles), the national territory covers about 46,620 sq. km (18,000 sq. m.), of which 49% is land. Belize's land mass includes more than 1,000 tiny islands, known as cayes, totaling about 690 sq. km (266 sq. m). However, there are about 1,540 sq. km. (595 sq. m.) of lagoons on the mainland, reducing effective land area to some 21,400 sq. km (8,263 sq. m). The average dimensions of the Belize rectangle are about 260 km (156 miles) north to south and 180 km (109 miles) east to west; the mainland has 280 km (168 miles) of coastline. The barrier reef, the second longest in the world and the longest in the northern hemisphere, extends 200 km (132 miles) from the Mexican border in the north to the Sapodilla Cayes in the south.

The coastal zone of Belize may occupy as much as forty percent of the national territory. Most of this is comprised of the Coastal Plains, where elevations are at or below sea level. The coastal plain extends up to fifty kilometers wide north of the Belize River, but narrows considerably in the south of the country. Most of the more than eleven hundred offshore islands or cayes are also at sea level (many are completely over-washed by the sea at high tides). These cayes also form part of the coastal zone. The entire coastal zone is vulnerable to natural disasters, such as hurricanes, which produce higher than usual high water levels. Belize has been hit or seriously affected by four catastrophic hurricanes over the past three years.

Environmental Protection and Conservation, community-level environmental management efforts funded through the United Nations Global Environmental Fund and the Protected Areas conservation Trust (PACT).

#### **Climate**

The climate is subtropical, with temperatures ranging from 21° C in the cooler months of October to February to 32.2° C in the warmer months of May to September. The annual mean relative humidity is 81.8%, while total rainfall varies from 1,588 mm to 4,290 mm, annually. The average annual rainfall over the past 15 years is reported at 2006 mm. There are two distinct seasons: a rainy season, which normally commences in late May and lasts until November, and a dry season, which stretches from December to early May. Topographic variations throughout the country are responsible for major fluctuations in air temperature, humidity and rainfall.

For years, scientists have known that localized human factors such as pollution and overfishing damage coral reefs. But what about the effects of global environmental changes? Many reefs lay close to densely populated countries, making it difficult to distinguish between changes caused



directly by humans from those with more widespread origins. When the health of Belize's reefs began to decline, scientists saw a unique opportunity. The Belize situation is quite unique, and suggested global change because the country is small and the pollution and human effects are less than they might be in many other Caribbean countries. Scientists proved through various experiments that rising ocean temperatures, increased exposure to ultraviolet radiation, and more frequent and violent storms and weather patterns possibly caused by global climate change have led to a partial die-off of the reefs known as coral bleaching.

### **Hydrology**

Though Belize is a relatively low country, its river systems and many perennial streams supply most of its water needs. The country is well endowed with both surface water, and water stored in aquifers, as evidenced by the fact that wells can be drilled almost anywhere in the country with the expectation of reaching water. The Land Information Center (LIC) has identified thirty-two watersheds, although the National Hydrological Services classifies twenty-two major watersheds for Belize. Streams draining the southeastern and eastern slopes of the Maya Mountains have well-developed branching patterns with relatively steep, straight courses in the mountainous areas. On the coastal plain, streams become progressively more sluggish and drainage is less effective. Near the submerging coast, there are numerous lagoons, mangrove swamps, deep estuaries and river-mouth bars.

### **Air**

Climate change, sea level rise and flooding, the United Nations Framework Convention on Climate Change projects a sea-level rise of about fifty centimeters during the next one hundred years, which implies that almost all of the cayes and about forty percent of the Belize mainland would be under water. The entire social and economic situation of the country would change. Since such a change would be gradual, it is expected that adjustments would occur along with the change process, and might only be noticeable over the long run. These same flat coastal areas are also subject to flash flooding and sustained inundation after heavy rainfall.

## **BIOLOGICAL CONDITIONS, BIODIVERSITY, ECOLOGY AND NATURE CONSERVATION**

### ***Terrestrial ecosystems***

Belize has a significant number of terrestrial reserves. Presently, the terrestrial reserves cover about 2,450,143 acres or 9,921.3 sq. km., equivalent to 43% of the country. Although small in size, Belize is a country of exceptional biological diversity; it is home to a highly diverse number of animal species: up to 163 species of mammals (mostly bats), 571 species of birds (including the endangered Jabiru Stork), 121 of reptiles, and 42 of amphibians have been listed for Belize. Of this number, 52 species of mammals and 81 of the bird species are determined to be endangered, although not necessarily so in Belize. In its territory are some of the last healthy populations in Central America of the Black Howler Monkey and the Jaguar. In addition, the spectacular barrier reef is home to hundreds of species of fish and other aquatic life. (*Source: Belize National Biodiversity Action Plan, 1998.*) Belize is estimated to have about 4,000 species of native flowering plants (Angiosperms) of which 2,500 are dicots (Dwyer and Spellman 1981) and 1,500 are monocots

(Spellman et al. 1975). The latter include approximately 250 species of orchids (B. Adams). Approximately 700 species of native trees are reported for Belize, representing 331 genera in 87 plant families. The richness of Belize's biodiversity may be attributed to the fact that approximately 79 % of its territory remains under some form of vegetation cover. In addition, most water resources and mangrove forests remain in relatively pristine conditions.

### ***Coastal ecosystems***

The Belizean barrier reef is considered one of the "Seven Underwater Wonders of the World" and received recognition as a World Heritage site in 1996. During the early 1970s the state of the coral reef was designated by a Smithsonian expert as pristine, but more recent studies and observations have revealed sufficient change for the designation to be changed to "almost pristine". Approximately half of Belize's national territory is under the sea. The extent and diversity of highly productive tropical coastal and marine ecosystems that are characteristic of Belize are exceptional in the Caribbean. These include coastal lagoons, mangroves (which occupy about 3% of the country), sea grass beds and coral reefs.

## **SOCIO – ECONOMIC CONDITIONS, SOCIO – CULTURAL CONDITIONS AND HUMAN HEALTH**

### ***Population issues***

The 2000 population census determined that the enumerated Belize population stands at 240 204, an increase of 26.8% over the 1991 census. After adjusting for a 3.5% under-enumeration or under-coverage, the Central Statistical Office of the Ministry of Budget Management places the population at mid-year 2000 at 249,800, a 28.5% increase over the 1991 figures. This is partly as a result of a large influx of Central American refugees, primarily Salvadorans and Guatemalans.

The latest census information also indicates that immigration has been even more pronounced in the last nine (9) years than in the eleven (11) years between 1980 and 1991. The improvement in the delivery and quality of basic health services and reduction in the death rate have probably also contributed to the increasing population growth. Other sources of data indicate that the overall fertility rate has been declining during the period 1980-1991. Even so, Belize experienced an increase from 2.6 to 2.7% population growth per annum during this period. At this rate, Belize's population will double in the next 26 years.

The previously observed low population density, estimated at 5.2 inhabitants per sq. km. in 1970, increased to 7 persons per sq. km. in 1994, and has changed to a high of 10.4 per sq. km in 2000, still one of the lowest in the world; its ratio of 306 persons per sq. km of cultivated land is, however, higher than that of nearby Honduras and Nicaragua. Additionally, approximately 50% of the population lives in urban areas and much of the country is currently inhospitable to human habitation. An unusual feature of the recent Belizean experience is the fact that the rural population has been growing not only in absolute numbers but also in its share in total population.

The urban/rural balance has shifted over the years, from 46% rural in 1970 and 49% in 1980 to 52% in 1991; the situation changed to 51% in 1994, increased to 53 % in 1998 and was again 52%

in 2000. (*Population Census 2000---Major Findings, Central Statistical Office, Ministry of Budget Management*). This feature is explained by the tendency of immigrants to settle in rural areas, the higher fertility rates in the rural areas, by the fact that most out-migration occurs from the urban areas and that land is generally available in the rural areas. Both population growth and its high concentration in rural areas have important consequences for environmental resources. Pressures on tropical forest areas are greater than what could be expected given the low population level. Similarly, a rapidly increasing population, particularly of the “slash and burn” type that normally inhabits the rural areas, increases the potential for unsustainable agricultural practices.

### ***Socio - economic aspects***

Belize has experienced impressive economic growth since the mid-1980s, largely because of the rapid expansion of agriculture, fisheries and tourism, which are heavily dependent on the environment. The sustained growth in these sectors is, therefore, crucial for the Belizean economy. This will only be possible if the land is appropriately used, if the forests are protected, if the physical and chemical properties of agricultural soils do not seriously deteriorate, if the fish stocks do not get depleted, and if the country is able to maintain its many tourist attractions in coastal areas as well as inland. These attractions largely correspond to the country's unique natural environment, including relatively pristine beaches, coral reefs, natural tropical forests and biodiversity.

Belize is ranked 58 th out of 117 countries rated by the United Nations Development Program (UNDP) in its 1999 Human Development Report. This is an improvement from 83 rd place in 1998 and places Belize favorably among the nations of the world in respect of GDP per capita (US\$2,825), education (75.5% literacy) and life expectancy (72 years).

While this ranking appears good, it masks the fact that a full 33% of the population is considered poor, as determined by a poverty assessment carried out in 1995/96. Equally disturbing are the current parallel critical issues of drugs, crime, teenage pregnancies and unemployment and/or underemployment. The report, additionally, does not factor in environmental degradation and urban development problems.

### ***Forest Management***

Sustainable forest management continues to be an increasingly difficult task to address because of the ever- increasing demand placed on the forest resources. The recently completed Forest Management and Planning Project determined that only fourteen percent (14%) of the forests of Belize was suitable for timber production forest or which could be utilized for multiple-use management. The forest industry has contributed an average of 3% to the GDP over the last several years. This low figure is due to the fact that not all the goods and services derived from the forests are captured in financial terms, some revenues being credited to other sources even though derived from forests.

Developmental pressures created by expanding agricultural industry (including farming and aquaculture), urban and rural (housing and farming) expansions, and the improvement and expansion of infrastructure (roads, etc) all contribute to reducing the forest estate. Activities such as illegal logging and squatting with land clearing, exacerbated with the lack of accurate information about the status of the forest, combine to make the job doubly difficult.

The fact that public investments made in the forest sector require a relatively long time to be recovered reduces the priority that is placed on this type of forest development. There are also no economic incentives to promote sustainable re-forestation. With respect to the other environmental concerns, the need for watershed protection, biodiversity protection and management are some issues, which now require greater emphasis in the management equations. While the timber industry (processing and manufacturing) continues to grow slowly, and exploitation is underway, the lack of accurate and reliable data about the national forest estate prevents a holistic approach to its management. The impact of non-timber exploitation is not determined because the information is incomplete, so mitigation measures cannot be applied.

### *Agriculture*

The sugar industry, the districts of Corozal and Orange Walk produce 1.2 million tons of cane annually. The average ton per acre produced is 18; farmers who fertilize use 25 lbs. of nitrogen, 12 lbs. of phosphorous and 8 lbs. of potassium per acre. The rate of fertilizer application is 8 times this amount in the Caribbean, and 4 times this amount in the U.S. (E. Zetina, personal communication). In addition, all the sugarcane, approximately 60,000 acres, is burnt as a matter of fact annually for sugar cane production; this practice supposedly facilitates reaping and reduces the danger of snake bites, but increases pollution.

The citrus industry, this industry is concentrated in the west and south of the country, mainly in the Cayo and Stann Creek Districts. Mineral fertilizers (mainly dolomite) are used. Herbicides and pesticides are also used but very little fungicides. Fertilizer is applied carefully and at reduced levels during the harvesting process. It is believed that contamination is minimal in this sector.

The banana industry, in 1992, 77,233 acres of banana were under cultivation (King et al, 1992). The whole industry was virtually destroyed by Hurricane Iris in 2001 but is again in full production. Pesticide use in the banana industry is extensive. Aerial spraying for Black Sigatoga is frequent, and exposures to employees have been of concern, especially in the last two decades. Social concerns as a result of the spraying became an issue during the 1990s. Little water quality data on the effects of pesticide residues on the receiving water bodies is available. One report indicated that of two chemicals tested, little or no residues were found in the receiving water bodies.

### *Electricity*

The use of hydropower in Belize is limited. The Mollejon hydroelectric plant is currently the largest hydropower plant in Belize, capable of producing from 5 to 20 megawatts depending on the availability of water. This plant utilizes the water by the use of a dam and a penstock, which directs the water towards the turbines for electricity generation. The water returns to the river largely unchanged in quality. Plans to build an upstream storage facility will increase the supply of water to the plant, thus ensuring a more stable supply of electricity from this plant. An extremely controversial small hydro scheme is the Chalillo dam opposed by NGOs. Chalillo dam would have an installed capacity of only 8MW.

### ***Health care and services***

Water and sanitation projects in rural and low-income housing areas, utilizing the Commonwealth Debt Relief to fund water projects in deprived communities, mortgage financing for home construction or improvement for low-income families.

### **Education and training**

Reform of the primary education system, employment training for youths and adults, targeting of the Commonwealth Debt Relief to fund school books and materials in deprived communities and construction of additional school facilities to double as hurricane shelters.

### ***Solid waste disposal***

The Government of Belize is cognizant of the need to put in place a comprehensive solid waste management program. Recently, the Solid Waste Management Project was put under way in order to analyze alternatives for solid waste management and disposal in Belize. This program was initiated after the recognition that solid waste management is a principal environmental problem facing Belize. Solid waste disposal in Belize is carried out on an ad hoc basis, with most population centers still lacking a comprehensive management scheme. However, solid waste collection systems have recently been put in place in certain urban centers. There are no technically designed landfills in place throughout the country, thereby increasing the risk of contamination of the surrounding environment. Until the comprehensive solid waste management program comes into place, Belize's water bodies will continue to be faced with the risk of

### ***Industrial effluents***

Belize has no heavy industry and has remained relatively free of industrial contamination. However, significant contamination has resulted from the sugar processing industry in the north, which has contaminated the New River. In the south, the citrus industry has contaminated (to a certain extent) the Stann Creek River. Heavy metal contamination has been detected at the mouth of the Belize River and along the Haulover Creek (Gibbs & Guerra, 1996), although the source is currently unknown. Currently, the Solid Waste Management Project has been halted by the Government of Belize due to a lack of funds; this necessitates a continuation of the process that seeks sustainability for the project. However, Government has established the Solid Waste Management Authority Board, which has as its aims, the development of a solid waste management system for the country. Furthermore, the system of collection and disposal of waste from the major municipalities will be continued and expanded. As rural centers expand, the collecting services are also expanded, resulting in a beneficial service to the community.

## **ENVIRONMENTAL POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORK**

### ***Changes in the Policy and decision – making policy***

The last decade saw some important changes in the policy and in the decision-making processes of government. Public-private partnerships were utilized with much more frequency than in the previous decade. This strategy has proven to be effective for the implementation of public projects, since it guaranteed a greater chance of sustainability after project input was completed. It also established ownership by the beneficiaries from the stage of project formulation and results in

greater efficiency because better use is made of the available human, financial and other resources that are utilized for the particular project. The non-governmental, private and civil society sectors were much more involved in the development and implementation of projects, either entirely or partially.

Government has also made some changes in the way decisions are made. Since the current government took office in August 1998, all policy or legislative decisions are made by the Cabinet instead of by the individual minister who would otherwise have responsibility in the area of the activity. The public is given the opportunity to make inputs on national issues via public consultations, the media, sub-committees of the national assembly and/or individual representation. The mid- and senior management levels of the public service use the consultative or participatory decision-making process frequently through the formation of technical and advisory committees, which extend across departments, ministries and civil society.

### ***Strengths and weaknesses of the planning process***

Any process involving the participation of all interested stakeholders generally produces better results, since it benefits from greater input of and from a wider variety of sources; however, this is many times considered time-consuming by the ultimate decision-makers because of the longer time required, and because of the difficulty in reaching a decision that satisfies all stakeholders. The same is the result if the decision needs to be by consensus instead of majority rule. Very often confrontational and adversarial relationships and turf-protection positions develop. Compromise and conflict resolution then needs to be applied during the process. All participants in partnerships may not perceive their benefits to be equal and, therefore, may not have as much commitment to the process, thereby contributing to some weaknesses in the system.

### ***MAJOR INITIATIVES FOR SUSTAINABLE DEVELOPMENT***

With the combined input of government, non-government organizations, civil society, the private sector and international and regional funding agencies, a number of strategies were initiated to implement Agenda 21. These include:

*National Committee and Task Force for Sustainable Development, The National Strategic Plan, The National Environmental Action Plan,*

- i) strengthening land use management
- ii) improving waste management
- iii) reducing deforestation and unsustainable agricultural practices
- iv) strengthening legal and institutional capacity
- v) enhancing integrated coastal zone management
- vi) improving water resources management
- vii) expanding the use of financial mechanisms for environmental and natural resources management
- viii) improving health conditions
- ix) breaking the poverty/environmental degradation cycle
- x) development of a conservation strategy for tourism.

