

PROJECT BRIEF

1. IDENTIFIERS

PROJECT NUMBER: MEX/00/G41/A/IG
TITLE: **Mexico: Integrated Ecosystem Management in 3 Priority Ecoregions**
DURATION: 8 years in 2 phases [Phase 1: 5 years, Phase 2: 3 years]
IMPLEMENTING AGENCY: United Nations Development Programme (UNDP)
EXECUTING AGENCY: Secretariat of Environment, Natural Resources Fisheries
REQUESTING COUNTRY: Mexico
ELIGIBILITY: Mexico Ratified the CBD and FCCC on March 11, 1993
GEF FOCAL AREA: Primary: Biodiversity; Secondary: Climate Change, & Land Degradation
PROGRAMMING FRAMEWORK: OP 12: Integrated Ecosystem Management

2. SUMMARY: The project will protect biodiversity and sustain vital ecological functions within 3 globally significant ecoregions: the Tehuantepec Moist Forest, the Pacific Dry Tropical Forests, and the Sierra Madre del Sur Pine-Oak Forest. These ecoregions contain a range of forest communities including pine forest, pine-oak forests, cloud forest, tropical rain forest, tropical dry forest and mangroves, which provide habitat for native fauna, act as carbon reservoirs, and protect watersheds. Yet they face a suite of growing anthropogenic pressures that imperil their ecological integrity and functions. This situation is mirrored in other parts of Mexico and the Government has responded by founding the Sustainable Regional Development Program (PRODESA), which aims at integrating biodiversity conservation and development objectives in 24 discrete regions. Working at three sites: Chinantla in Oaxaca State, Montaña in Guerrero and Los Tuxtlas in Veracruz, the project will strengthen and cross-fertilize PRODESA by piloting integrated and replicable ecosystem-management models that conserve biodiversity and sequester carbon, while forestalling land degradation. The objective is to establish the institutional framework and local capacities to manage a mosaic of biodiversity-friendly land and resource uses, including set-asides for biodiversity protection, compatible agro-forestry and silvo-pastoral systems, and ecological restoration. A number of cross-sectoral interventions are advanced to remove barriers to integrated ecosystem management. The Government of Mexico will then replicate the management paradigm at other PRODESA sites.

3. COSTS AND FINANCING (MILLION US\$)

		Phase 1	Phase 2	Total
GEF	Project	10.61	4.68	15.30
	PDF-B			00.35
	Sub-Total	10.61	4.68	15.65
CO-FINANCING	Government	41.25	20.34	61.59
	PDF-B			00.12
	Sub-Total	41.25	20.34	61.71
TOTAL PROJECT COST		51.87	25.02	77.36

4. ASSOCIATED FINANCING: (Baseline): Estimated at 154.49 over eight years.

5. GEF FOCAL POINT ENDORSEMENT

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LIST OF ACRONYMS

ANP	Natural Protected Areas
BCI	Interagency Planning and Programming Agreements
CBD	Convention on Biological Diversity
CNA	National Water Commission
COBIDES	Committees for Integrated Ecosystem Management and Biodiversity Protection
CONABIO	National Commission on Biodiversity Knowledge and Use
CONANP	National Council on Protected Areas
COPLADES	State Development Planning Committee
EAP	Economically Active Population
FANP	National Fund for Protected Areas Management
FCCC	Framework Convention on Climate Change
FONAES	National Fund to Support Social Enterprises
GoM	Government of Mexico
INE	National Institute for Ecology (SEMARNAP)
INI	National Institute for Indigenous Affairs (SEDESOL)
LMC	Local Management Committees
NPD	National Development Plan
PNUD	United Nations Development Program
PROAREP	National Program for Attention to Priority Regions
PROCYMAF	Conservation and Forest Resources Sustainable Management Project
PRODEFOR	Forestry Development Program
PRODEPLAN	Commercial Forestry Plantations Development Program
PRODERS	Sustainable Regional Development Program
PROFEPA	Office of the Federal Environmental Protection Attorney
PRONARE	National Reforestation Program
SAGAR	Secretariat of Agriculture, Livestock and Rural Development
SCT	Secretariat of Communications and Transportation
SECOFI	Secretariat of Trade and Industrial Development
SEDAF	State Secretariat of Agricultural, Livestock and Forestry Development
SEDENA	Secretariat of National Defense
SEDESOL	Secretariat of Social Development
SEMARNAP	Secretariat of Environment, Natural Resources and Fisheries
SEP	Secretariat of Public Education
SINAP	National System of Protected Areas
SRA	Secretariat of Agrarian Reform
SSA	Secretariat of Health
UMAS	Sustainable Wildlife Systems
VMC	Village Management Committee

PROJECT CONTEXT

1. Environmental Context: Mexico is one of the world's biologically richest countries, with the second highest count of reptiles and mammals recorded in any nation, and the fourth highest tally of plants and amphibians (Mittermeier 1998). A very high incidence of endemism is characteristic, with more than 900 endemic vertebrate species, and up to 70% endemism in some plant families (i.e. Cactaceae and Agavaceae). The determinants of this extraordinary wealth include the nation's rugged topography, varied climate, and complex bio-geographical history¹. Some 29 % of Mexico's territory is forested, and forests provide a number of vital ecological functions, including by storing and accumulating carbon, sustaining hydrological cycles, and stabilizing soils. Yet, despite their ecological values, Mexico's forests are being lost at an alarming pace, with some estimates placing forest loss at between 600,000 and 700,000 hectares per year (Masera et al, 1997). The country may have lost as much as 95% of its original tropical forest cover, more than half of its temperate forest biomes, and a significant portion (>50%) of its semi-arid vegetation. The global environmental implications of this loss are grave, both in terms of the scale of biodiversity loss, and contribution to Mexico's GHG emissions and to land degradation. Mexico's forests are estimated to store 1,500 million metric tons of carbon (Masera, 1995). Presently, changes in land use, including permanent conversion of forests to other land uses and degradation account for over 30% of Mexico's CO₂ emissions (UNDP & WRI, 1999).

2. This project will seek to complement other biodiversity management initiatives, including planned investments in the Mexican protected area estate, by nesting conservation and regional development strategies within an integrated approach to ecosystem management. This approach is distinguished from other conservation efforts in that it will work at bioregional scales and across the productive sectors. While primarily geared towards generating global conservation benefits, by protecting flora and fauna that might otherwise be extinguished, the project will also generate other global environmental benefits by safeguarding carbon sinks, and foreclosing severe land and water degradation. Three globally significant sites have been selected as the focus of intervention: La Chinantla, La Montaña and Los Tuxtlas². All of these sites are mountainous and are distinguished by large local variations in altitude, substrate and micro-climatic conditions. All are in turn characterized by exceptional beta-diversity—a product of these geo-physical attributes.

- a) The Chinantla region in the southern part of the state of Oaxaca covers an area of 461,000 hectares (ha.) within the globally important Tehuantepec Moist Forest ecoregion. The area under forest totals 248,186 ha., the two largest remaining habitat blocks covering areas of 64,474 ha. and 56,123 ha. respectively. The Chinantla has two broad floristic belts, (Hernández 1999), including Mexico's biologically richest cloud forest (Rzedowski, J., 1999), and one of the country's largest extant tropical rain forests. A total of 1,847 species of vascular plants, 35 of which are endemic and 41 listed in Mexico's Red List of Endangerment; 93 amphibians (62 endemic, 49 listed); 200 reptiles (114 endemic, 107 listed); 530 birds (31 endemic, 169 listed); and 260 mammals (41 endemic, 52 listed) have been recorded.
- b) The Montaña region in Guerrero comprises an area of 692,000 ha., of which 281,332 ha. have natural forest cover. Two globally important ecoregions are represented: the Pacific Dry Tropical Forest and the Sierra Madre del Sur Pine-Oak Forest. The region's forests include two relative large, though spatially disconnected, forest blocks, namely the Huamuxtitlán-Tehuaxtitlán ravine (41, 652 ha.) and Iliatenco-Barranca del Aguila forest (69, 998 ha), plus one other large forest block and several forest patches. La Montaña protects a number of unique plant communities, including tropical dry forests, the species assemblages of which

¹ The number of species identified to is expected to increase as field research progresses. Currently, field biologists have studied only a small number of taxonomic groups, including vertebrates and certain plant families, in depth.