*The National Biodiversity Strategy and Action Plan*

*The National Poverty Elimination Strategy and Action Plan 1998-2003*

*The Belize Medium Term Strategy 2000-2002*

*The National Human Development Advisory Committee*

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## **VII Nicaragua – Estado del Ambiente**



## NICARAGUA - ESTADO DEL AMBIENTE

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### AMBIENTE FISICO

Es tierra de lagos y volcanes, que cuenta con sustratos de aguas y bosques, ecosistemas acuáticos y terrestres que albergan una gran cantidad de recursos sumamente valiosos para la nación. En el país cada vez se refleja más el interés de todos los estratos sociales, técnicos y profesionales, en saber cuales son las condiciones en que se encuentran cada uno de los elementos que integran el ambiente físico natural y su relación con la sociedad.

#### Ubicación Geográfica

Se encuentra localizada en el centro del istmo centroamericano, entre Honduras y Costa Rica, y los océanos Atlántico y Pacífico. La superficie del país es de 130,682 km<sup>2</sup>, 8% de su superficie esta ocupada por aguas continentales; La longitud de sus costas es en el Pacífico de 305 Km y en el Atlántico 450 Km.

#### Geología y Topografía

De acuerdo a la conformación del relieve, el país se divide en tres grandes regiones: la región del pacífico, la región montañosa central y la región Atlántica, compuesta en su totalidad por 6 provincias Geomorfológicas.

En la región del pacífico se encuentran tres provincias: planicie costera del pacífico, cordillera volcánica del pacífico y de presión nicaragüense; en la región montañosa central, se encuentra la provincia de tierras altas del interior; por último, en la región Atlántica, se localizan las provincias planicie costera del caribe y estribaciones montañosas del Atlántico.

#### Clima

El clima de Nicaragua es esencialmente tropical. Las estaciones climáticas se reducen a dos: lluviosa y seca. El "invierno" o estación lluviosa se extiende entre mayo y octubre; el "verano" o estación seca comprende de noviembre hasta abril. En la Región del Caribe las lluvias son frecuentes y más prolongadas, y suelen extenderse hasta febrero. En las partes secas, al noroeste del país, llueve entre 700 y 1,000 milímetros anuales; en cambio, en los sitios más húmedos, hacia el sureste, se precipitan entre 4,000 y 5,000 milímetros por año. Por lo general, los meses de junio, septiembre y octubre son los más lluviosos. La temperatura media anual de Nicaragua comprende un rango que varía de 28° Centígrados (84° F) junto a los litorales, a los 22° Centígrados (72° F) en las partes montañosas. Managua es una ciudad normalmente calurosa, su temperatura en las primeras horas de la tarde oscila entre 27° C (82° F) en enero y febrero, alcanzando hasta 36° C (96° F) en abril y mayo.

#### Hidrología

Nicaragua está dividida en dos grandes regiones hidrográficas: la vertiente del Pacífico con 12,183 Km<sup>2</sup>, representando el 9% del territorio nacional, y la vertiente del Atlántico con 117,420 Km<sup>2</sup>, equivalente al 91% de la superficie de territorio nacional. Los ríos de la vertiente del Pacífico, constituyen el drenaje superficial de 8 cuencas hidrológicas pequeñas, cuyos ríos no exceden los 20

Km. de longitud En la mayoría se trata de ríos intermitentes con un régimen irregular y caudal de estiaje muy reducido.

Los ríos de la vertiente del Atlántico, son de largo recorrido y se distribuyen en 13 cuencas relativamente grandes, con un régimen caudaloso y permanente. Los cursos inferiores de la mayoría de éstos, son navegables con influencia de las mareas del Mar Caribe cuyos efectos, en muchos casos, alcanza varios kilómetros aguas arriba de la desembocadura.

Nicaragua tiene dos lagos, el Xolotlán o Lago de Managua, con una superficie de 1,040 km<sup>2</sup>, y el Cocibolca o Lago de Nicaragua, con una extensión superficial de 8,200 Km<sup>2</sup>. También cuenta con dos pequeños lagos artificiales construidos con fines hidroeléctricos y de riego, el Apanás de 51 kilómetros cuadrados, y Las Canoas de 18 kilómetros cuadrados. Existen varias lagunas de origen volcánico, tales como las lagunas de Masaya, Nejapa, Apoyo, Xiloá, Apoyeque, Tiscapa, Asososca, Acahualinca, y otras.

### **Suelos**

El recurso suelo esta siendo fuertemente afectado por la problemática en la tenencia de la tierra. Las tierras nacionales siempre se han considerado como tierra de nadie en donde cualquier persona se establece, demarca y después de un determinado periodo obtiene el dominio y posesión total de la tierra. Los bosques están desapareciendo, para dar lugar a la agricultura y ganadería, esto junto a las prácticas inadecuadas en estas actividades, están causando una degeneración del recurso, al no ser utilizado de acuerdo con su vocación, causando erosión y disminución en la producción agrícola.

### **Aire**

En Nicaragua el problema de la contaminación atmosférica proviene de las principales ciudades y su vinculación con el deterioro de la calidad del aire tiene su origen principal en las emisiones provenientes del parque vehicular. La calidad del aire ha venido siendo modificada por la emisión de gases, partículas, ruido y vibraciones provenientes del parque vehicular, principalmente y en menor medida por otras actividades realizadas por el hombre. Los índices de enfermedades respiratorias han tenido un aumento alarmante, por lo que urge que el gobierno tome iniciativas para solucionar la problemática

Al aspecto de la contaminación acústica se le ha prestado poca atención, a pesar de estar siempre presente, siendo el ruido de los vehículos el que provoca la mayor contaminación de este tipo.

## **CONDICIONES BIOLOGICAS, BIODIVERSIDAD, ECOLOGIA Y CONSERVACION DE LA NATURALEZA**

### **Flora y Fauna Terrestre**

Los últimos estudios realizados en el país han demostrado que existen 78 tipos de ecosistemas, de los cuales 15 son ecosistemas humanizados y 63 son ecosistemas naturales, de estos el 31% son bosques.

En Nicaragua se encuentran reportadas unas 6,500 especies de plantas vasculares, distribuidas en 223 familias. Puede existir en el país un aproximado de 9,000 especies de las cuales 60 pueden ser endémicas.

La última actualización sobre la diversidad biológica nicaragüense, registra que hay 1503 especies vertebradas, de ellas las aves son las que mayor número presentan, existen dos especies de mamíferos endémicos y existen alrededor de 10,000 especies de insectos.

### **Recursos Marinos**

Los principales ecosistemas representados en la zona costera son manglares, lagunas costeras y esteros, playas, arrecifes de coral y praderas marinas, estos albergan un gran número de especies entre las que podemos mencionar 5 especies de mangle, aproximadamente 45 especies de peces, 300 especies de anfibios y reptiles, y otras diversas especies de mamíferos, aves, moluscos, entre otros; muchas de estas de gran importancia en la economía del país.

## **CONDICIONES SOCIO-ECONOMICAS, SOCIO-CULTURALES Y SALUD HUMANA**

### **Arqueología y Heredad Cultural**

En el territorio nacional se conservan vestigios de distintas civilizaciones de la época precolombina y de la etapa colonial. Se están realizando estudios mediante los cuales se han descubierto rastros de una posible sociedad prehistórica desconocida, en las costas del Caribe del país, estos vestigios y rastros presentes en forma de cerámica, construcciones y petroglifos representan un factor de gran interés para los turistas. Sumado a esto el país cuenta con una gran herencia cultural española, conservándola en comunidades cercanas a las ciudades principales, como son Granada y Masaya donde aun se pueden observar prácticas y características típicas de ese tiempo, así como también convivir con las distintas comunidades étnicas.

### **Aspectos Socio-Económicos**

#### Economía

Desde 1997 la economía Nicaragüense ha crecido en 5.4% y el ingreso por habitante en 2.3%. La agricultura es la base de la economía del país. A comienzos de los años '90, el sector agrícola de Nicaragua empleaba alrededor de un tercio de la población activa. Los principales cultivos comerciales son el café, el algodón y las bananas. Entre los otros cultivos, se encuentra la caña de azúcar, el maíz, el sorgo, el arroz, las judías y las naranjas. Nicaragua es uno de los principales países ganaderos de América central.

Nicaragua produce madera, que es cortada en trozos y luego despachada por los principales ríos que se vuelcan en el mar Caribe.

#### Turismo

Constituye una de las potencialidades más grande de las que dispone Nicaragua. Se estima que en 1998 ingresaron al país un total de 405,702 turistas que generaron ingresos estimados de 90 millones de dólares. De esos turistas 17,040 visitaron sitios de interés eco turístico. La diversidad de recursos naturales, sumado a la diversidad de playas y costas en el atlántico y el pacífico y a los lagos y lagunas, así como el conjunto de islas en el Caribe, constituyen parte de este potencial turístico.

### Agricultura, Forestería y Pesca

Los principales productos que se cultivan en la costa del Caribe son granos básicos y tubérculos, es una agricultura de subsistencia. En la costa pacífica se cultiva soya, maíz, sorgo, caña de azúcar, cítricos y frutales. Estos generan ingresos importantes en la economía local y nacional, principalmente con la caña de azúcar por la producción de azúcar y licores. A nivel forestal son tres los principales productos que se han estado exportando, estos son: madera aserrada de pino, madera aserrada latifoliada y madera contra chapada, la industria forestal cuenta con un total aproximado de 80 empresas registradas, muchas son pequeñas industrias que no son dueñas de bosques y con maquinaria diseñada para el procesamiento de trozas de grandes dimensiones, elemento que ha generado problemas, debido a que la materia prima que esta industria requiere se está volviendo escasa, debido al uso irracional del recurso. En la pesca comercial los principales productos de extracción comercial son el camarón y el cangrejo.

### Población

La población de Nicaragua está estimada en 4,5 millones de habitantes. Alrededor del 77% de los nicaragüenses son mestizos (población de ascendencia mixta blanca y amerindia), alrededor del 10% son blancos, estando constituido el resto de la población por amerindios (4%) y por negros (9%).

### **Infraestructura y transporte**

El país cuenta con los servicios de infraestructura necesarios para el desarrollo de todas sus actividades económicas, como ser vías de comunicación terrestres, áreas y marítimas, así como transporte en todos estos medios; actualmente existen diversas iniciativas de proyectos en preparación y ejecución, para el mejoramiento de todos estos aspectos. Estas están siendo ejecutadas por el Ministerio de Transporte e Infraestructura.

### **Agua y Saneamiento**

Durante 1997 a 1998, se construyeron servicios de agua potable en 40 comunidades urbanas y alrededor de 512 km. De distribución fueron instalados, 24 nuevos pozos fueron construidos, 55 estaciones de bombeo instaladas y 39 tanques de almacenamiento construidos, Managua depende de un sistema mixto de agua subterránea y agua de laguna.

En el sector saneamiento la mayor problemática está enfocada a la contaminación del agua por lo que se están implementando estrategias, entre las cuales está el proyecto de Saneamiento del Lago Managua.

### **Salud Pública**

La problemática en el aspecto salud se está dando mayormente por la contaminación del recurso hídrico, la pobreza está íntimamente relacionada con el acceso a servicios, las enfermedades diarreicas producidas por la contaminación del agua solo son superadas por las enfermedades de las vías respiratorias, producidas por la contaminación atmosférica.

El país cuenta con los servicios básicos de salud pública beneficiando a toda la población, sobre todo a aquella con menores recursos.

## **POLÍTICA AMBIENTAL, LEGISLACIÓN Y MARCO INSTITUCIONAL**

Desde la década de los noventa, el Gobierno de Nicaragua ha venido impulsando todo un proceso de cambio orientado a la búsqueda de un modelo de desarrollo sostenible y conservación de los recursos naturales, bajo el concepto de que esta riqueza natural, siendo racional y sosteniblemente aprovechada puede sustentar la base del desarrollo económico y social de país.

Como resultado de este proceso, se elaboro la Estrategia de Conservación para el Desarrollo Sostenible, que estableció los primeros lineamientos de política globales y sectoriales en materia ambiental, siguiéndole una propuesta de Esquema de Ordenamiento Ambiental del Territorio y un Plan de Acción Forestal. Sin embargo, el desarrollo de la planificación ambiental y el ordenamiento territorial estuvo limitado, principalmente por aspectos de carácter institucional y político, que no permitieron la coordinación intersectorial necesaria para la puesta en marcha de este programa nacional de desarrollo. El Ministerio del Ambiente y los Recursos Naturales tiene a partir del año 1998 un mandato legal y Misión redefinidos, a través de la Ley de Organización, Competencias y Procedimientos del Poder Ejecutivo, Ley 290, correspondiendo al Ministerio.

Hoy en día se como resultado del trabajo que hemos realizado con la Política y Plan Ambiental de Nicaragua 2001-2005 (PANic), aprobado según Decreto Ejecutivo 25-2001, permitiéndonos conocer de forma actual, nuestros principales problemas, identificar los temas y acciones priorizadas, así como los plazos de intervención.

La decada de los noventa fue para el país, la decada de la legislación ambiental, donde se firman y ratifican todos los documentos y declaraciones de la cumbre de río y los instrumentos legales a nivel centroamericano.

Actualmente se han desarrollado distintas estrategias de proyectos para el fortalecimiento de los convenios internacionales que tratan las distintas problemáticas.

## **VIII El Salvador – Estado des Ambiente**

## ESTADO DEL AMBIENTE – EL SALVADOR

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El Ministerio de Medio Ambiente y Recursos Naturales (MARN), autoridad nacional en materia ambiental de El Salvador, presenta el Segundo Informe Nacional del Estado del Medio Ambiente, correspondiente al Período 2001 - 2002, como un instrumento de divulgación de la situación ambiental y en cumplimiento del Art. 31 de la Ley del Medio Ambiente.

### VULNERABILIDAD AMBIENTAL Y SOCIOECONÓMICA

Algunas estimaciones sobre las diferentes amenazas, indican que alrededor del 9.36% del territorio nacional (1,970 km<sup>2</sup>) está expuesto a impactos severos y moderados por inundaciones, asimismo el 19.2% (4,040 km<sup>2</sup>) está expuesto a diversos tipos de deslizamientos y más de 47% (10,000 km<sup>2</sup>) tiene posibilidades de ser afectado por sequías de forma severa, moderada o débil.

El número de sismos registrados en el 2001 fue de 12,828, año en el cual el país fue sacudido por dos terremotos fuertes, causando pérdidas económicas por un estimado de US \$ 1,604 millones; como consecuencia la pobreza antes y después de los terremotos aumentó del 44.7% al 47.4%. Además, en ese mismo año se calculan pérdidas económicas por la sequía de US \$ 38.3 millones.

La Gestión del Riesgo se refiere a un proceso social y de planificación, cuyo propósito es lograr la reducción de los niveles de riesgo existentes en la sociedad y fomentar la construcción del desarrollo y nuevas oportunidades, sobre una base de seguridad y sostenibilidad aceptables. Para lo cual se han planificado programas de monitoreo de: vulcanológico y sísmico, hidrológico, meteorológico, calidad de agua y un sistema de alerta temprana de inundaciones entre otros.

### AMBIENTE FÍSICO

#### *Clima*

Gran parte de los habitantes del país viven en áreas sujetas a riesgos derivados de fenómenos climáticos, tales como inundaciones, las cuales provocan frecuentes derrumbes o deslizamientos de tierra y sequías agrícolas.

En un clima tropical las oscilaciones de la temperatura entre el día y la noche son altas, pudiéndose alcanzar diferencias entre 9.0°C y 15.0°C, En El Salvador existen dos épocas bien definidas: una lluviosa y otra seca. La lluviosa va desde la segunda mitad de mayo hasta la primera mitad de octubre y la seca, de la segunda mitad de noviembre a la primera mitad de abril, considerando abril y noviembre como los meses de transición.

La precipitación anual oscila entre 1,200 y 2,800 mm; con una humedad relativa que varía de 30 a 40%. Las variaciones significativas del clima son el ENOS (El Niño-Oscilación del Sur) y La Niña, generados por las interacciones entre la atmósfera y el océano en el Pacífico Tropical.

#### *Hidrología*

El país cuenta con unos 360 ríos, cuyas áreas de recogimiento han sido agrupadas en regiones hidrográficas, de las cuales la más importante es la cuenca del río Lempa con 18,240 Km<sup>2</sup>,

perteneciendo El Salvador 10,255 Km<sup>2</sup> (56 %) y el resto a Guatemala y Honduras (14 y 30 % respectivamente). Dentro del territorio nacional la cuenca del Lempa representa un 49 % del país. Sus aguas son utilizadas para generación de energía eléctrica, riego, abrevadero y abastecimiento de agua potable e industrial.

Los lagos y lagunas principales de El Salvador son: lago de Ilopango (70.4 Km<sup>2</sup>), laguna de Güija, compartida con Guatemala (44.1 Km<sup>2</sup>), lago de Coatepeque (24.8 Km<sup>2</sup>), laguna de Olomega (24.2 Km<sup>2</sup>), laguna El Jocotal (15 Km<sup>2</sup>) y otras. Entre los embalses hidroeléctricos están: Cerrón Grande (135 Km<sup>2</sup>), 5 de Noviembre (17 Km<sup>2</sup>), 15 de septiembre (35 Km<sup>2</sup>) y Guajoyo (32.5 Km<sup>2</sup>), todas ubicadas a lo largo del Río Lempa.

El Servicio Nacional de Estudios Territoriales (SNET), ha planificado realizar una priorización de cuencas hidrográficas para abordar el problema de la contaminación por medio de la implementación de planes de monitoreo de calidad y cantidad de agua con el fin de obtener información confiable y continua de los recursos hídricos.