² The regions are ranked as high conservation priorities in Mexico's Biodiversity Action Plan (CONABIO, 2000).

display considerable variation when contrasted with similar communities elsewhere in the two ecoregions (PAIR-Montaña, 1999). There are fragments of hilltop holm oak groves and riparian vegetation in the ravines, unique areas of acanthus forests and montane cloud forest (PAIR-Montaña, 1999). A total of 40 amphibians (10 endemic, 16 listed); 112 reptiles (10 endemic, 52 listed); 561 birds (7 endemic, 85 listed); and 98 mammals (2 endemic, 25 listed) have so far been identified. The inventory of plants is incomplete but is expected to be large.

- c) Los Tuxtlas in Veracruz has an area of 165,000 ha., of which 24% is forest cloaked. There are 4 large remaining forest blocks, covering a combined area of 39,719 ha, plus a number of outlying forest patches. Los Tuxtlas is the northernmost example of tropical rainforest in North America, and protects a remnant of the regionally outstanding but threatened Tehuantepec Moist Forest ecoregion. Forest communities include tropical moist forest, tropical dry forest, mangroves, hill forest and cloud forest. 1,300 species of plants have been recorded (2 endemic, 15 listed); 42 amphibians (35 endemic, 25 listed); 113 reptiles (82 endemic, 63 listed); 561 birds (27 endemic, 24 listed); and 63 mammals (6 endemic, 6 listed).

3. Institutional Context: Several Federal Agencies contribute in different ways to development and land use management. SEMARNAP, the Environmental Secretariat, has overall responsibility under national legislation for discharging regulatory functions relating to the environment, including in the forestry, fisheries, agriculture and urban/ industrial sectors, and for air quality (climate change) and watershed management. This includes oversight of compliance by developers with environmental standards, administration of protected areas and other special management zones created to protect natural resources, and co-ordination of the country's response to global initiatives, including the Environmental Conventions. The Attorney General's Office for Environmental Protection (PROFEPA) is responsible for prosecuting offenders for malfeasance under environmental legislation, and works closely with other SEMARNAP units. SAGAR—the Agricultural Secretariat—has overall responsibility for promoting and managing agricultural and rural development, supporting both smallholders and large-scale producers. The Secretariat coordinates a number of programs and services, including extension, farming systems research, and marketing and distribution. Another Secretariat, SEDESOL, is responsible for social development and, through its Institute for Indigenous Affairs (INI), for the welfare of indigenous peoples. A fourth Secretariat, the Secretariat of Communications and Transportation (SCT), is responsible for constructing infrastructure such as roads. All these Secretariats are headquartered in Mexico City, but maintain offices the States that manage the bulk of their field operations.

4. Municipalities are responsible for town planning—defining and enforcing zoning requirements in villages and hamlets. Municipalities are also responsible for providing civic utilities such as water supplies and waste management systems. Mexico's 31 States share responsibilities with Federal Agencies for delivering Government services, and have generally created institutional structures that mirror those created at the Federal Level. SEDAF, the State Secretariats of Agricultural, Livestock and Forestry Development are responsible in principal, for delivering services to the agriculture, livestock and forestry sectors, although budgetary constraints have hitherto prevented them from effectively discharging these obligations. However, the Federal Government has embarked on a far-reaching administrative decentralization program, which should see the gradual transfer of some functions and budgets for services from the center to the State level.

5. Land management jurisdictions for croplands, rangelands and forestlands depend on the tenure system. About half of Mexico's croplands, and 80% of the forest estate are under a form of land tenure known as the *ejidos* system, administered by agrarian communes. Under this system, land is divided into individual plots, tenure rights over which are allocated to heads of household, or *ejidatarios*, who appropriate rights to descendents. Members acquire land rights upon reaching adulthood. Another tenure system, known as *comunidades*, is characteristic of indigenous communities. Here, land is managed by and in the interest of the community. Under Agrarian

Law, *ejidos* and *comunidades* are responsible for land use planning, allocation and management, and for enforcing federal or local regulations that circumscribe land uses in the public interest, such as within protected areas. These units are therefore the primary local vehicles of land use planning and management, and have a critical stake in the conservation arena. In addition to local governments and community based groups, several local NGOs are engaged in the areas of environmental management and sustainable development at the 3 sites, including, in Chinantla, ERA, Methodus, and Mesofila, in Montaña, PAIR, and in Los Tuxtlas: Luisa Pare, Sierra Santa Marta, and Alicea.

6. Policy Context: The *National Development Plan* (NDP) advances a medium-term development agenda, emphasizing the need to balance economic, social and environmental objectives and encouraging the active involvement of civil society in environmental management. Mexico ratified the UNFCC—Framework Convention on Climate Change—in 1993, and has since advanced several measures to meet commitments under the Convention. These include the preparation of a Country Study, Inventory of Emissions Sources, National Communication to the Conference of Parties to the UNFCC and an Action Plan for abating emissions of green house gasses (GHGs). The regulation of land uses to mitigate emissions of GHGs resulting from changes in land use status is flagged in the Plan as a national policy priority. Mexico’s Congress ratified The *Convention on Biological Diversity* on the same day as the UNFCC in 1993. The NDP’s *Environmental Program* lists the protection and sustainable use of biodiversity as one of its three highest priorities. The Government has recently finalized a *National Biodiversity Strategy*, with the financial support of the GEF, which flags 4 pillars of conservation management: i) protection and preservation of ecosystems; ii) assessment of biodiversity; iii) management of information on biodiversity; and iv) diversification of the use of natural resources.

7. Legal Context: The principal environmental statute in Mexico is the General Law of Ecological Equilibrium and Environmental Protection (LGEEPA), enacted in 1988 and amended by congressional consensus on December 13, 1996. A specific section of the Law deals with biodiversity, providing the legal framework for Protected Areas (ANPs). *The Organic Law of the Federal Public Administration*, (enacted in 1994), provides for the creation of SEMARNAP and defines its functions and legal responsibilities. Other key legal provisions related to the environmental sector include the *Federal Hunting Law* (1996), regulating taking of wildlife; and the *Forestry Law* (1996) which regulates forestry, including protection, restoration, reforestation and production from a development perspective. In addition to the Laws mentioned above, other legal instruments with a bearing on environmental management include the *Fishing Law*, the *Federal Law of Plant Varieties*, the *Agriculture Law*, the *Plant and Animal Health Laws*, the *National Water Law*, *Agrarian Law* and *General Human Settlement Law* (1993). Other Legislation and specifications to Laws, such as Presidential Decrees, complete this framework.

8. Overview of Land Use: 39 municipalities have administrative jurisdiction over the 3 project regions. The regions have a combined population of approximately 720,000, with a mean population density of some 4.62/ hectare. A general summary of land uses is provided in Table 1:

a) In La Chinantla, 70.5% of the economically active population (EAP) derive their principal livelihoods from agriculture and forestry. 3.8% of the total area (or 7,701 ha) is cropland, cultivated with corn, coffee and, to a much smaller extent, vanilla bean. Smallholders extract different non-timber forest products, including ornamental plants (mainly Camedor Palms, and some orchids, ferns, and cycads), and medicinal plants to supplement their household income. Livestock husbandry is dominated by cattle production. Slash and burn agriculture is still practiced on slopes of 15 to 45 degrees, but intensive agriculture on permanent plots predominates in the Chinantla lowlands. 93% of the land in the lowlands is administered under the *ejido* system, and 7% as communal property, compared with 4% as *ejido* and 96% as communal property in the uplands. The mean size of smallholder plots under the *ejido* system is 2 hectares. (Beltrán, E. 1999, Mesofilo Group, 1999 and PAIR-Oaxaca, 1999.)