### ***Suelos***

La mayor parte de los suelos de El Salvador se desarrollan directamente sobre sustratos volcánicos o sobre materiales procedentes de estos sustratos. Como principal consecuencia de este hecho destaca su riqueza en potasio y ocasionalmente en fósforo; la cual se debe a los constituyentes propios de la litosfera y cuya descomposición asegura su fertilidad.

Los procesos erosivos y su consecuente influencia en el proceso de desertificación y sequía cobran suma importancia, si consideramos que el suelo es un recurso de aprovechamiento en la producción alimenticia nacional y en el sostenimiento de la flora y fauna. Asimismo se reduce su capacidad de infiltración y precolación disminuyendo la disponibilidad de agua para los diferentes usos.

El impacto social generado por el deterioro acelerado de los suelos por las bajas cosechas incrementando el nivel de pobreza de la población rural; por otro lado los agricultores se ven obligados a utilizar más fertilizantes químicos inorgánicos afectando con ello su economía familiar y al medio ambiente.

### ***Aire***

La contaminación atmosférica representa un problema predominantemente urbano, debido a los altos niveles de concentración de vehículos e industrias, y por la alta generación y consumo de energía, principalmente en la Área Metropolitana de San Salvador. A partir del año 1997 hasta el año 2002 se ha realizado el monitoreo de la calidad de aire con el apoyo técnico y financiero de FUSADES y Swisscontact; los resultados se han venido publicando en los Informes de Calidad del Aire del Gran San Salvador

Existe una Estrategia Nacional para la Disminución de la Contaminación del Aire por Fuentes Móviles, la cual incluye el proyecto de Revisión Técnica Vehicular, cuyo objetivo será verificar las condiciones del parque vehicular con respecto a las emisiones de gases, partículas y ruido, que contribuyan a reducir la contaminación del aire, la tasa de mortalidad y morbilidad y los accidentes de tránsito. Dicho proyecto está pendiente de ejecución.



## CONDICIONES BIOLÓGICAS, BIODIVERSIDAD, ECOLOGÍA Y CONSERVACIÓN DE LA NATURALEZA

### *Flora y fauna terrestre*

Por su ubicación en la región mesoamericana, El Salvador, cuenta con la mayor diversidad genética vegetal a nivel mundial. En la actualidad se han registrado un total de 3,403 especies de plantas, concentrando la atención en aquellas que poseen semillas y que proveen bienes y productos como madera, fibras, colorantes y resinas, que son utilizadas con fines artesanales e industriales. Asimismo existen alrededor de 285 especies que se utilizan para curar, aliviar o calmar más de 30 enfermedades o afecciones.

A nivel nacional, se conocen 30 especies de flora endémicas, principalmente orquídeas, helechos, bromelias, hierbas, arbustos y árboles, cuyas poblaciones han sido reportadas dentro de Áreas Naturales Protegidas como el Parque Nacional El Imposible, Montecristo, cerro Cacahuatique y cerro El Pital.

Los invertebrados marinos representan un 89% del total de especies reportados. Los peces óseos y las aves son los que cuentan con un mayor número de registro de especies, 42% y 34% respectivamente, del total de especies reportadas.

De los vertebrados, los anfibios presentan el menor número de registros, 2% de los vertebrados reportados para El Salvador y menos de un 1% de los registros mundiales. De reptiles se han registrado 98 especies con tres registros de nuevas especies para El Salvador reportados en el 2001. En cuanto a mamíferos representa un 4% de lo registrado a nivel mundial y un 9% del total de vertebrados de El Salvador.

### *Recursos costero - marinos*

La zona costera se caracteriza principalmente por la presencia de playas arenosas, aunque también existen fondos rocosos y bosques salados. Las primeras están representadas en: Barra de Santiago, Metalío, San Diego, El Pimiental, Costa del Sol, Punta San Juan del Gozo, El Icacal. Las comunidades con mayor biodiversidad de zonas rocosas son: Los Cóbanos, El Pital-Mizata, El Sunzal, El Cuco, islas del Golfo de Fonseca. Los bosques salados ocurren principalmente en la Barra de Santiago, Estero de Jaltepeque, Bahía de Jiquilisco y Bahía de la Unión.

Estas zonas experimentan fuertes presiones ambientales debido a: Explotación desordenada de algunos recursos biológicos, contaminación por desechos sólidos, domésticos, agrícolas e industriales y azolvamiento por la alta carga de sedimentos en los ríos durante la estación lluviosa.

## CONDICIONES SOCIOECONÓMICAS, SOCIOCULTURALES Y SALUD HUMANA

### *Población*

El Salvador tiene una extensión territorial de 21,040.79 km<sup>2</sup>, políticamente está dividido en 14 departamentos y 262 municipios. Con un crecimiento poblacional sostenido, registrándose 6.27 millones de habitantes para el año 2000 y 6.51 millones en el 2002.

### ***Aspectos socioeconómicos***

De la Población Urbana Total, el 75% se concentra en el Área Metropolitana de San Salvador Ampliada (AMSSA) y en las 4 ciudades más importantes del país: Santa Ana, San Miguel, Sonsonate y Usulután. Es de destacar que estas 4 ciudades todavía están lejos de alcanzar las características de tamaño, estructura urbana y concentración de servicios que tiene el AMSSA.<sup>3</sup>

Este crecimiento no planificado de la población en áreas urbanas trae como consecuencia la agudización de problemas ambientales debido al hacinamiento, aumento de la actividad industrial, del tráfico vehicular, poca disponibilidad de abastecimiento de agua potable y un sistema de drenaje y alcantarillado no adecuado para cubrir las necesidades de una creciente población.

El PIB por habitante, es considerado un indicador de prosperidad económica promedio, aunque no refleja las desigualdades que existen entre las diferentes clases sociales. De 1998 a 2002, el PIB por habitante de los salvadoreños creció a una tasa promedio anual de 2.4%, y durante todo el período las tasas de crecimiento estuvieron por encima de las tasas promedio de América Latina y el Caribe. Sin embargo la tasa de desempleo se ha mantenido en promedio para el área urbana en 6.7% y casi 7.0% en el área rural.

El Salvador se encuentra comprometido con la promoción de la conservación y protección del medio ambiente, y para ello desarrolla un plan de gobierno denominado “La Nueva Alianza” 1999 – 2004, dentro del cual se encuentra la “**Alianza por el Futuro**”, cuyo objetivo es buscar el desarrollo sostenible de la sociedad salvadoreña, identificando áreas claves como: las áreas naturales, los recursos hídricos, los recursos forestales, ordenamiento territorial, entre otros.

### ***Recurso forestal y agricultura***

El territorio de El Salvador es fundamentalmente de vocación forestal debido a la composición de sus suelos, rangos de temperatura y sobre todo su régimen y cantidad de precipitación. Su vegetación natural va desde bosques secos a nivel del mar, hasta bosques nebulosos entre los 1,200 mts. Hasta 2000 msnm. Con una cobertura boscosa que alcanzaría al 10.8% del territorio salvadoreño.

La conjugación de los factores que degradan los bosques, tales como: agricultura migratoria, incendios forestales, plagas tienen a su vez, impactos severos en los ecosistemas y los servicios ambientales que estos proveen.

El Estado esta creando las condiciones para promover el desarrollo forestal sostenible por medio de mecanismos de libre mercado y asegurar la conservación de las áreas naturales no protegidas y áreas críticas, con el fin de recuperar y conservar los recursos naturales, contribuyendo a elevar la calidad de vida de la sociedad.

Muchas de las tierras agrícolas del país son utilizadas para cultivos limpios (maíz y frijol), sin las prácticas apropiadas de conservación de suelos. Tal condición favorece al incremento de la erosión hídrica, y por tanto, predispone estas tierras a una fuerte degradación.

### ***Agua abastecimiento y calidad***

El régimen de precipitaciones propio de El Salvador, condiciona en cierta medida, los usos potenciales del agua. Aunado a la rápida expansión de la frontera agrícola, se hace necesario la construcción de sistemas de almacenamiento y regulación que permitan un óptimo aprovechamiento del recurso agua para las poblaciones que más lo necesitan, lo cual hasta la fecha no se está haciendo.

De acuerdo al Plan Maestro de los Recursos hídricos (MAG, 1982), la disponibilidad de agua considerando la que proviene de Guatemala y Honduras mediante las cuencas transfronterizas de los ríos Lempa, Paz y Goascorán, es de 17,971 millones de m<sup>3</sup> anuales, totalizando un área de recogimiento de 31,341 Km<sup>2</sup> (Anexo 4). De acuerdo a este cálculo, la disponibilidad de agua es de 3,500 m<sup>3</sup> / persona / año.

### ***Electricidad***

La capacidad instalada para generación de energía eléctrica en el país es de 954.1 MW y la que se genera en las presas hidroeléctricas del río Lempa es de 398.6 MW, lo cual representa un 41.8 % del total nacional. El resto es por generación termoeléctrica.

### ***Salud pública***

En El Salvador muchas enfermedades están asociadas con una mala calidad ambiental y a la falta de acceso a los servicios básicos, también la contaminación del aire favorece la aparición de las diversas enfermedades respiratorias.

Las Enfermedades **Infecciosas Respiratorias Agudas** (IRAS), con un 80% ocupado el primer lugar de morbilidad. La segunda causa la constituye el **parasitismo intestinal** y su tendencia ha sido creciente, observando 313,302 casos en el 2000, aumentando a 376,320 en el 2002. Le sigue las consultas por **diarreas y gastroenteritis** de origen infeccioso hasta en mayo del 2002, se registraron un total de 83,936, de las cuales el 68% de las atenciones corresponden a niños menores de 5 años. El cuarto lugar lo ocupa las **infecciones de las vías urinarias** y en quinto se encuentra la **bronquitis** que ha tenido una tendencia similar a las IRAS.

Debido a la estrecha relación entre el deterioro ambiental y la salud humana, el Ministerio de Salud y Asistencia Social (MSPAS), ha integrado esfuerzos conjuntos con el Ministerio de Medio Ambiente y Recursos Naturales (MARN) y otras instituciones gubernamentales y ONG. El MSPAS ha asignado un 3.59% del presupuesto del Ministerio para Salud Ambiental.

### ***Educación***

El Ministerio de Educación, con apoyo técnico del MARN, ha incorporado la Educación Ambiental como un eje transversal, en el currículo de los Programas de Educación Básica y Media, mediante 4 Guías Didácticas que fueron distribuidas a los docentes y que pueden ser consultadas en el sitio web del MARN: [www.marn.gob.sv](http://www.marn.gob.sv)

La escolaridad promedio a nivel nacional aumentó ligeramente de 5.3 años a 5.5. La tasa total de analfabetismo a nivel nacional se redujo del 18.1% en 1999 al 16.6% en el 2002.

### ***Gestión de residuos***

Aproximadamente un 95% de las aguas residuales se descarga sin tratamiento alguno en los ríos, quebradas y otras fuentes de agua a lo largo y ancho país. La incidencia de enfermedades de origen hídrico muestra una tendencia al incremento asimismo se deterioran los ecosistemas y pérdida de la biodiversidad.

El 69% de los municipios (182) cuentan con servicio de recolección de basura, equivalente al 63% de la población total de El Salvador con acceso a éste. La generación de basura es de 2,347.26 toneladas al día. La que en su mayoría es dispuesta en vertederos ya que solo 19 municipios cuentan con relleno sanitario.

## **POLÍTICA AMBIENTAL, LEGISLACIÓN Y MARCO INSTITUCIONAL**

### ***Políticas y legislación ambiental***

Las Políticas emitidas por el Gobierno de El Salvador, están sustentadas en los lineamientos emanados de la Constitución de la República y la Ley del Medio Ambiente; así como los macro principios de la Política Nacional del Medio Ambiente, al igual que en los instrumentos de orden internacional y regional firmados por El Salvador, en materia ambiental.

Durante el período 2001 – 2002, se formularon aprobaron y publicaron cinco importantes políticas, constituyéndose en instrumentos oficiales para orientar acciones y programas en la recuperación y reversión de procesos que deterioran el medio ambiente.

- Política Nacional del Medio Ambiente.
- Política Nacional de Desechos Sólidos.
- Política Nacional de Lucha contra la Desertificación.
- Política Nacional de Áreas Naturales Protegidas.
- Política Nacional para la sostenibilidad del Recurso Hídrico.

Dentro del seguimiento al Convenio de Diversidad Biológica se establecieron los Lineamientos de Política para el Acceso a los Recursos Genéticos asociados a la Vida Silvestre; los Procedimientos para la Participación de la Sociedad en la Gestión de las Áreas Naturales Protegidas, la Estrategia Nacional para implementar estos Procedimientos y la Estrategia Nacional para la realización de Inventarios de la Biodiversidad.

El Sistema Nacional de Gestión del Medio Ambiente (SINAMA), tiene su fundamento legal en los artículos 5 y 6 de la Ley de Medio Ambiente, y su función es propiciar la creación de unidades ambientales en las entidades e instituciones del Sector Público y establecer los mecanismos de coordinación de gestión ambiental.

### ***Convenios Ambientales Internacionales y Regionales***

El Salvador ha suscrito 11 Convenios Internacionales y cinco Convenios Regionales sobre Medio Ambiente, los cuales definen los marcos jurídicos y técnicos, para la ejecución de acciones en temáticas relevantes, tanto a nivel local, regional y global. Estos instrumentos internacionales tienen el propósito de proteger, conservar y mitigar efectos adversos sobre los recursos.

Convenio de Basilea y el acuerdo Regional sobre el control de los movimientos transfronterizos de desechos peligrosos y su eliminación.

Convención de Viena para la Protección de la Capa de Ozono.

Protocolo de Montreal Relativo a las Sustancia que Agotan la Capa de Ozono.

Convenio sobre Diversidad Biológica.

Convención sobre La Protección del Patrimonio Mundial.

Convención Marco de las Naciones Unidas sobre El Cambio Climático

Convención de Naciones Unidas de lucha Contra la Desertificación y la Sequía

Convención relativa a Humedales de importancia internacional específicamente como hábitat de aves acuáticas (RAMSAR)

Convenio de Róterdam para la aplicación del Procedimiento de Consentimiento Fundamentado Previo Aplicable a ciertos plaguicidas y productos químicos peligrosos objeto del comercio internacional.

Convenio de Estocolmo sobre Contaminantes Orgánicos Persistentes.

Adicionalmente, se está avanzando en la firma y ratificación del Protocolo de Cartagena sobre Bioseguridad y del Convenio de Estocolmo sobre Contaminantes Orgánicos persistentes.

### ***Programas y proyectos***

Actualmente hay en ejecución 39 proyectos de cooperación no reembolsable, utilizándose durante el 2002, US \$ 3,6 millones provenientes de Alemania, España, Luxemburgo, Japón, Estados Unidos-USGS, Swisscontact, Holanda, CEPREDENAC, PNUD, Banco Mundial, BID, Protocolo de Montreal, PNUMA, Unión Europea, UNICEF, Secretaría de la Convención Ramsar, Secretaría de la Convención de Desertificación, Secretaría de la Convención de Basilea y GEF, los cuales se orientaron a las diferentes áreas ambientales y fortalecimiento institucional.

Como ejemplo se mencionan: Sistema de Cobro y Pago por Servicios Ambientales (CPSA), La valoración económica de los Recursos Naturales, El Sistema de Evaluación Ambiental (SEA), Educación Ambiental y Participación Social y Atención Ciudadana.

Adicionalmente se ha logrado lo siguiente: Alternativas Tecnológicas de Acceso al Agua y Saneamiento. Aprender Haciendo (EMAS), Sistematización de la experiencia (PROCEDAMO), Rehabilitación y Manejo de las Subcuencas El Tránsito y de la Vertiente Sur del Volcán Chaparrastique (Solidaridad Internacional, ISF – FINLANDIA, Oikos SOLIDARIDAD y UCA), Valoración Económica del Humedal Barrancones (MARN), Caracterización de Amenazas Geológicas en la Ladera Sur- Occidental del Volcán Chaparrastique (Geólogos del Mundo), Reducción de la Vulnerabilidad de la Población de la Subcuenca El Transito Cuenca Baja del Río Grande de san miguel ( Oikos, ministerio de Asuntos exteriores de España, agencia Española de Cooperación internacional, Solidaridad Internacional, CORDAID) y el Programa de

Saneamiento Ambiental Integral de la Comunidad El Borbollón y Laguna El Jocotal (Oikos, Solidaridad Internacional Unión Europea y El salvador, entre otros.

### ***Normas Jurídicas y Ambientales***

En el período 2000-2002 se han dado avances para fortalecer la normativa ambiental que permita mejores y modernas regulaciones, las que a continuación se resumen:

- Ley Forestal
- Reglamento General de la Ley del Medio Ambiente
- Reglamentos Especiales: Aguas Residuales, Desechos Sólidos, Sustancias, Residuos y Desechos Peligrosos, Normas Técnicas de Calidad Ambiental y Sustancias Agotadoras de la Capa de Ozono.
- Lineamientos de Política para el Acceso a Recursos Genéticos asociados con la Vida Silvestre.
- Procedimientos: Participación de la Sociedad en la Gestión de las ANPs y Manual de Procedimientos Técnicos para la realización de Inventarios de la Biodiversidad.
- Ordenanzas Municipales.