- b) In La Montaña, 84.4% of the EAP is devoted to agricultural activities (INEGI, 1998). 55,000 ha are under cultivation, mainly with corn, coffee, and rice. Hillside subsistence farming systems dominate on slopes of 15 - 45 degrees. On gentler slopes, draft animals are used for tilling. Goats and, to a lesser extent, cattle and sheep, are raised for subsistence. There are a number of small cattle ranches in the low lands. The average size of farm plots is 3 hectares. Land tenure in the Huamuxtitlán ravine is as follows: 45% communal, 14% ejido, 40% private and 1% federal. In Iteateco, 21% of land holdings are administered as *ejidos* and 88% is communally owned. (INEGI, 1994 and PAIR-UNAM, 1995.) Copal harvests (from certain *Bursera* species) and handicraft production supplement household income. Approximately 90% of households depend upon firewood to meet domestic needs (Arias, 1997). Finally, some medicinal herbs are collected from the wild for subsistence and for sale in local markets.
- c) In Los Tuxtlas, some 60% of mestizo communities and 79% of indigenous communities obtain their principal source of livelihood from agriculture and livestock production. Corn and tobacco comprise the staple crops, while coffee, fruit, legumes and root crops are also cultivated, both for productive purposes and home consumption. Indigenous communities grow maize on hillsides, and manage small herds of livestock. Livestock husbandry is dominated by non-transhumant cattle production—accounting for a larger share of aggregate income than in the other regions. Wild harvests provide a means of supplementing household income for forest-edge communities. A number of non-timber products are harvested, notably some palms, orchids, cycads and medicinal plants. The tourism sector has also seen growth, providing new opportunities for local employment. 66% of land holdings are administered as *ejidos*, 3% under communal management, 22% under private ownership, and the residual, by the State. The mean size of farm plots in the region ranges between 16- 24 ha. (INEGI, 1990).

TABLE 1: SUMMARY OF LAND USES

Statistics/ Land Use	La Chinantla	La Montaña	Los Tuxtlas
Size of Region	461,000 ha.	692,000 ha	165,000 ha
Households	19,533	43,575	41,080
Area of Forest	248,186 ha.	291,332 ha	39,719 ha.
Size of largest Habitat Blocks	64,474 ha /56,123 ha.	41,652 ha./69,988 ha.	9,805 ha/18,031 ha/ 1,883 ha/ 10,000 ha
Area of Croplands	17,701 ha.	55,000 ha.	6,422 ha.
Area of Rangelands	44,489 ha.	112,104 ha.	90,913 ha.
Area of Degraded Land	2,384.64 ha.	88,576 ha.	2,448 ha.
Area under Tree Plantations	18,672ha.	0 ha.	2,000 ha.
Secondary Vegetation	115,185 ha.	124,228 ha.	13,443 ha
Water bodies	13,382 ha.	20,760 ha.	2,000 ha
No. of Cattle [Goats/Sheep]	39,125 cattle	59,429 cattle 123,408 goats 15,710 sheep	221,874 cattle
Fuelwood Consumption	71,295 Ton/Year	190,863 Ton/Year	157,439 Ton/Year

BASELINE ACTIVITIES

9. Threats: All of the target sites have experienced significant past disturbance, unfortunately a situation that prevails throughout Mexico, particularly in tropical forest biomes. 46.16%, 57.9%

and 76% of the original forest cover in La Chinantla, Montaña and Los Tuxtlas respectively has been extinguished, and the remaining forest is threatened with insularization. Despite the fact that the regions are different in many regards (socio-culturally, historically, bio-geographically, etc.), they face similar threats to their ecological integrity. These are natural habitat loss, defaunation, and soil and water degradation. The determinants of these threats are briefly summarized below:

- a) Agricultural encroachment constitutes the main threat to forests. Farming systems, while varying by crop and agro-ecological conditions, are generally characterized by their low productivity. Soil and water conservation practices such as crop rotation, mulching, ditching and terracing are not evenly practiced. This results in nutrient depletion and soil degradation, contributing towards declining farm productivity. Farmers residing at the forest-edge may simply abandon existing plots and establish new fields on forest land to maintain farm productivity. Such encroachment is also a primary contributor towards habitat fragmentation.
- b) The expansion of livestock rangelands at the expense of forests is a major threat in all the regions, but particularly in Los Tuxtlas. Stocking intensities on rangelands may not reflect their environmental carrying capacities, and overgrazing is a problem in some areas. Despite this, rangeland management remains perfunctory, with little evidence of pasture rotation, or efforts to otherwise enhance the quality of pasture. Similar problems are emergent in Chinantla, although this threat is far less acute in that region. But in La Montaña, where goats dominate stock inventories, and livestock are often released into forests to browse, damage is being sustained to the biologically rich forest understory. There has been little investment in the development of improved silvo-pastoral systems and cultivation of trees for fodder.
- c) Wildfires occur periodically in the dry season (January – May) in all the regions and are often deliberately kindled to clear plots for farming or ranching or because of land disputes. The consequent loss or deterioration of vegetation and ecological structure catalyses a downward spiral of ecological degradation. Wildfires also contribute towards GHG emissions. According to data provided by SEMARNAP, some, 904 ha, 3,812 ha and 1,720.ha of forest have been damaged by fire in Chinantla, Montaña, and Los Tuxtlas respectively between 1997-99. Burning of vegetation and crop residues is not illegal, and, indeed is an important part of farming and pastoral management, releasing potash into the soil. But fire needs to be more effectively controlled to minimize the impact, particularly during sustained droughts.
- d) In all three regions the illegal and selective extraction of forest products, including timber and minor forest products, is common. This threat is growing in La Chinantla. While such uses do not generally cause habitat conversion, they do pose a threat to native flora and fauna. Fuelwood provides the major source of energy for rural communities. Wood is also cut for housing and agricultural uses (posts, corn bins, etc.) In La Montaña, fuelwood harvests have a strong impact on the environment for in addition to home consumption, stocks are marketed.

10. Root Causes: The root causes of the aforementioned threats, assessed following input from communities, are summarized in Annex E. Widespread poverty constitutes a key problem in all areas, because it correlates in risk aversity, and a propensity against technological innovation. The problem is compounded because the poor, often indigenous communities, may lack access to Government services, including agricultural extension advice and marketing support. Other key problems stem from an institutional failure to accommodate ecological management objectives within the development agenda, including by accounting for ecological capital values when siting infrastructure such as roads, a failure to invest sufficiently in ecological capital, such as in fuelwood plantations, and, in La Chinantla, promotion of land settlement. Local *ejidos* and *comunidades* in La Chinantla and La Montaña with remaining stocks of forest capital are facing encroachment from neighboring communities. Although this is illegal, they have often lacked the wherewithal to effectively stem this encroachment, particularly as these forestlands have not been designated as ecologically sensitive areas—to be protected. A widespread lack of awareness of ecological values, and their contributions to productive activities, has hampered effective policy

integration in the past. But this situation is changing as forests become scarcer. Finally, a failure to effectively administer forestry and conservation laws means that the risk attached to infringements of the law is perceived to be low. Successful management will merit tighter enforcement.