### ***Marco institucional ambiental***

Mediante la implementación del Sistema Nacional de Gestión del Medio Ambiente (SINAMA) se han creado 25 Unidades Ambientales Municipales, 5 Gubernamentales y 7 en Instituciones Autónomas, las cuales funcionan para realizar un monitoreo y control de la gestión ambiental a nivel de planes, programas y proyectos en las instituciones del Estado.

La coordinación interinstitucional ha permitido la aclaración y delimitación de competencias de carácter jurídico, creación de bases de datos públicos del Sistema de Información Ambiental y divulgación de Leyes y Reglamentos fortaleciendo las unidades ambientales institucionales y municipales, son logros obtenidos mediante diferentes proyectos encaminados a la creación de las bases del SINAMA. Este esfuerzo lo realizó el MARN, con la participación de la Policía Nacional Civil - División Ambiental, COMURES, ISDEM, Fiscalía General de la República y Ministerio de Salud.

## **IX    Major Projects in the Region**

## EU AND OTHER DONOR COOPERATION WITH THE REGION FROM AN ENVIRONMENTAL PERSPECTIVE (A SELECTION)

The following information is based on the identification of the Environmental Regional Programme of DANIDA, the information collected at the Delegation in Nicaragua and during the interviews as well as from the internet.

<b>Watershed management and disaster prevention</b>				
<b>Project</b>	<b>Source of financing</b>	<b>Management</b>	<b>Duration</b>	<b>Budget</b>
Programa de Desarrollo de Zonas Fronterizas en América Central (ex FOEXCA)	EU ACR/1989/0012 (ex ALA/89/12)	CABEI/BCIE	01/2004 – 01/2009	54.167.503 € EC 40,5 Mio €
Programa de Desarrollo y Gestión Sostenible de las Cuencas de Honduras (FORCUENCAS)	EU HND/B7- 3100/01/0319 N°5827	GOPA	12/2002 – 12/2009	31 mio €
Reducción de la vulnerabilidad de las familias pobres en el Golfo de Fonseca (Nicaragua, Hond., El Salv.)	EU ONG/PVD/2004/ 62995/RAC N° 62995	OIKOS - PT	? – 07/2007	734.035 €
Reducción de la Vulnerabilidad y la Degradación Ambiental	EU	CEPREDENA C, CRRH, CCAD, SICA	formulation stage start 2005	20 mio Euro
Programa Trinacional de Manejo de Recursos Naturales en la Cuenca Alta del Río Lempa	IADB (with a contribution of the GTZ)	Comisión Trinacional Trifinio	in execution	El Salvador: 14 mio Guatemala: 4.5 mio Honduras: 3.3 Mio USD (loan)
Programa Trinacional de Desarrollo Sostenible de la Cuenca Alta del Río Lempa.	Norway	Comisión Trinacional Trifinio	2002 - 2006	1.200.000 USD
Program for the Integrated Management of Water Resources and the Sustainable Development of the San Juan River Basin and its Coastal Zone	World Bank (GEF) UNEP			3.930.000 USD (CEO endorsed)
FOCUENCAS	ASDI (2d phase in preparation)	CATIE	06-2000 – 06-2004.	5 mio USD
Environmental Regional Programme	DANIDA	CCAD	formulation	



<b>Biodiversity, protected areas and forests</b>				
<b>Project</b>	<b>Source of financing</b>	<b>Management</b>	<b>Duration</b>	<b>Budget</b>
Gestión Participativa de Áreas Protegidas (Comanejo) y manejo de conflictos ambientales en CA	EU. ENV/2003/063-915 N°63915	IUCN-BE	11/2003 - 10/2006	Total € 1.160.000 EU 75% - UICN & other 25%.
Biodiversidad y Humedales en Áreas Indígenas	EU ENV/HND/2000 /054-418 N° 54418	Terra Nuova. Fundación UNA.	06/2001 - 09/ 2004	828.000 €
Conservación del bosque y desarrollo sostenible en zonas de amortiguamiento en el Atlántico Norte Costarricense	EU	MINAE	2001 - 2005	4.400.000 €
Corredor Biológico Mesoamericano	World Bank (Fiduciary Fund from The Netherlands)	World Bank & CCAD.	1999-2004	Fid. Fund #1: 4.4 Mio USD Fid. Fund #2: por 3.4 Mio USD
Corredor Biológico Mesoamericano (CBM)	GEF/PNUD GTZ	CCAD	04/2000 - 03/2006	GEF/PNUD: US\$ 10.6 mio GTZ: US\$ 5 mio Contrapartida países: US\$ 4,000,000
Integrated Ecosystem Management in Indigenous Communities	World Bank - GEF /IBRD	CCAD & (ACICAFOC)	Start 2005	9.7 Mio USD (CEO endorsed)
Integrated Silvo-Pastoral Approaches to Ecosystem Management	World Bank/ GEF	CATIE		4.770.000 USD (CEO endorsed)
Biodiversity Conservation and Integration of Traditional Knowledge on Medicinal Plants in National Primary Health Care Policy in Central America and Caribbean	UNEP/GEF			0.750 USD (CEO approved)
Programa Regional Ambiental (PROARCA)	USAID-CCAD	CCAD	2001-2007	45.800.000 USD
Corazón Transfrontier Biosphere Reserve Project	GEF	CCAD	in preparation	12.400.000 USD

INBIO- capacitando y compartiendo la tecnología para la gerencia de la biodiversidad en Centroamérica	Norway	INBIO - Instituto Nacional de Biodiversidad Costa Rica	2004-2008	4.300.000 USD
Estrategia Forestal Centroamericana (EFCA)	FAO	CCAD-UICN	2004-2005	94.000 USD
Asistencia Técnica para el Sistema Centroamericano de Áreas Protegidas	Spanish Environment Ministry, National Parks	CCAD		3.000.000
<b>Sea &amp; costal zones</b>				
<b>Project</b>	<b>Source of financing</b>	<b>Management</b>	<b>Duration</b>	<b>Budget</b>
Protección y Manejo regional de los recursos Marino- Costeros en el Golfo de Honduras	EU	CISP	2003-2006	1.120.415 Euros
Conservation and Sustainable Use of the Mesoamerican Barrier Reef	World Bank GEF	CCAD	06/2001 – 06/2006	16.25 mio US\$ GEF: 11,034,000.
Reducing Pesticide Runoff to the Caribbean Sea	BM/GEF. UNEP			4.585.000 USD (approved))
Sistema del Arrecife Mesoamericano. (Manejo Ambiental Mejorado en el Corredor Biológico Mesoamericano)	USAID	México (Quintana Roo), Belice, Guatemala (Izabal), Honduras (Atlántida, Cortés, Islas de la Bahía)	11/2003 - 11/2006	US\$ 1,5 mio
<b>Energy</b>				
<b>Project</b>	<b>Source of financing</b>	<b>Management</b>	<b>Duration</b>	<b>Budget</b>
Regional Program on Electrical Energy Efficiency in Industrial and Commercial Service Sectors in 7 Countries in Central America	UNDP /GEF			3.350.000 USD Pending
Creation and Strengthening of the Capacity for Sustainable Renewable Energy Development in Central America.	UNDP/GEF			0.750 USD CEO Approved

Accelerating Renewable Energy Investments in Central America	UNDP/GEF	CABEI/BCIE		6.100.000 USD Pending
Energía y Ambiente	Finland – Ministry of External Affairs	CCAD	06/2003 – 06/2006	3 Mio EUR
<b>Impacto Ambiental, Contaminación y Producción Limpia</b>				
<b>Project</b>	<b>Source of financing</b>	<b>Management</b>	<b>Duration</b>	<b>Budget</b>
Fortalecimiento de las Evaluaciones de Impacto ambiental	Sweden (ASDI) The Netherlands	UICN, CCAD.	2005-2007	1.6 mio USD approval pending
Legislación Ambiental	COSUDE (Switzerland)	CCAD	2003 – 07/2007	1 mio USD
Sistemas de Gestión Ambiental (PROSIGA)	The Netherlands	CCAD	2001 – 07/2004	3.450.000 USD (closing)
Evaluación Ambiental Estratégica y Plan Puebla Panamá	BID	CCAD	2004-2005	100.000 USD
Monitoreo de los Cambios de la Cobertura de la Tierra para Determinar Emisiones de Carbón y Modelamiento Regional de Escenarios de Cambio Climático en Centroamérica	PROGRAMA NASA/USAID CAMBIO CLIMÁTICO	CCAD	10/2003 – 10/2006	1.800.000 USD
Apoyo a la CCAD para lograr los compromisos de ALIDES (II FASE)	ASDI (Sweden)	CCAD	01- 11/2004	420.000 USD
<b>Environment &amp; civil society</b>				
<b>Project</b>	<b>Source of financing</b>	<b>Management</b>	<b>Duration</b>	<b>Budget</b>
Fortalecimiento de las comunidades Afro-descendientes	World Bank	CCAD	2003-2005	0.5 Mio
ALIANZAS	Norway	UICN	2004-2008	5 mio
CAMBIOS (antiguo Focades)	World Bank PNUD-GEF	CABAI/BCIE	in negotiation	13 mio USD
<b>Environmental Education &amp; Research</b>				
<b>Project</b>	<b>Source of financing</b>	<b>Management</b>	<b>Duration</b>	<b>Budget</b>
Apoyo Institucional CATIE	ASDI	CATIE	2003-2005	3 Mio USD
Earth Grants	Norway	EARTH		5.900.000 USD

Recuperación de los Pastos Degradados (+ institutional building CATIE)	Norway	CATIE	2003-2007	6.400.000 USD
<b>Other projects</b>				
<b>Project</b>	<b>Source of financing</b>	<b>Management</b>	<b>Duration</b>	<b>Budget</b>
Municipios Fronterizos Honduras – El Salvador	EU ACR/IB/2000/2052 N° 3232	CABEI/BCIE	07/2001 – 12/2010	35 mio. € Hond. 18 mio El Salv. 17 mio
Apoyo a la Integración Centroamericana (PAIRCA)	EU ALA/B7-3100/2003/5754 N° 5754	PNUD	03/2004 - 2008	15 mio. €
Unión Aduanera Centroamericana	EU ACR/AIDCO/2001/0270 N° 3214	GTZ	2004 – 03/2009	8 mio.€
Programa Regional de Seguridad Alimentaria	EU OD/2003/5984 N° 5984		2004 - 2009	12 mio. €
Fomento al Desarrollo Sostenible mediante el turismo en Centroamérica (FODESTUR)	GTZ	SICA - Consejo Centroamericano de Turismo y otros	1st phase 1999-2002 2d phase 2002-2005	
Etc.				

Perfiles IMDS: Componente ambiental para road show del PPP mayo 2005							
after: <a href="http://www.ccad.ws/proyectos/PPP05/PPP05.htm">http://www.ccad.ws/proyectos/PPP05/PPP05.htm</a>							
A. GESTIÓN AMBIENTAL REGIONAL							
Nombre del Proyecto	Países Beneficiarios	Entidad Proponente	Entidad Ejecutora	Tipo de Proyecto	Financiamiento Total (en US\$)	Tiempo de Ejecución	Actividades: Componente de Desarrollo Agropecuario y Rural
1. <a href="#">Fortalecimiento y Ampliación de la Red de Empresas por Producción Más Limpia</a>	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panamá	Red de Producción Más Limpia, CCAD	CCAD con el apoyo de la Red de Producción Más Limpia	Cooperación Técnica	542, 880	2 años	
2. <a href="#">Creación del Centro Regional de Desechos Peligrosos</a>	Belice, Costa Rica, El Salvador, Guatemala, Honduras, México, Nicaragua y Panamá	MARN	Centro Regional del Convenio de Basilea para Centroamérica y México, con el apoyo del MARN	Cooperación Técnica	439,000	2 años	
B. MANEJO DE RECURSOS NATURALES							
Nombre del Proyecto	Países Beneficiarios	Entidad Proponente	Entidad Ejecutora	Tipo de Proyecto	Financiamiento Total (en US\$)	Tiempo de Ejecución	Actividades: Componente de Desarrollo Agropecuario y Rural
3. <a href="#">Creación del Centro Regional de Biodiversidad</a>	Belice, Costa Rica, El Salvador, Guatemala, Honduras, México, Nicaragua y Panamá	CCAD	CBM, CCAD	Cooperación Técnica	2,068,000	5 años	Conocimiento de productos tradicionales y no tradicionales
4. <a href="#">Conservación de Recursos Naturales en Tierras Privadas en los Corredores Biológicos Transfronterizos</a>	Belice, Costa Rica, El Salvador, Guatemala, Honduras,	CCAD	Ministerios de cada País, con el apoyo de la CCAD	Cooperación Técnica	3,030,000	4 años	Pago por Servicios Ambientales; Intercambio de experiencias en eco-negocios

	México, Nicaragua y Panamá						
<b>C. DESARROLLO SOSTENIBLE DE COMUNIDADES RURALES EN ÁREAS NATURALES MULTINACIONALES</b>							
Nombre del Proyecto	Países Beneficiarios	Entidad Proponente	Entidad Ejecutora	Tipo de Proyecto	Financiamiento Total (en US\$)	Tiempo de Ejecución	Actividades: Componente de Desarrollo Agropecuario y Rural
5. <a href="#">Manejo Comunitario de Bosques en los Bolsones Fronterizos</a>	El Salvador, Honduras,	MARN	MAG, MARN-El Salvador COHDEFOR-Honduras, Cancillería de El Salvador y Cancillería de Honduras	Cooperación Técnica	400,000	5 años	
6*. <a href="#">Protección Ambiental y Control de la Contaminación Originada por el Transporte Marítimo en el Golfo de Honduras</a>	Belice, Guatemala, Honduras.	BID	COCATRAM, CCAD	GEF	7,000,000 más co-financiamiento adicional por 4,100,000	5 años	
7*. <a href="#">Desarrollo Sostenible del Río Binacional Sixaola en Talamasca, Costa Rica y de la Provincia de Bocas del Toro, Panamá</a>	Costa Rica, Panamá	Repúblicas de Costa Rica y Panamá	MIDEPLAN de Costa Rica y el MEF de Panamá	GEF	12 millones Costa Rica; 16,9 Millones Panamá	Costa Rica: 4 años; Panamá: 3 años (I Fase)	Diversificación de la producción; Asistencia técnica en comercialización
8*. <a href="#">Programa Trinacional de Desarrollo Sostenible de la Cuenca Alta del Río Lempa</a>	El Salvador, Guatemala, Honduras	BID	Comisión Trinacional del Plan Trifinio (CTPT)	Préstamo	31,295,000	5 años	Fomento de actividades productivas y diversificación económica; Valor agregado a productos agrícolas; Mejora de productividad agrícola
9. <a href="#">Desarrollo Regional Inter-fronterizo Nueva Segovia- El Paraíso</a>	Honduras, Nicaragua	BID	BID	Cooperación Técnica	385,000	9 meses	
10. <a href="#">Programa de Manejo Integrado del Ecosistema del Golfo de Fonseca</a>	El Salvador, Honduras, Nicaragua	BID, MARENA	CCAD, en colaboración con los Ministerios de Medio Ambiente y	GEF	8,740,500	3,8 años	Pesquerías y acuicultura sostenible

			Recursos Naturales				
11. <a href="#">Gestión Integrada de la Cuenca del Río San Juan</a>	Costa Rica, Nicaragua	MARENA	MARENA, MINAE con el apoyo de diversas instancias dependiendo el caso	Cooperación Técnica	5,630,000	5 años	Desarrollo del Sector pesquero y acuícola
<b>D. TRANSVERSALIDAD AMBIENTAL</b>							
Nombre del Proyecto	Países Beneficiarios	Entidad Proponente	Entidad Ejecutora	Tipo de Proyecto	Financiamiento Total (en US\$)	Tiempo de Ejecución	Actividades: Componente de Desarrollo Agropecuario y Rural
12. <a href="#">Fortalecimiento a la Alianza en Energía y Ambiente con Centroamérica</a>	Belice, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panamá	CCAD	Alianza en Energía y Ambiente con Centroamérica /CCAD	Cooperación Técnica	3,600,000	3 años	Desarrollo rural
13. <a href="#">Sistemas de Energía Solar para Conservación de Productos de Pescadores Artesanales del Istmo Centroamericano</a>	Belice, Costa Rica, Guatemala y Nicaragua	OSPESCA	OSPESCA/ SG-SICA y CCAD/ Alianza en Energía y Ambiente con Centroamérica	Cooperación Técnica	220,000	1 año	Desarrollo rural
14. <a href="#">Minicentral Hidroeléctrica Gualpuca</a>	El Salvador	Ministerio de Medio Ambiente y Recursos Naturales	SABES	Cooperación Técnica	535,000	1 año	Desarrollo rural
15. <a href="#">Abastecimiento de Energía Solar para Hogares de Bajos Recursos Económicos y la Introducción de la Turbococina para la Producción de sal en Comunidades Costeras del Golfo de Fonseca, Departamento de la Unión</a>	El Salvador	Ministerio de Medio Ambiente y Recursos Naturales	Ministerio de Medio Ambiente y Recursos Naturales	Cooperación Técnica	300,000	2 años	Desarrollo rural

## **ADMINISTRATIVE APPENDICES**



## **I. Study Methodology / Work Plan**

## **1. Objective of the Regional Environmental Profile for the Central American Region**

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As per Article 2 of the Terms of Reference (ToRs), the objective of the Regional Environmental Profile is to “identify and assess environmental issues to be taken into account in the preparation of the regional and country strategy papers for the Central American region for the period 2007-2011”. The present mission thus aimed at drawing up a Central America Regional Environmental Profile that will provide decision-makers in the European Commission (EC) and the partner countries with information on the key regional and national environmental challenges and environmental management concerns, strategies, objectives, programmes and actors.

## **2. Expected results and outputs**

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The study is expected to deliver the following results and outputs :

- An assessment of the environmental situation in the Central American region ;
- An overview of past and ongoing international cooperation in the environmental conservation and management field ;
- A summary of the critical environmental challenges faced by individual Central American countries and by the region as a whole.
- Recommendations and, as far as possible, relevant guidelines or criteria for mainstreaming environmental concerns in priority development areas.

## **3. Proposed methodology and organisation**

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### **3.1. The experts**

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Given the objective of the mission, the expected results, the short duration of the assignment and the multiple key sectors and major stakeholders to take into account, a team of two complementary experts realized the mission in order to cover the main fields and aspects concerned. Mr. Midré, the Team Leader, has more than sixteen years experience in missions abroad, with particular interest for Central America and concerned with issues relating to environmental conservation and management, ecology, forestry, agro-forestry and agricultural development, rural development, land use planning, nature protection and national park management, amongst other issues. He has in depth knowledge of international environmental policies, environmental assessment techniques and institutional aspects. Dr. Rivera has also sixteen years of experience in the environmental area. During this time she has been involved in supporting the conservation of the environment in Honduras through consultancies for the government and private sector, NGO's and international organizations. She has wide experience in environment training, environmental impact evaluations, environmental diagnostics, environmental audits, watershed diagnostics, management plans, biological evaluations (territorial and aquatics), wild life, land use, environmental quality (base line), limnological analysis, political and environmental legislation.

### 3.2. Organisation of the mission

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In accordance with the Terms of Reference (Article 5), the mission realized (among other activities) consultations with EC regional/country desk officers and other relevant officials, EC Delegations in Central America, the SICA's, Environment and Development Commission (CCAD). Consultations also took place with a selection of national and local authorities, key international funding agencies operating in the region, plus key national, regional and international civil society actors operating in the environmental field.

A visit to 5 out of the 7 Central American countries has taken place. EC representatives were particularly supportive and made available most of the representatives of the key actors and major stakeholders identified.

### 3.3. Realized work plan

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#### **Activity 1 : Desk analysis (including briefing of Expert I in Brussels)**

- Duration : Expert I (Mr. Midré), 1 day ; Expert II (Dr. Rivera), 1 day
- Location : Brussels (briefing) for Mr. Midré, Tegucigalpa for the 2d expert
- Tasks :
  - ✓ analysis of the specific issues addressed during the briefing ;
  - ✓ discussions on the mission ToRs and preparation of the mission ;
  - ✓ review of the existing documents : review of evaluation reports with respect to environmental issues on development and economic co-operation produced by government, EC or other agency sources ; review of environmental literature, evaluation reports, environmental policy and legislation framework, legislation and regulations and enforcement relating to environmental issues, action plans, and progress in implementation.

#### **Activity 2 : Field phase including travel**

- Duration : 17 days (for both experts).
  - o Day 1 : **Honduras** (for expert II, Dr. Rivera)
    - Expert 1 : Mr. Midré travelled from Brussels to Managua
    - Expert 2 : As Honduran expert, Dr. Rivera has a particularly extensive knowledge of environmental issues in Honduras. She will have a consultation with EC office in Honduras and will consult a selection of key actors (national and local authorities, key international funding agencies operating in the region, plus key national, regional and international civil society actors operating in the environmental field).
  - o Days 2 – 3 : **Nicaragua**
    - Consultation with EC Delegation to Nicaragua, Honduras, El Salvador and Guatemala;
    - Consultation with a selection of key actors (NGOs).
  - o Days 4 –8 : **El Salvador**
    - Consultation with EC Regional Office in San Salvador, present and past EU projects, MARN and representatives of the civil society ;
    - Consultation with SICA (and CCAD)
  - o Days 8 – 9 : **Guatemala**
    - Consultation with EC Delegation in Guatemala

- Consultation with a selection of key actors (civil society, MARN, university)
- o Days 10 – 11 : **Costa Rica**
  - Consultation with EC Delegation
  - Consultation with a selection of key actors (civil society, MINAE, Ministerio de Relaciones Exteriores, Aid cooperation)
- o Day 12 - 16 : **Honduras**
  - Consultation with EC Regional Office and a selection of key actors
- **Nicaragua**
  - Consultation with donors, MARENA, MAG-FOR, the civil society
- o Day 17 - 18 : **Nicaragua – Europe / Honduras**
  - Expert 1, Mr. Midré : Return to Europe
  - Expert 2, Dr. Rivera : Return to Honduras
- Tasks :
  - ✓ assessment of the environmental situation in the Central American region covering the impact of key environmental factors on the region's development and responses to these; regional and national environmental policy and legislation; institutional structure and capacity; the involvement of civil society in environmental issues.
  - ✓ analysis of the critical environmental challenges faced by individual Central American countries and by the region as a whole.
  - ✓ analysis of past and ongoing international cooperation in the environmental conservation and management field.
  - ✓ identification of recommendations and, as far as possible, relevant guidelines or criteria for mainstreaming environmental concerns in priority development areas such as regional integration and social cohesion among others.

### **Activity 3 :** Report finalisation

- Duration : 10 days
- Location : Office country of the experts
- Tasks : Finalisation of the draft report, according to the issues to be studied referred to in the Terms of Reference.

### **Activity 4 :** Debriefing in Brussels

- Duration : 1 day for Expert 1, Mr. Midré
- Location : Brussels
- Tasks :
  - ✓ Share the findings and conclusions of the field mission ;
  - ✓ Presentation of the Draft Report to the Head of Unit of DG RELEX G/2 ;
  - ✓ Discussions.

### **Activity 5 :** Final report

- Duration : 1 day for both experts
- Location : Office country of the experts
- Task : Integration of the comments received from the EC on the Draft Report

## **II      Consultants' Itinerary and List of Persons / Organisations consulted**

**REGIONAL ENVIRONMENTAL PROFILE FOR CENTRAL AMERICA**  
**MISSION ITINERARY in Europe**

No.	NAME	INSTITUTION	POSITION	Documentation & Assistance	TELEPHONE	E-MAIL	Mission Meeting Date
1	Peter Versteeg	European Commission External Relations Directorate-General	Desk Officer – Central America	Briefing/debriefing on the Mission to Central America	(w) + 32-2- 296.17.29 (Fax) + 32.2.299.10.32	peter.versteeg@cec.eu.int	22/11/04 10/01/05
2	Etienne Coyette	European Commission Environment Directorate-General	Desk Officer	Briefing on the Mission to Central America	(w) + 32-2- 298.83.21 (Fax) + 32-2- 296.95.57	etienne.coyette@cec.eu.int	22/11/04
3	Elina Bardam	European Commission External Relations Directorate-General	Economic Analysis Unit	Briefing/debriefing on the Mission to Central America	(w) + 32-2- 299.33.05 (Fax) + 32.2.299.21.76	elina.bardam@cec.eu.int	22/11/04 10/01/05
4	Marc Litvine	European Commission External Relations Directorate-General	Desk Nicaragua	Briefing/debriefing on the Mission to Central America	(w) + 32-2- 299.40.60 (Fax) + 32.2.299.10.32	marc.litvine@cec.eu.int	22/11/04 10/01/05
5	Jean Paul Ledant	AGRECO-GEIE Environmental Mainstreaming	Coordinator Environmental Help Desk	Briefing/debriefing on the Mission to Central America	(w) + 32-2- 626.33.20 (Fax) + 32.2- 646.35.02	ledant@agreco.be	22/11/04 10/01/05
6	Nicolas Bulte	European Commission External Relations Directorate-General	Desk Honduras	Briefing/debriefing on the Mission to Central America	(Fax) + 32.2.299.10.32	nicolas.bulte@cec.eu.int	22/11/04 10/01/05
7	Jean Claude Gallner	AGRECO-GEIE Environmental Mainstreaming	Environmental Help Desk	Debriefing on the Mission to Central America	(w) + 32-2- 626.33.20 (Fax) + 32.2- 646.35.02	gallner@agreco.be	10/01/05

8	Louis du Breuil Pontbriand	AIDCO		Debriefing	(w) +32-2-295 45 16		10/01/05
9	Helen McCarthy- O'Kelly	DG Environnement		Debriefing	(w) +32-299 01 13		10/01/05
10	Peter Brinr	AGRECO-GEIE Environmental Mainstreaming	Environmental Help Desk	Debriefing on the Mission to Central America	(w) + 32-2- 626.33.20 (Fax) + 32.2- 646.35.02	brin@agreco.be	10/01/05

**REGIONAL ENVIRONMENTAL PROFILE FOR  
CENTRAL AMERICA - MISSION ITINERARY in Central America**

No.	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
	<b>NICARAGUA</b>						
1	Sr. Karl Rawert	Unión Europea Delegación de la CE for NIC, CR, SAL, GUA, HON, & PAN	Prime Secretary	Contacted key stakeholders in Nicaragua in environmental issues.	(w) 00 505 270 4499 (Fax) 00 505 270 4484	<a href="mailto:Karl.RAWERT@cec.eu.int">Karl.RAWERT@cec.eu.int</a> <a href="http://www.delnic.cec.eu.int">www.delnic.cec.eu.int</a>	24/11/04
2	Sra. Mieke Vanderschaeghe	Unión Europea Delegación de la CE for El Salvador	Adviser in cooperation issues	Contacted key stakeholders in El Salvador	(w) 00 505 270 4499 (Fax) 00 505 270 4484	<a href="mailto:Mieke.VANDERSCHAEGHE@cec.eu.int">Mieke.VANDERSCHAEGHE@cec.eu.int</a> <a href="http://www.delnic.cec.eu.int">www.delnic.cec.eu.int</a>	24/11/04
3	Sr. Rémy Llinares	Unión Europea Delegación de la CE for Nicaragua/Environment	Adviser in cooperation issues	Contacted key stakeholders in Nicaragua. Guided meetings in the country	(w) 00 505 270 4499 (Fax) 00 505 270 4484	<a href="mailto:Remy.LLINARES@cec.eu.int">Remy.LLINARES@cec.eu.int</a> <a href="http://www.delnic.cec.eu.int">www.delnic.cec.eu.int</a>	24/11/04
4	Sra. María Monge	Unión Europea Delegación de la CE for Nicaragua - Environment	Adviser in cooperation issues	Stated environmental concerns and issues important for the REP	(w) 00 505 270 4499 (Fax) 00 505 270 4484	<a href="mailto:Maria.MONGE@cec.eu.int">Maria.MONGE@cec.eu.int</a> <a href="http://www.delnic.cec.eu.int">www.delnic.cec.eu.int</a>	24/11/04
5	Sra. Olga Veluce	Unión Europea Delegación de la CE for Nicaragua / Environment	Adviser in cooperation issues	Shared his experiences and regional perspectives on environmental issues in Nicaragua and C.A.	(w) 00 505 270 4499 (Fax) 00 505 270 4484	<a href="mailto:olga.viluce@cec.eu.int">olga.viluce@cec.eu.int</a>	24/11/04
6	Sr. Jaime Barquero	Ex Director de MARENA; Key stakeholder in the environment	Independent adviser in environmental issues	Shared his experiences and regional perspectives on environmental issues in Nicaragua and C.A.		<a href="mailto:Karl.RAWERT@cec.eu.int">Karl.RAWERT@cec.eu.int</a> <a href="http://www.delnic.cec.eu.int">www.delnic.cec.eu.int</a>	24/11/04
7	Sr. Gianantonio Ricci	Asociación de Cooperación Rural de África y América Latina	Representante y Coordinador en C.A.	Shared his experiences and regional perspectives on environmental issues in Nicaragua and C.A.	(w) 00 505 277 4676 (h) 00 505 887 63 17	<a href="mailto:acracore@ibw.com.ni">acracore@ibw.com.ni</a>	24/11/04



No.	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
8	Sra. Grazia Faieta	Terra Nouva-Centro Per il Volontariato	Oficial de Proyecto	Shared her experiences and regional perspectivas on environmental sigues in Nicaragua and C.A.	00 505 266 6628; 266 4699; 266 4689	tnouva@cable.net.com.ni	24/11/04
9	Sra. María Eugenia Malespi	GBC – Mosquitia Hondureña	Oficial de Proyecto	Shared her experiences and regional perspectivas on environmental sigues in Nicaragua and C.A.			24/11/04
10	Sr. Pierpaolo Biagi	CISP – Comitato Internazionale oer lo Svikuppo dei Popoli	Oficial de Proyecto	Shared his experiences and regional perspectivas on environmental sigues in Nicaragua and C.A.	00 505 266 0104; 266 0653	<a href="mailto:cisp.ca@cable.net.com.ni">cisp.ca@cable.net.com.ni</a>	24/11/04
11	Sr. Falguni Guharay	CATIE	Esp. en Agricultura sostenible	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A.		<a href="mailto:emergen@mipafcatie.org.ni">emergen@mipafcatie.org.ni</a>	24/11/04
12	Sr. Roberto Canessa	ECORIS	Consultant	Presented the advances in the RSP		canessa@eptisa.be	25/11/04
13	Sr. Fernando Rueda	ECORIS	Consultant	Presented the advances in the RSP			25/11/04
14	Sr. Paul Kohorst		Consultant	Presented the advances in the RSP			25/11/04
15	Sr. Laurens M. Hoppenbrouwer	Emerging Markets Advisory Consultants (EMACON)	Consultant	Participated in the RSP presentation	(Perú) 00 511 979 16199; 00 511 422 0733 (Wash.) 00 202 746 5764; 00 202 318 0208	<a href="mailto:lhopperbrouwer@emacn.com">lhopperbrouwer@emacn.com</a> <a href="http://www.emacn.com">www.emacn.com</a>	25/11/04
16	Sr. Miguel Ángel Lombardo	CSP de El Salvador	Consultor	Participated in the RSP presentation		<a href="mailto:m.lombardo@wanadoo.es">m.lombardo@wanadoo.es</a>	25/11/04

No	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
17	Sr. Luis Nunes de Carvalho	Unión Europea Delegación de la CE for NIC, CR, SAL, GUA, HON, & PAN	Consejero Responsable de la Cooperación de El Salvador	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 00 505 270 4499 (Fax) 00 505 270 6141	<a href="mailto:luis.nunes-de-carvalho@cec.eu.int">luis.nunes-de-carvalho@cec.eu.int</a>	25/11/04
	<b>EL SALVADOR</b>						
18	Sr. Jean-Phillipe Rondeau	Unión Europea Delegación de la CE for NIC, CR, SAL, GUA, HON, & PAN	Coordinator of El Salvador Office	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 00 503 263 8020; 263 8139; 263 8140 (Fax) 00 503 263 8136	<a href="mailto:delegation-el-salvador@cec.eu.int">delegation-el-salvador@cec.eu.int</a> <a href="http://www.delnic.cec.eu.int">www.delnic.cec.eu.int</a>	26/11/04
19	Sr. Marten Gillis	FORGAES	Codirector Europeo	Shared his experiences and regional perspectives on environmental issues in 18El Salvador and C.A	(w) 00 503 260 5622; 00 503 260 5623	<a href="mailto:mgillis@marn.gob.sv">mgillis@marn.gob.sv</a> <a href="http://www.forgaes.org.sv">www.forgaes.org.sv</a>	26/11/04
20	Sra. Susana de Flores	FORGAES	Coordinator: Risk Management and Land Planning	Shared her experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 00 503 260 5636; 00 503 260 5637	<a href="mailto:sflores@marn.gob.sv">sflores@marn.gob.sv</a> <a href="http://www.forgaes.org.sv">www.forgaes.org.sv</a>	26/11/04
21	Sr. Julio Olano	Ministerio de Agricultura y Ganadería (MAG)	Coordinator: Forestry Planning, Watersheds, and Irrigation	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A			26/11/04
22	Sr. René Salgado	CENDEPESCA - MAG	Operation Coordinator	Shared his experiences and regional perspectives on fisheries issues in El Salvador and C.A			26/11/04