11. Baseline Programs: Absent intervention, the afore-mentioned threats in the 3 regions are likely to gradually accelerate, resulting in the extirpation of forests, except, perhaps, from small, fragmented patches in areas that are relatively inaccessible. This will have its corollary in the loss of biodiversity and impairment of ecological services, with both global and domestic environmental impacts. Given the demographic and economic fundamentals of the regions, any resolution of this crisis will necessitate broad based and cross-sectoral coordination of policies and management responses. In other words, the threats and their antecedents will need to be addressed at a regional level. A number of constraints have hitherto served to hamper management on this scale:

- Despite the laudable policy framework for environmental management, mechanisms for coordinating and administering interventions across sectors are weakly developed. Policy makers and end-users of natural ecological capital tend to be poorly informed of the links between ecological and productive systems, and the externalities associated with development.
- A multi-agency framework for planning, monitoring and adapting environmental management is missing, foreclosing effective mainstreaming of conservation with development objectives.
- Mismatched sectoral policy objectives are causing unintended negative ecological externalities, and a legal basis for solidifying their management at bioregional scales is lacking. Enforceable local land use codes are needed to give legal backing to ecosystem management.
- Technological solutions to enhance the conservation compatibility of productive activities remain undefined within the specific environmental context of the regions. Due to a lack of information and technical capacities, institutions are unable to effectively promote conservation. Local stakeholders—municipalities, farmers’ organizations, and indigenous groups, amongst others— have not participated in the analysis and design of sustainable use paradigms for the productive sectors. This has reduced their willingness to adopt the models.
- The protection of forests *per se* will not protect biological diversity owing to the risk of defaunation and insularization. There remains an unmet need to create nuclei protected areas within 2 of the 3 target regions, La Chinantla and La Montaña, to establish refugia for wildlife.

The baseline for each of 5 ‘bundles’ of actions required to address these ‘barriers’ is as follows.

12. Institutional Frameworks: The Government initiated the Sustainable Regional Development Program (PRODESA) in 1996 to realize sustainable development objectives, including poverty alleviation, by combining investments in the productive sectors with environmental management so as to enhance their ecological, social and economic sustainability. The Government has recognized that many of the threats to ecological integrity have their genesis far away from natural ecological frontiers, in policy and investment decisions orchestrated at the federal and regional levels that impact the price and benefits of environmental management and spur land use conversion. Field based conservation tends to be focused within small protected areas. While important, these efforts are often poorly married with regional development activities, including policies, planning and investment operations. PRODESA is aimed at coordinating and strategically adapting policies, planning and investments across sectors and institutions in 24 regions. But, although PRODESA has deployed this concept on a trial basis with encouraging results, for several reasons the model has not yet been fully developed. In particular, there is an unmet need to integrate global environmental management objectives into the framework. PRODESA commenced activities in Chinantla and La Montaña in 1997, funding community outreach work, and creating regional planning committees. In the case of Chinantla, these have taken the form of 2 Technical Committees for Natural Resource Management, and in La Montaña, a Regional Sustainable Development Council. These Committees are composed of

representatives from Federal and State authorities, local NGOs and local producer associations.

13. As part of the NDP, Mexico's President inaugurated the National Program for Attention to Priority Regions (PROAREP) in 1998. This Program, under the umbrella of "Interagency Planning and Programming Agreements", is an effort to integrate the development efforts of eight Secretariats: SAGAR; SCT, SEDESOL, SEMARNAP, Agrarian Reform, Commerce and Industry, Public Education, and Health. PROAREP focuses on 36 regions, including the PRODERS regions, with selection based on social wellbeing. Regional Development Councils (COPLADES) are being created at a State level as a forum for policy dialogue among Federal, State and Municipal authorities, as well as with NGOs and grassroots organizations. While PRODERS is a pivotal part of the Program, it has yet to confront global environmental dilemmas.

14. There is a widespread paucity of understanding of the ecological dimensions of sustainable development, and the socio-economic impacts of ecological degradation. Such an understanding will be critical to create a constituency for sustaining ecosystem management. But, amongst federal and state Government agencies, only SEMARNAP is engaged in awareness raising, and then mainly on 'brown' issues. Several NGOs in Los Tuxtlas have obtained funding for awareness programs, but these initiatives are nascent and need scaling- up to have a lasting impact.