No	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
23	Sr. Orlando Altamirano	Ministerio de Medio Ambiente y Recursos Naturales (MARN)	Executive Director	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 00 503 245 6515 (Fax) 00 503 245 0130	<a href="mailto:altamir@marn.gob.sv">altamir@marn.gob.sv</a> <a href="http://www.marn.gob.sv">www.marn.gob.sv</a>	26/11/04
24	Sr. Luis Armando Trejo Castillo	Ministerio de Medio Ambiente y Recursos Naturales (MARN)	General Director of Environmental Management	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 00 503 224 6515 (Fax) 00 503 224 6468	<a href="mailto:ltrejo@marn.gob.sv">ltrejo@marn.gob.sv</a> <a href="http://www.marn.gob.sv">www.marn.gob.sv</a>	26/11/04
25	Lic. Elizabeth Guillén de Fuentes	Ministerio de Medio Ambiente y Recursos Naturales (MARN)	Cooperation Specialist	Shared her experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 00 503 224 0444 (Fax) 00 503 224 6944	<a href="mailto:efuentes@marn.gob.sv">efuentes@marn.gob.sv</a> <a href="http://www.marn.gob.sv">www.marn.gob.sv</a>	26/11/04
26	Sr. Ernesto López Zepeda	Ministerio de Medio Ambiente y Recursos Naturales (MARN)	Director General del Patrimonio Natural	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 00 503 245 6515 (Fax) 00 503 245 0130	<a href="mailto:elopez@marn.gob.sv">elopez@marn.gob.sv</a>	26/11/04
27	Sra. Mercedes Llort	Plan Trifinio	Executive Director	Presented the Plan Trifinio: Results to 2004, Lessons Learned, Projects	(w) 00 503 264 3619; 264 3620; 264 5220 (Fax) 00 503 264 3621	<a href="mailto:mercedesllort@trifinio.org">mercedesllort@trifinio.org</a>	26/11/04
28	Lic. Silvia Quiroa Yada	Centro Salvadoreño de Tecnología Apropriada FOE – El Salvador	Vice Directora Ejecutiva	Shared her experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 00 503 220 3306; 220 6480; 220 0046 (Fax) 220 3313	<a href="mailto:cesta@es.com.sv">cesta@es.com.sv</a> <a href="http://www.tao.ca./-cesta">www.tao.ca./-cesta</a>	27/11/04

No .	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
29	Sr. Benjamín Alas	OIKOS Solidaridad	Project Official	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A			27/11/04
30	Sr. Herman Rosa	Programa Salvadoreño de Investigación sobre Desarrollo y Medio Ambiente (PRISMA)	Director	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 00 503 298 6852; 298 6853; 224 3700 (Fax) 00 503 223 7209	<a href="mailto:h.rosa@prisma.org.sv">h.rosa@prisma.org.sv</a> <a href="mailto:prisma@prisma.org.sv">prisma@prisma.org.sv</a> <a href="http://www.prisma.org.sv">www.prisma.org.sv</a>	27/11/04
31	Ing. Rosendo Mauricio Sermeño	Unidad Ecológica Salvadoreña (UNES)	Executive Coordinator	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 260 1447; 260 1465; 260 1480 (Fax) 260 1675; 257 3185	<a href="mailto:coord.unes@telesal.net">coord.unes@telesal.net</a> <a href="http://www.unes.org.sv">www.unes.org.sv</a>	27/11/04
32	Sr. Ángel Ibarra	Unidad Ecológica Salvadoreña (UNES)	Project Official	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 260 1447; 260 1465; 260 1480 (Fax) 260 1675; 257	<a href="mailto:coord.unes@telesal.net">coord.unes@telesal.net</a> <a href="http://www.unes.org.sv">www.unes.org.sv</a>	
33	Sr. Laurens M. Hoppenbrouwer	Emerging Markets Advisory Consultants (EMACON)/ CSP de El Salvador	Consultant	Presented CSP work plan	(Perú) 00 511 979 16199; 00 511 422 0733 (Wash.) 00 202 746 5764; 00 202 318 0208	<a href="mailto:lhopperbrouwer@emacon.com">lhopperbrouwer@emacon.com</a> <a href="http://www.emacon.com">www.emacon.com</a>	28/11/04
34	Sr. Miguel Ángel Lombardo	CSP de El Salvador	Consultant	Presented CSP work plan	Hotel Presidente	<a href="mailto:m.lombardo@wanadoo.es">m.lombardo@wanadoo.es</a>	28/11/04
35	Sr. Guillermo Monterroza	CORDES	Gerente de Relaciones	Presented CORDES Experiences on agroecological experiences: weaknesses and strengths			29/11/04

No	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
36	Sr. Peter Wachowski	PROCEDAMO	Director Europeo de Proyecto	Presented CORDES Experiences on the project experiences: weaknesses and strengths; Shared El Salvador and C.A. environmental perspectives			29/11/04
37	Sr. Hernán Romero Chavarría	BID	Especialista Sectorial	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 00 503 233 8900 (Fax) 00 503 233 8921	<a href="mailto:hernanc@iadb.org">hernanc@iadb.org</a>	29/11/04
38	Sr. Francisco López Sancho	AECI	Coordinador General	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A	(PBX) 00 503 211 2324 (Fax) 00 503 275 7525	<a href="mailto:aecisal@vip.telesal.net">aecisal@vip.telesal.net</a>	29/11/04
39	Sra. Amaia Larralde	Proyecto de Medio Ambiente de Paz y Tercer Mundo (PTM)	Coordinadora	Presented PTM Experiences on strategic lines experiences: weaknesses and strengths	(w) 00 503 235 2485	<a href="mailto:ptmsalva@navegante.com.sv">ptmsalva@navegante.com.sv</a>	29/11/04
40	Sr. Jorge Rodríguez	Proyecto de Medio Ambiente de Paz y Tercer Mundo (PTM)	Técnico	Presented PTM Experiences on strategic lines experiences: weaknesses and strengths	(w) 00 503 235 2485	<a href="mailto:ptmsalva@navegante.com.sv">ptmsalva@navegante.com.sv</a>	29/11/04

No	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
41	Sra. Alba Margarita Salazar	SICA/CCAD	Consultora Secretaría Ejecutiva	Shared his experiences and regional perspectives on environmental issues in El Salvador and C.A	(w) 00 503 289 6131 (Fax) 00 503 289 6127	<a href="mailto:msalazar@ccad.ws">msalazar@ccad.ws</a> <a href="http://www.ccad.ws">www.ccad.ws</a>	30/11/04
	<b>GUATEMALA</b>						
42	Sr. Luis M. Godinho	Delegación de la Comisión Europea en Guatemala (UE)	Counselor	Shared his experiences and regional perspectives on environmental issues in Guatemala and C.A	(w) 00 502 2384 2500 (Fax) 00 502 2384 2596	<a href="mailto:Luis.godinho@cec.eu.int">Luis.godinho@cec.eu.int</a> <a href="http://www.ueguate.org">www.ueguate.org</a>	30/11/04
43	Sr. Alberto Guinda	Delegación de la Comisión Europea en Guatemala (UE)	Project Coordinator	Shared his experiences and regional perspectives on environmental issues in In Guatemala and C.A	(w) 00 502 2384 2500	<a href="mailto:alberto.guinda@cec.eu.int">alberto.guinda@cec.eu.int</a> <a href="http://www.ueguate.org">www.ueguate.org</a>	30/11/04
44	Sr. Laurent Umans	Embajada Real de los Países Bajos	Environmental Adviser	Shared his experiences and regional perspectives on environmental issues in In Guatemala and C.A	(w) 00 502 2367-4762 ext. 215 (Fax) 00 502 2367-5024	<a href="mailto:gua@minbuza.nl">gua@minbuza.nl</a> <a href="mailto:laurent.umans@minbuza.nl">laurent.umans@minbuza.nl</a>	30/11/04
45	Sr. Iván Azurdia Bravo	Fundación Solar	Executive Director	Shared his experiences and regional perspectives on environmental issues in In Guatemala and C.A	(w) 00 502 360 1172 (Fax) 00 502 332 2548	<a href="mailto:funsolar@inteln.net.gt">funsolar@inteln.net.gt</a>	1/12/04
46	Sra. Ximena Leiva Conte	Fundación Defensores de la Naturaleza	Institucional Development Subdirector	Shared his experiences and regional perspectives on environmental issues in In Guatemala and C.A	(PBX/Fax) 00 502 440 8138	<a href="mailto:xleiva@defensores.org.gt">xleiva@defensores.org.gt</a>	1/12/04

No .	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
47	Sra. Rita Michaan	Ministerio de Recursos Naturales (MARN)	Cooperation and Communication Director	Shared his experiences and regional perspectives on environmental issues in In Guatemala and C.A	(w) 00 502 2423 0500 ext. 436 (Cel) 00 502 5709 7156;	<a href="mailto:rpublicas@marn.gob.gt">rpublicas@marn.gob.gt</a>	1/ 12/04
48	Sr. Isabel Ibarra	Ministerio de Recursos Naturales (MARN)	Ministry Adviser	Shared his experiences and regional perspectives on environmental issues in In Guatemala and C.A	(w) 00 502 2423 0500, ext. 431	<a href="mailto:rpublicas@marn.gob.gt">rpublicas@marn.gob.gt</a>	1/12/04
49	Sr. Peter Marchetti	Universidad Rafael Landívar	Research Director	Shared the process, methodology and funds for the elaboration of the Country's environmental Profile. Discussed Second phase and perspectives of application	(w) 00 502 2-279 7979, ext. 2876-2874		1/12/04
50	Sr. Pedro Pineda	Universidad Rafael Landívar	Researcher	Shared the process, methodology and funds for the elaboration of the Country's environmental Profile	(w) 00 502 2-279 7979, ext. 2692	<a href="mailto:papineda@url.edu.gt">papineda@url.edu.gt</a>	1/12/04
	<b>COSTA RICA</b>						
51	Sr. Roelf Smit	Delegación de la Comisión Europea en Costa Rica, Panamá	Prime Adviser	Shared the process, methodology and funds for the elaboration of the Country's environmental Profile. Accompanied the EC REP Mission.	(w) 00 506 283 2959 (Fax) 00 506 283 2960; 283 2961	<a href="mailto:roelf.smit@cec.eu.int">roelf.smit@cec.eu.int</a>	2/12/04

No	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
52	Sra. Lesbia Sevilla Estrada	Ministerio de Ambiente y Energía (MINAE)- Sistema Nacional de Áreas de Conservación	Internacional Cooperation Official	Shared her experiences and regional perspectives on environmental issues in Costa Rica and C.A	(w) 00 506 283 8004 (Fax) 00 506 283 7343	<a href="mailto:lsevilla@minae.go.cr">lsevilla@minae.go.cr</a>	2/12/04
53	Sra. Patricia Marín González	Ministerio de Ambiente y Energía (MINAE)- Sistema Nacional de Áreas de Conservación	Internacional Cooperation Official	Shared her experiences and regional perspectives on environmental issues in Costa Rica and C.A	(w) 00 506 283 8004 (Fax) 00 506 283 7343	<a href="mailto:pmarin@minae.go.cr">pmarin@minae.go.cr</a>	2/ 12/04
54	Sr. Raúl Solórzano Soto	Ministerio de Ambiente y Energía (MINAE)- Sistema Nacional de Áreas de Conservación	Superior Director	Shared his experiences and regional perspectives on environmental issues in Costa Rica and C.A	(w) 00 506 283 7654 (Fax) 00 506 283 8004; 283 7118	<a href="mailto:rsolor@minae.go.cr">rsolor@minae.go.cr</a>	2/12/04
55	Sr. . Ronald Mc Carthy	Unión Mundial para la Naturaleza (IUCN) – Oficina Regional para Mesoamérica (ORMA)	Program Oficial- Forest Conservation Area and Protected Areas	Shared his experiences and regional perspectives on environmental issues in Costa Rica and C.A	(w) 00 506 241 0101 (Fax) 00 506 240 9934	<a href="mailto:ronald.mccarthy@iucn.org">ronald.mccarthy@iucn.org</a> <a href="http://www.iucn.org/places/orma">www.iucn.org/places/orma</a>	2/12/04
56	Sr. Alberto Salas	Unión Mundial para la Naturaleza (IUCN) – Oficina Regional para Mesoamérica (ORMA)	Coordinator	Shared his experiences and regional perspectives on environmental issues in Costa Rica and C.A	(w) 00 506 241 0101 (Fax) 00 506 20 0034	<a href="mailto:alberto.salas@iucn.org">alberto.salas@iucn.org</a> <a href="http://iucn.org/places/orma/">iucn.org/places/orma/</a>	2/12/04
57	Sr. Jürgen Nauber	Unión Mundial para la Naturaleza (IUCN) – Oficina Regional para Mesoamérica (ORMA)	Coordinator	Shared his experiences and regional perspectives on environmental issues in Costa Rica and C.A	(w) 00 506 241 0101 (Fax) 00 506 20 0034	<a href="mailto:Jurgen.nauber@iucn.org">Jurgen.nauber@iucn.org</a> <a href="http://iucn.org/mesoamerica">iucn.org/mesoamerica</a>	2/12/04



No	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
58	Sr. Tomás Abadía	Delegación de la Comisión Europea en Costa Rica, Panamá	Business Official	Shared his experiences and regional perspectives on environmental issues in Costa Rica and C.A	(w) 00 506 283 2959 (Fax) 00 506 283 2960; 283 2961	<a href="mailto:tomas.abadia-vicente@cec.eu.int">tomas.abadia-vicente@cec.eu.int</a>	3/12/04
59	Sra. Circe Milena Villanueva Monge	Ministerio de Relaciones Exteriores y Culto – Dirección de Cooperación Internacional (dci)	Internacional Cooperation Director	Shared her experiences and regional perspectives on environmental issues in Costa Rica and C.A	(w) 00 506 256 2694 (Fax) 00 506 256 9349	<a href="mailto:cvillanueva@rree.go.cr">cvillanueva@rree.go.cr</a>	3/12/04
60	Sr. Alexis Coto Varela	Ministerio de Relaciones Exteriores y Culto– Dirección de Cooperación Internacional (dci)	Internacional Cooperation Assitant	Shared his experiences and regional perspectives on environmental issues in Costa Rica and C.A	(w) 00 506 256 2694 (Fax) 00 506 256 9349	<a href="mailto:acoto@rree.go.cr">acoto@rree.go.cr</a> <a href="http://www.rree.go.cr">www.rree.go.cr</a>	3/12/04
61	Sra. Vera C. Varela	Fundación Geotrópica	Executive Director	Shared his experiences and regional perspectives on environmental issues in Costa Rica and C.A	(w) 00 506 253 2130 (Fax) 00 506 253 4210	<a href="mailto:fneotrop@racsa.co.cr">fneotrop@racsa.co.cr</a>	3/12/04
62	Ing. Federico Corrales P.	Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH Convenio Costarricense Alemán de Cooperación Técnica (MOPT/GTZ)	Project Adviser- Aire Limpio San José	Shared his experiences and regional perspectives on environmental issues in Costa Rica and C.A	(w) 00 506 221 4033; 257 7798, ext. 2866 (Fax) 00 506 223 9260; 255 1141	<a href="mailto:moptgtz@sol.racsa.co.cr">moptgtz@sol.racsa.co.cr</a> <a href="mailto:fcorrales@racsa.co.cr">fcorrales@racsa.co.cr</a>	3/ 12/04
<b>HONDURAS</b>							
63	Sr. Yves Leenaert	EC Delegation in Honduras	Consultant- Coutry Strategic Paper - Honduras	Shared his experiences and regional perspectives on environmental issues in Honduras and C.A	(w) 00 504 239 9991; 239 9992; 239 1042; 231 1965 (Fax) 00 504 239 9994	<a href="mailto:yves.leenaerts@yahoo.com">yves.leenaerts@yahoo.com</a>	23/11/04

No	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
64	Sr. Ian Walker	Gobierno de Honduras	Adviser of the GOH in Energy, Infrastructure and Economic issues	Shared his experiences, and regional perspectives on environmental issues in Honduras and C.A	(w) 00 503 220 1713 (Fax) 238 8572	<a href="mailto:iwalker@esa.hn">iwalker@esa.hn</a>	4/12/04
65	Ing. Jenny Suazo	Agenda Forestal; Ministerio de Industria y Comercio de Honduras	Environmental Coordinator; Environmental Negotiator of Honduras for CAFTA	Shared her experiences and regional perspectives on financial environmental issues in Honduras and C.A	(w) 00 504 226 6005 (cell) 00 504 990 8437 (Fax) 00 504 235 3082; 235 5047	<a href="mailto:jelisuan@cybertelh.hn">jelisuan@cybertelh.hn</a> <a href="mailto:jelisuan@multivisionhn.net">jelisuan@multivisionhn.net</a>	5/12/04
66	Sr. Juan Zaratiegui Biurrun	Delegación de la Comisión Europea para Nicaragua, Costa Rica, El Salvador, Guatemala, Honduras y Panamá	Coordinator of Honduran Office	Shared his experiences and regional perspectives on environmental issues in Honduras and C.A	(w) 00 504 239 9991; 239 9992; 239 1042; 231 1965 (Fax) 00 504 239 9994	<a href="mailto:juanZARATIEGUI@cec.eu.int">juanZARATIEGUI@cec.eu.int</a>	6/12/04
67	Sra. Gracia María Barahona	Banco Centroamericano de Integración Económica (BCIE)	Environmental Adviser	Shared her experiences and regional perspectives on financial environmental issues in Honduras and C.A	(w) 00 504 240 2263 (Fax) 00 504 240 2135	<a href="mailto:gbarahona@bcie.org">gbarahona@bcie.org</a>	6/12/04
68	Sr. Salvador Navarrete Marín	Banco Centroamericano de Integración Económica (BCIE)	Coordinator of: Programa de Desarrollo de Zonas Fronterizas en América Central (BCIE-UE)	Shared his experiences, program, and regional perspectives on environmental issues in Honduras and C.A	(w) 00 504 240 2141 (Fax) 00 504 240 2151	<a href="mailto:snavarre@bcie.org">snavarre@bcie.org</a>	6/12/04
69	Sr. Jorge A. Quiñónez A.	Fundación Hondureña de Ambiente y Desarrollo-VIDA	Executive Director	Shared his experiences, and regional perspectives on environmental issues in Honduras and C.A	(w) 00 504 239 1642 (Fax) 00 504 239 1645	<a href="mailto:Jorge_quinonez@fundacionvida.org">Jorge quinonez@fundacionvida.org</a> <a href="http://www.fundacionvida.org">www.fundacionvida.org</a>	6/12/04

No .	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
70	Sr. José Francisco Abarca U.	Fundación Hondureña de Ambiente y Desarrollo-VIDA	Technical Director	Shared his experiences, and regional perspectives on environmental issues in Honduras and C.A	(w) 00 504 239 1642 (cell) 00 504 972 3109 (Fax) 00 504 239 1645	<a href="mailto:jose_abarca@fundacionvida.org">jose_abarca@fundacionvida.org</a> <a href="http://www.fundacionvida.org">www.fundacionvida.org</a>	6/12/04
71	Sr. Sara Ávila	Secretaría de Recursos Naturales y Ambiente(SERNA)	Technical Adviser of the SERNA 's Direction of Environmental Control and Assessment (DECA)	Shared his experiences, and regional perspectives on environmental issues in Honduras and C.A	(w) 00 504 232 2011; 235 4864	<a href="mailto:gudielavila@yahoo.es">gudielavila@yahoo.es</a>	6/12/04
	<b>NICARAGUA</b>						
72	Sra. Gundula Weitz	Primer Secretario - Embajada de la República Federal de Alemania en Nicaragua	Encargada de Asuntos de Cooperación	Presented the activities of the German Cooperation at National and Regional level	(w) 00 505 266 3917/18 (Fax) 00 505 266 7667	<a href="mailto:Gundula.weitz-huthmann@diplo.de">Gundula.weitz-huthmann@diplo.de</a>	6/12/04
73	Dr. Lasse Krantz	Embajada de Suecia en Nicaragua SIDA	Conserejo Regional Recursos naturales y Ambiente	Explained the activities from Sweden from the regional point of view	(w)00 505 266 00 85 (cell) 850 35 85 (Fax) 00 505 266 67 78	<a href="mailto:Lasse.krantz@sida.es">Lasse.krantz@sida.es</a>	6/12/04
74	Sra. Margrethe Holm Andersen	Embajada Real de Dinamarca para Centroamérica	Consejera	Introduced the cooperation activities of Denmark	(w) 00 505 268 0250-55 (Fax) 00 505 266 8095	<a href="mailto:marand@um.dk">marand@um.dk</a>	6/12/04
75	Sr. Mike Speirs	Embajada Real de Dinamarca para Centroamérica	Consejero	Presented the Regional Programme for Environment in formulation	(w) 00 505 268 0250-55 (Fax) 00 505 266 8095	<a href="mailto:mikspe@um.dk">mikspe@um.dk</a>	6/12/04

No	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
76	Sr. Alain Ruche	Unión Europea Delegación de la CE for NIC, CR, SAL, GUA, HON, & PAN	Consejero	Indicated the relationships with the DG ENV and the internacional conventions	(w) 00 505 270 4499 (Fax) 00 505 270 4484	<a href="mailto:Alain.RUCHE@cec.eu.int">Alain.RUCHE@cec.eu.int</a>	6/12/04
77	Sr. LivioE. Sáenz Mejía	Ministerio Agropecuario y Forestal MAG – FOR Dirección General de Política	Director General	Explained the relationships of the MAG – FOR at national & regional level	(w) 00 505 276 0233 ext. 1025 (Fax) 00 505 276 0233	<a href="mailto:isaenz@magfor.gob.ni">isaenz@magfor.gob.ni</a>	6/12/04
78	Sra. María Victoria Urquijo	Corredor Biológico Mesoamericano Políticas Públicas y Desarrollo Institucional	Asesora Regional	Presented the CBM and its relations with CCAD	(w) 00 505 233 4455 (Fax) 00 505 233 1848	<a href="mailto:Victoria.urquijo@biomeso.net">Victoria.urquijo@biomeso.net</a>	7/12/04
79	Sr. Bernardo Tórrez Guerrero	MARENA Oficina de Desarrollo Limpio y Cambio Climático	Consultor Nacional	Explained the activities of Nicaragua en material de cambio climático	(w) 00 505 263 2596 (Fax) 00 505 233 1868	<a href="mailto:betogue@yahoo.com.ni">betogue@yahoo.com.ni</a>	7/12/04
80	Sra. María Engracia de Trinidad	MARENA Proyecto Manejo Sostenible de la Tierra en Áreas degradadas propensas a sequía (GEF)	Coordinadora Nacional	Presented the activities of the project	(Fax) 00 505 263 2595 (cell) 88 68744	<a href="mailto:mstcord@ibw.com.ni">mstcord@ibw.com.ni</a>	7/12/04
81	Sr. Miguel Torres	MARENA Proyecto ARAUCARIA – Río San Juan	Director Español	Explained the work of the Araucaria Programme	(Fax) 00 505 263 12 71	<a href="mailto:migueltorres@marena.gob.ni">migueltorres@marena.gob.ni</a>	7/12/04
82	Sr. Miguel Ángel Encinas Encinas	Embajada de España en Nicaragua AECI Oficina Técnica de Cooperación	Coordinador General	Presented the regional approach of the AECI	(w) 00 505 266 9285/86 (Fax) 00 505 266 9283	<a href="mailto:coordinador@aecinicargau.org.ni">coordinador@aecinicargau.org.ni</a>	7/12/04

No .	NAME	INSTITUTION	POSITION	DOCUMENTATION & ASSISTANCE	TELEPHONE	E-MAIL	MISSION MEETING DATE
83	EU – Delegation Working groups “integration” & “rural development”	Unión Europea Delegación de la CE for NIC, CR, SAL, GUA, HON, & PAN	Advisors	Debriefing and general discussion about the state of the environment	(w) 00 505 270 4499 (Fax) 00 505 270 4484		7/12/04
84	Sr. Bernard Coppens	CEVECO	Coordinator	Presented the point of view of an NGO on the environment	(w) 00 505 278 3775	coppens@veconic.org.ni	7/12/04
85	Sra. Dania Hernández	CEVECO	Forestry Advisor	Id.	(w) 00 505 278 3775	danielahernj@hotmail.com	7/12/04
86	Sr. Denis Pommier	Unión Europea Delegación de la CE for NIC, CR, SAL, GUA, HON, & PAN	Asistente Técnico	Exchange about land tenure and mainstreaming environmental concepts	(w) 00 505 270 4499 (Fax) 00 505 270 4484	Denis-Jean.POMMIER@cec.eu.int	8/12/04
87	Lic. Mario Herrera Montoya	CIDEP Consultora Integral para el Desarrollo Económico Productivo	Gerente General	Explained the difficulties of rural development projects in Nicaragua	(w) 00 505 250 5208/9 (cell) 617 2998	<a href="mailto:cidep@ibw.com.ni">cidep@ibw.com.ni</a> <a href="mailto:mjherrera@cidep.net">mjherrera@cidep.net</a>	8/12/04
88	Sr. Carlos Guillén	CIDEP	Consultant	Exchange about the land tenure problematic in Nicaragua	(w) 00 505 250 5208/9	<a href="mailto:cidep@ibw.com.ni">cidep@ibw.com.ni</a>	8/12/04
89	Sr. Erwin Geuder-Jilg	AGEG German Association of Development Consultants	Agronomist	Exchange about land tenure, rural development and environment	(w) 00 49 (0)8640 - 5318 (Fax) 00 (49) 8640 5415	geuder.jilg@t-online.de	8/12/04

### **III List of Documentation consulted**

Ubicación	AUTOR/ORGANIZACIÓN	NOMBRE	AÑO
Honduras	FORGAES	Hacia una Gestión Ambiental Sostenible-Brochure	2004
Honduras	Ministerio de Ambiente y Recursos Naturales	Medio Ambiente en Cifras el Salvador	2003
Honduras	Ministerio de Ambiente y Recursos Naturales	Valoración Económica del Humedal Barrancones, Cantón Piedras Blancas, Municipio de Pasaquina, Departamento de la Unión, El Salvador	2002
Honduras	PROCEDAMO-PRRAC/S/01/032	Gestión Socio Ambiental Concertada de la Cuenca del Río Lempa en El Salvador, Anexo 1 CD	2004
Honduras	PROCEDAMO	Sistematización de la experiencia Anexo 1 CD	2004
Honduras	Geólogos del Mundo	Caracterización de Amenazas Geológicas en la Ladera Sur-Occidental del Volcán Chaparrastique	2004
Honduras	Universidad Centroamericana "José Simeón Cañas"	Rehabilitación y Manejo de las Subcuencas El Tránsito y de la Vertiente Sur del Volcán Chaparrastique	2004
Honduras	Universidad Centroamericana "José Simeón Cañas"	Reducción de la Vulnerabilidad de la Población de la Subcuenca El Tránsito cuenca baja del Río Grande de San Miguel	2002
Honduras	Universidad Centroamericana "José Simeón Cañas"	Manual de Saneamiento Ambiental Programa de Reconstrucción para la América Central	2004
Honduras	Universidad Centroamericana "José Simeón Cañas"	Programa de Saneamiento ambiental Integral para la comunidad el Borbollon y Laguna el Jocotal	2004
Honduras	EMAS	Alternativas Tecnológicas de Acceso al agua y saneamiento Aprender Haciendo Anexo 1 CD	2004
Honduras	Ministerio de Ambiente y Recursos Naturales	Valoración Económica del Humedal Barrancones, Cantón Piedras Blancas, Municipio de Pasaquina, Departamento de la Unión, El Salvador	2002
Honduras	Solidaridad Internacional	Rehabilitación y manejo de la subcuenca de El tránsito y de la Vertiente Sur del volcán Chaparrastique, cuenca baja del río Grande de San Miguel	2004
Honduras	Financiado por la Unión Europea	Mapa de la Unión Europea	2004
Honduras	Conferencia de Socios Y Donantes	Naturaleza, gente y bienestar articulando el desarrollo sostenible en Mesoamérica	2004
Honduras	Integrandonos para el Desarrollo	Programa Binacional de Desarrollo Fronterizo	2004
Honduras	Comisión Centroamericana de Ambiente y Desarrollo	Política Centroamericana para la conservación y Uso Racional de los Humedales	2004
Honduras	CCAD Corredor Biologico Mesoamericano	Estado Actual del Comanejo de Areas Protegidas en Mesoamerica	2004
Honduras	CCAD Corredor Biologico Mesoamericano	Foro de Donantes CCAD 2004	2004
Honduras	Pinceladas del Futuro	Pinceladas del Futuro desde el Oriente Salvadoreño	2003
Honduras	Unión Europea	EURONOTAS	2004
Honduras	Cooperación Austríaca para el Desarrollo	Ahorre dinero con los desechos de su finca	2004
Honduras	Fundación NEOTROPICA	Para no tropezar dos veces con la misma piedra	2004
Honduras	Fundación NEOTROPICA	Memorial Annual	2003
Honduras	Fundación NEOTROPICA	Cacería en Osa La Cacería Un problema de todos y todas	2004
Honduras	Comisión Europea	El Programa DIPECHO: Reduciendo el Impacto de los desastres	2004

Honduras	PROCUECA SAN JUAL	Diálogo sobre agua y Clima anexo 1 Cd	2004
Honduras	PROCUECA SAN JUAL	Programa de Acciones Estratégias (PAE)	2004
Honduras	IUCN Unión Mundial para la Naturaleza	El Despertar Ambiental (Los primeros 15 años de UICN en Mesoamérica)	2004
Honduras	European Commission	Central American Integration What's next?	2004
Honduras	Banco Centroamericano de Integración Económica	Marco General del Progra	2004
Honduras	European Commission	Identification Fiche (Proposal for Formulation)	2004
Honduras	Unidad de Coordinación BCIE-UE	Programa de Desarrollo de Zonas Fronterizas en América Central	2004
Honduras	Evaluación de Estrategia regional de la CE en América Latina	Anexo 3: Inventario de Proyectos Financiado bajo el reglamento ALA 443/92, 1996	2004
Honduras	Integrating the environment EC Economic and Development CO-Operation	A Comprehensive Strategy	2004
Honduras	European Commission	Evaluación de las acciones de rehabilitación y reconstrucción financiadas por la comunidad Europea en los países ACP/ALA/MED/TACIS	2004
Honduras	Commission of the European Communités	Communication from the Commission to the Council and the European Parliament	2004
Honduras	Comisión Europea	Documentos de Estrategia Regional para América Central 2002-2006	2004
Honduras	Instituto de Incidencia Ambiental	Perfil Ambiental de Guatemala	2004
Honduras	Countdown 2010	Halt the Loss of Biodiversity	2004
Honduras	Grant Agreement between Development Alternatives Inc. (DAI) and the Escuela Agrícola Panamericana, Zamorano (Zamorano) Award number UWR-006	Watershed Rehabilitation & Improved Natural Resource Management in the Upper Choluteca watershed Interactive Atlas	2004
Honduras	CCAD Comisión Centroamericana de ambiente y Desarrollo	Foro de Donantes CCAD 2004, San Salvador El Salvador	2004
Honduras	Informe de Misión de Consultoría Asistencia Técnica Europea	Evaluación de las acciones de rehabilitación y reconstrucción financiadas por la comunidad Europea en los países ACP/ALA/MED/TACIS	2004
Honduras	Programa Medio Ambiente	Programa Medio Ambiente OTC El Salvador 2002-2005	2004
Honduras	Proyectos Jicatuyo, Prolancho, Pronorcen, Zona Norte	La Metodología Facilitadora de Apoyo al Desarrollo Sostenible	2003
Honduras	Ministerio de Ambiente y Recursos Naturales	Intervención de la Cooperación Externa en el Sector Recursos Hídricos en el Salvador	2003
Honduras	Water IQC November 2002	Honduras Effective & Sustainable Water Management	2002



#### **IV    Curricula Vitae of the Consultants**

## CURRICULUM VITAE (SUMMARY)

1. Family name : Midré
2. First names : Michel Frédéric François
3. Date of birth : 1<sup>st</sup> February 1961
4. Nationality : Belgian
5. Civil Status : married
6. Education :

<b><i>Institution :</i></b>	State Faculty of Agricultural Sciences, Gembloux, Belgium
<b><i>Date: from / to:</i></b>	09/1980 – 09/1986
<b><i>Diploma obtained :</i></b>	MSc in Agriculture, with specialisation in forestry and fresh water (Ingénieur Agronome, orientation Eaux et Forêts)
<b><i>Institution :</i></b>	Fondation Universitaire Luxembourgeoise (FUL), Arlon, Belgium
<b><i>Date: from / to:</i></b>	09-12/1986, 01-06/1988, 06/1991
<b><i>Diploma obtained :</i></b>	MSc. in Environmental Sciences, specialisation in agro-meteorology

7. Level of languages: (mark 1 to 5 for competence, 5 being the maximum)

<i>Language</i>	<i>Reading</i>	<i>Speaking</i>	<i>Writing</i>
French	5	5	5
Spanish	5	5	4
English	5	5	4

8. Years of experience: 15

9. Main fields of expertise: Environment / Forestry / Rural Development

10. Professional experience (Latin America selection):

<i>Country</i>	<i>Date</i>	<i>Name of the project</i>	<i>Main activities and responsibilities</i>
Peru	from 2003	Local Community Participation in Protected Areas Management in the Peruvian Amazon” Project (PIMA), INRENA – World Bank	Biological and Social Monitoring and Evaluation System”; responsible for the sub-component “Evaluation”
Paraguay	from 2004	Sustainable Natural Resources Management Project” (GTZ)	Backstopping, agroforestry, support to small farmers in the use of improved techniques
Panama	1998 - 2004	Forest Development in the Buffer zones and Management of the National Park Cerro Hoya” Project. (GTZ)	Backstopping, nature conservation, environmental education, national park development plan
Dominican Rep. / Haïti	07-08/ 2003	Transborder Environmental Programme (8 <sup>th</sup> EDF) Mid-term evaluation	Administrative co-ordination and translation of the report in Spanish.
Nicaragua	11/2000 – 01/2001	Environmental Program Nicaragua-Finland (PANIF)	Team leader: SEA & planning of the phase 2001-2002
Central America	11/1999- 06/2000	Environmental strategy of the EC in Central America	Feasibility study Environmental Expert
Guatemala	01/1995 – 04/1998	PROSELVA (Tropical Forests Conservation Programme) - KfW	Backstopping, protected areas, , land tenure, institutional building, environmental education

El Salvador, Guatemala, Honduras	04- 05/1994	Pilot Development Project of the Trifinio Region (EU- ALA 88/14):	Mid-term evaluation, forestry and rural development expert
Nicaragua	06/1988 – 08/1990	School of Ecology – Universidad Centroamericana (ADRAI)	Advisor to the Forest and Watershed management Department

**CURRICULUM VITAE**  
**CARLA LIZZETH RIVERA ZELAYA**  
**BIOLOGIST**

<b>Years with Firm/Entity:</b>	4 years
<b>Nationality:</b>	Honduran

**Key Qualifications:** Carla Rivera is Biologist of the National Autonomous University of Honduras, with masters degree in oceanography and limnology of the University of Wisconsin-Madison in Madison, Wisconsin, United States. Recently she finished her doctorate in natural resources and environment from the University of Santiago de Compostela in Spain.

She has sixteen years of experience in the environmental area. During this time she has been involved supporting the conservation of the environment in Honduras through consultancies for the government and private sector, NGO's and international organizations. She has wide experience in environment training, environmental impact evaluations, environmental diagnostics, environmental audits, watershed diagnostics, management plans, biological evaluations (territorial and aquatics), wild life, land use, environmental quality (base line), limnological analysis, political and environmental legislation.

**Education:**

1999-2001	University of Santiago de Compostela. Santiago de Compostela, Spain. Ph.D. in Natural Resources and the Environment.
1993-1995	University of Wisconsin-Madison. Madison, WI, EEUU. Masters Degree in Oceanography and Limnology 1993-95. (Academia Excellency)
1993-1988	National Autonomous University of Honduras (UNAH). Tegucigalpa, Honduras. Major in Biology 1988-93. (Academic Excellency)
1983-1987	National Autonomous University of Honduras (UNAH). Tegucigalpa, Honduras Bachelor's Degree in Biology 1983-87. (Academic Excellency)

**Consultancies:**

2003	Qualitative Environmental Assessments of Sanitation Projects in 13 Municipalities of Honduras. US Army Corps of Engineers/FHIS/USAID. April 2003 to June 2004.
2003	Establishment of the Honduran National Information System (SIN) for Biotechnology and Biosafety for the Natural Resources Ministry (SERNA). July to November 2003.
2003	Environmental Impact Assessment Study of the Urbanization Zona 8 of the Cerro Grande Neighborhood, Tegucigalpa, M.D.C: Honduras. Urbanizaciones Hasbun S.A. de C.V. January to March 2003.
2002-2003	Preparation of the Management Plan for the Río Pijol Microwatershed, Morazán, Yoro. Ecological Association for the Protection of the Pico Pijol National Park (AECOPIJOL). October 2002 to February, 2003.
2002	Design and Planning of the Sustainable and Effective Use of Water (MESA) of the Choluteca and Negro River Watersheds. Honduras. USAID/DAI. August – September, 2002.
2002	Site Planning and Conservation of the Lake Yojoa Region, Honduras. The Nature Conservancy (TNC) for the Municipal Association for the Protection of Lake Yojoa (AMUPROLAGO). February and April, 2002
2002	Environmental Impact Assessment Study of the Utila Power Company. Bay Islands, Honduras. Tennessee Valley Infrastructure Group, Inc. (TVIG). January to March 2002.
2001	Environmental Impact Assessment Study of the (EIA for the Tegucigalpa Flood and Landslide Control Project (Choluteca River Watershed) for

	JICA/SOPTRAVI/BEINSA. Tegucigalpa, M.D.C., Honduras. September to December 2001.
2001	Environmental Impact Assessment Study of the Project: Urbanización Yojoa. SAYBE and ASSOCIATES/BEINSA. Lake Yojoa, Honduras. December 2001 to January 2002.
2001	Preparation of the Strategic Management Plan of Lake Yojoa Watershed for the Municipal Association for the Protection of Lake Yojoa (AMUPROLAGO). Lake Yojoa, Honduras. October, 2001 to June 2002.
1997	Creation and Coordination of the Environmental Unit of the Special Environmental Public Ministry of the GOH. Tegucigalpa, M.D.C. Organization of American States (OAS). July-December. 1997.
1997	Environmental Viability Study of Los Llanitos Hydroelectric Power Plant, Santa Bárbara, Cortés. ESA Consultores/Statkraft Groner. August to September. 1997.
1997	Rapid Ecological Assessment of the Coastal Zone of Punta Izopo Wild Life Refuge Wildlife Conservation Society (WCS)/PROLANSATE-USAID/Fundación VIDA. July, 1997.
1997	Formulation of the of the Coral Reef System at Jeannette Kawas National Park and Punta Izopo Wild Life Refuge, Tela, Honduras. Wildlife Conservation Society (WCS)/PROLANSATE-USAID/Fundación VIDA . August to September. 1997.
1997	Environmental Impact Assessment of Puerto Cortés Sewage System, Honduras. ESA Consultores/IDB. March to September, 1997.
1995-1996	Environmental Impact Assessment of the Touristic Complex “Club Marbella”, Tela, Honduras. ESA Consultores/IDETRISA. November 1995 - March 1996.

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Tegucigalpa, M.D.C., Honduras, C.A.

## **V      Terms of Reference for the Regional Environmental Profile**

Terms of Reference  
Regional Environmental Profile of the  
Central American Region

1. Background

The Central American region (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama) is an important and highly biodiverse geographical corridor, which links the North American and South American sub-continent. It is particularly vulnerable to natural disasters including, hurricanes, earthquakes, flooding and droughts. The region's vulnerability, high reliance on agricultural production and exports, and growing interest in promoting tourism have contributed to raising awareness of the critical need to preserve and appropriately manage its environmental resources. In the context of the Central American Integration System (SICA), the region is promoting an integrated approach to regional environmental preservation and management issues. In this regard, the principal institution responsible for coordinating regional environmental matters is the Central American Commission for Environment and Development (CCAD), which forms a part of the General Secretariat of SICA. CCAD's mission is to strengthen regional integration in the environmental policy field in order to promote sustainable economic, social and ecological regional development through harmonising environmental policies and management.

The region's strategic focal areas for environmental management are set out in the Central American Regional Environmental Plan (PARCA) and include:

- Water
- Clean production technologies
- Institutional development for environmental management, and
- Forests and biodiversity

Since 1992, the CCAD has been particularly involved in the development of a Regional Strategy for the Conservation and Sustainable Use of Mesoamerican Biodiversity, which has also benefitted from the close collaboration of Mexico. This strategy builds on the Central American Regional Environmental Plan (PARCA), the Central American Convention for the Conservation of Biodiversity and the Protection of Priority Forest Areas (CCABAP), the Convention on Biological Diversity (CDB), and the eight national biodiversity strategies.

The European Commission is currently launching the preparatory analysis for drafting its regional and country strategies for Central America for the period 2007-2013. In this context, it attaches particular importance to ensuring that consideration is given to environmental issues in order that they are systematically incorporated into the new country and regional strategy papers for the Central American region. To this end, the Commission considers it essential to draw up a Central America Regional Environmental Profile that will help it to identify the key environmental challenges in the region. To date, no such profile has been prepared by the Commission. However, significant support has been provided to the region in the area of tropical forest management, water management, and reconstruction and rehabilitation following Hurricane Mitch. In addition, a programme of support in disaster prevention and environmental management is currently under preparation in the context of the existing Regional Strategy for Central America. The finalisation and implementation of this project will also benefit from the preparation of the Regional Environmental Profile.

## 2. Objective

The objective of the Regional Environmental Profile is to identify and assess environmental issues to be taken into account in the preparation of the regional and country strategy papers for the Central American region for the period 2007-2013.

The Regional Environmental Profile will provide decision-makers in the European Commission and the partner countries with information on the key regional and national environmental challenges and environmental management concerns, strategies, objectives, programmes and actors in the Central American region. This information will help to ensure that the EC cooperation strategies for the period 2007-2013 systematically integrate environmental concerns into the selection of priority focal areas and establish the necessary environment safeguards for all cooperation activities undertaken in the Central American region. The Profile will constitute an important source of baseline information and will also contribute to focusing political dialogue and cooperation with the Central American region on key areas of concern such as sustainable development as well as raising awareness among policy-makers.

## 3. Results

The study will deliver the following:

- An assessment of the environmental situation in the Central American region covering the impact of key environmental factors on the region's development and responses to these; regional and national environmental policy and legislation; institutional structure and capacity; the involvement of civil society in environmental issues.
- An overview of past and ongoing international cooperation in the environmental conservation and management field.
- A summary of the critical environmental challenges faced by individual Central American countries and by the region as a whole.
- Recommendations and, as far as possible, relevant guidelines or criteria for mainstreaming environmental concerns in priority development areas such as regional integration and social cohesion among others.

## 4. Issues to be studied

The consultants will study the following issues:

### 4.1. The state of the environment

Including key issues (current status, pressures and trends) and environmental performance in meeting objectives/plans and targets in the following areas:

- **Physical environment** including climate (and climate change issues), air quality, water quality and resources (including marine environment), land quality and resources and natural disaster risks;
- **Biological conditions, biodiversity, ecology and nature conservation** including rare, endangered and endemic ecosystems, habitats and species, and biological resources of cultural, social, or economic importance.
- **Socio-economic conditions, socio-cultural conditions and human health** including archaeology and cultural heritage, values and aspirations, recreational, landscape and visual aspects, population, socio-economic conditions in relation with environmental issues (public health, vulnerability to disasters, access to natural resources and commodities).



Reference should be made to locally used (regionally, nationally) and to internationally recognised indicators and quality standards to establish a consistent basis for comparison of environmental and sustainable development performance. The indicators selected should facilitate future monitoring and evaluation of the extent of environmental integration and be useful for further environmental assessments.

Consequences of the environmental situation and trends on human well-being and sustainable development should be presented.

If appropriate, the information could be organized according to eco-geographical subdivisions with the scale (regional, national, local) of the problems indicated.

#### **4.2. Environmental policy and legislation**

A brief description and a review of strengths and weaknesses of the following:

- National and regional policy and environmental action plans for sustainable natural resource management and pollution control.
- Legislation, current and in preparation, by the Secretariat General of the Central American Integration System (SG-SICA) and by the member countries covering development control, requirements for EIA/SEA, environmental auditing, sustainable use or conservation of natural resources, pollution control, land tenure and land reform and provisions for public participation and access to environmental information and the effectiveness of enforcement of legislation.
- National and regional approaches to key international or regional environmental conventions such as those concerning climate change, biodiversity and desertification.
- Efforts in harmonising national policy and legislation at the regional level.

#### **4.3. Environmental institutional framework**

- institutional structure and responsibilities of the Central American regional and national bodies dealing with environmental issues in policy making, legislation, planning, environmental protection, monitoring and enforcement;
- formal structures and procedures for public participation in development control and environmental planning; capacity and financial resources of authorities responsible for environmental management.
- The extent and quality of protected areas (and, if relevant, other land use measures).
- capacity of authorities responsible for environmental management

#### **4.4. Integration of environmental concerns into the main sectors**

**The assessment should cover the following sectors:**

- agriculture, fisheries and forestry;
- industry, mining and oil extraction;
- services including transport, utilities (power, energy and water) and tourism

For the purposes of the main focal areas of the country strategies for 2007-2013, special attention should be given to mainstreaming environmental concerns into the areas of regional integration and social cohesion.

#### **4.5. EU cooperation with the region from an environmental perspective**

This analysis should cover experience relating to interventions with specific environmental objectives as well as the integration of environment into programmes with other primary objectives, including the application of environmental assessment procedures. Where information is available, the environmental impact of EU cooperation or potential risks should be identified for the benefit of future programmes. Lessons should be drawn from the existing evaluations.

#### **4.6. Cooperation funded by other agencies from an environmental perspective**

This should cover the involvement of other funding agencies and their experience in the region and include a list of recent and planned projects.

#### **4.7 Conclusions and recommendations**

This chapter will summarise the key aspects of the state of the environment in the Central American region including the policy and institutional constraints and challenges and make recommendations for priority actions that the region should pursue and for the environment safeguards that should be envisaged for future cooperation activities. The key environmental issues identified during the study for each of the seven countries should also be presented in a summary table form and there should be a clear distinction between the environmental problems that are to be addressed at national and at regional level. Recommendations should also be made as to how best the Commission can mainstream environmental issues into the next regional and country strategy papers.

The limitations of the profile should be articulated and an assessment of the need for additional environmental studies, such as Strategic Environment Analysis or others, should be made.

### **5. Work plan**

The work plan should include but not necessarily be limited to the following activities:

- Consultation with EC regional/country desk officers and other relevant officials, EC Delegations in Central America, the Secretariat General of SICA, in particular its Environment and Development Commission (CCAD), a selection of national and local authorities, key international funding agencies operating in the region, plus key national, regional and international civil society actors operating in the environmental field.
- Review of evaluation reports with respect to environmental issues on development and economic co-operation produced by government, EC or other agency sources.
- Review of environmental literature, evaluation reports, environmental policy and legislation framework, legislation and regulations and enforcement relating to environmental issues, action plans, and progress in implementation.
- Review of environmental performance indicators selecting appropriate indicators from those suggested by organisations such as EEA/OECD/Eurostat.
- Field analysis (in particular in Nicaragua and El Salvador where the key EC and CA regional representations are located) and if possible in other countries and/or through the organisation of a regional workshop that should be attended by regional and national authorities, donors, experts and civil society representatives.

On the basis of the proposed work plan and time schedule outlined in this Terms of Reference, the consultants must detail their work plan for the Regional Environmental Profile study in their offer.

## 6. Expertise required

The proposed mission shall be conducted by a team of two experts for a duration detailed in the time schedule below, who should have the following profiles:

- Expert level I or level II with at least 10 years experience in environmental conservation and management with in depth knowledge of international environmental policies, environmental assessment techniques and institutional aspects. He/she would be the team leader
- Expert level II from the Central American or Latin American region with a biophysical environment background and some 10 years experience

In addition:

- Previous working experience in the region is preferred;
- Experts should have an understanding of EU environment and development policies;
- Experience in undertaking environmental analysis and preparation of development programmes would be an asset;
- Familiar with Commission Guidance on Programming including Development Policy, Country Strategy, Project Cycle Management (PCM), Policy Mix and integration of environmental issues into other policy areas;
- Experience of participatory planning processes;

The experts should have excellent skills in Spanish and English. Spanish will be the working language although the final report must be presented in English.

For each specialist proposed, a curriculum vitae must be provided of no more than four pages setting out their relevant qualifications and experience.

## 7. Reporting

The study conclusions must be presented in the Regional Environmental Profile report in the format given in Appendix 1.

The draft report in 10 copies is to be presented to the Head of Unit of DG RELEX G/2 four weeks after the conclusion of the contract. Within 3 weeks, comments on the draft report will be received from the EC.

The consultants will take account of these comments in preparing the final report (maximum 40 pages excluding appendices). The final report in English in 50 copies is to be submitted within one week of receipt of EC comments on the draft report.

## 8. Presentation of the offer

The consulting firms should present their offer by providing the two CVs of the experts (not more than 4 pages each), and the proposed methodology (not more than 4 pages).

## 9. Time schedule

The assignment should ideally commence before mid-November 2004 and the work days should be allocated in line with the following schedule:

Activity	Expert I	Expert II
Desk analysis (including briefing of Expert I in Brussels)	8	6
Field phase including travel and	17	17

possible workshop		
Report finalisation	3	3
Debriefing in Brussels	1	
Final report	1	1
Total days	30	27

## 10. Appendices

### I. Report format for a Regional Environmental Profile

#### STANDARD REPORT FORMAT

##### **Report Format for a Regional Environmental Profile**

Maximum length (excluding appendices) 40 pages.

The following text appears on the inside front cover of the report:

*This report is financed by the European Commission and is presented by the [name of consultant] for the General Secretariat of the Central American Integration System (SG-SICA) and the European Commission. It does not necessarily reflect the opinion of the SG-SICA or the European Commission.*

#### **1. Summary**

This is an executive summary of the key chapters of the Regional Environmental Profile clearly indicating priority challenges and areas for action at the regional and country level.

#### **2. State of the environment**

This chapter will provide an overview of the context and general state of environmental conservation and management in the region – including questions of fundamental rights and indigenous rights. More specifically, it will include analysis of the:

- Physical environment;
- Biological conditions, biodiversity, ecology and nature conservation;
- Socio-economic and socio-cultural conditions and human health;

This chapter will also set out an assessment of the state of the environment including key issues as outlined in Section 4.1 of the TOR.

#### **3. Environmental policy, legislative and institutional framework**

This chapter will provide an assessment of the region's environmental policy, regulatory and institutional framework for pollution control, natural resource use and sustainable development. It will be divided into sections as follows:

##### **3.1. Environmental policy and legislation**

This chapter must include an assessment of the key issues outlined in Section 4.2 of the TOR.

##### **3.2. Environmental institutional framework**

This chapter should review the roles and capabilities of the main national and regional institutions as outlined in Section 4.3 of the TOR.

##### **3.3. Integration of environmental concerns into the main sectors**

This section must include an assessment of the key issues as outlined in Section 4.4 of the TOR.

##### **3.4. EU and other donor cooperation with the region from an environmental perspective**

This section must include EC and other donor assistance within the region from an environmental perspective covering the issues outlined in Sections 4.5 and 4.6 of the TOR.

## **5. Conclusions and recommendations**

This chapter will present the conclusions on the state of the environment in the Central American region and make recommendations for priority actions that the region should pursue. The key environmental issues identified during the study for each of the six countries should also be presented in a summary table form. Recommendations will also be made as to how best the Commission can mainstream environmental issues into the new regional and country strategy papers.

## **6. Technical appendices**

- I. Environmental maps of the region
- II. Reference list of environmental policy documents, statements and action plans

## **7. Administrative appendices**

- I. Study methodology/work plan (1–2 pages)
- II. Consultants' Itinerary (1–2 pages)
- III. List of persons/organisations consulted (1–2 pages)
- IV. List of documentation consulted (1–2 pages)
- V. Curricula vitae of the consultants (1 page per person)
- VI. Terms of Reference for the Regional Environmental Profile