15. Planning and Monitoring Adaptive Ecosystem Management: While national system plans for conservation have been developed, regional plans to operationalize these are lacking. In both La Chinantla and La Montaña, land use management plans have not as yet been developed. In Los Tuxtlas, where a Biosphere Reserve has been established, a management plan for the Reserve is being prepared. But, all told, this covers only a fraction of the bioregional landscape. In the other regions, basic information required to guide planning is missing, including information on the distribution of biodiversity, and geographical and socio-economic fundamentals. This information will need to be collected, collated and interpreted. Existing data management systems and information technology will need to be upgraded for this purpose. A larger constraint is that the framework and skills set required to engineer the participation of local communities and other stakeholders in the planning effort is largely absent, although there will be some effort by NGOs to engage communities in a dialogue on sustainable development in the baseline scenario. Any attempt to develop a Bioregional Land Use Management Plan will need to be anchored by accompanying community-planning efforts and management agreements within *ejidos* and *comunidades*. SAGAR, SCT, SEDESOL, SRA and the State Governments will maintain a social outreach program as part of their baseline efforts, which may be capitalized upon for this purpose.

16. In Los Tuxtlas, PROFEPA has established a natural resource monitoring program for the Biosphere Reserve, as part of its planning efforts, although, at present, this only covers core areas of the Reserve. However, an integrated monitoring and evaluation program, which informs management planning, will need to be created to create an adaptive framework for management.

17. Policy Development: There is a significant problem with weak policy integration, which needs addressing. For example, Government policies have promoted settlement in La Chinantla, without regard to the environmental impacts and in all 3 sites, there is no basis for matching the social benefits against the private costs of environmental management, and internalizing ecological externalities into the economic calculus of development through resource pricing. Also, the criteria for selecting beneficiary groups for service delivery do not sufficiently account for their social status or their natural resource holdings. Poorer groups—most in need of support—are often excluded. Finally, there has been a focus on promoting 'technical fixes' in the productive sectors, without accounting for local agro-ecological conditions or for their wider conservation impacts. Until the creation of the Interagency Planning and Programming Agreements", no official inter-agency coordination mechanism for policy integration existed. Nevertheless, this development in itself is not sufficient to address global environmental concerns. New mechanisms

for policy development and integration across Government agencies, and, involving civil society, are needed. This will need to be accompanied by the creation of new policy assessment tools—to enable decision-makers to weigh the relative costs, benefits and tradeoffs between different forms of natural resource usage. Additionally, new statutes and other subsidiary legislation will be required to give legal backing to local and regional Land Use Plans.

18. Rural Livelihoods: A number of agencies supply development services, including extension, farming systems research, marketing, training, credit and other support programs³. These services have a major bearing on land use allocation, and thus indirectly on conservation outcomes. But, in general, they are not geared towards protecting natural ecological capital and services, have not been adapted to prevailing agro-ecological conditions and have not adequately incorporated traditional knowledge of ecological processes. A tremendous effort is needed to reorient these investments to enhance their compatibility with forest conservation objectives. But for this effort to be successful in the long run, technical demonstrations are needed to define how best to adapt production systems to facilitate conservation while satisfying economic objectives. In this regard, to encourage the uptake of improved systems by local communities, it is critical that demonstrations be interwoven with indigenous systems of soil and water conservation, and account for constraints on land, capital and labor. The uptake of ‘enhanced’ production systems will tend to be greatest where the risks are low, and benefits per unit of work effort high. Several such models have already been successfully developed in Mexico and may be capitalized upon⁴.

19. Diagnostic studies performed during project preparation have identified several gaps in the knowledge and technology base, which need plugging to improve the record of environmental management. Table 2 provides a list of domestic investment needs, which will define the baseline, and the knowledge barriers that need to be conquered to create biodiversity friendly landscapes.

TABLE 2: LIST OF INVESTMENT AND DEMONSTRATION NEEDS

Investment Need (national baseline)	Knowledge/ Technology Gap (barrier)	Environmental Benefit
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³ Several other SEMARNAP programs complement the PRODERS initiative. These include PRODEFOR, which provides funding for sustainable forest management, PROCYMAF, which prepares and updates forest management plans and sponsors field research; PRONARE (implemented with SEDESOL and SEDENA) which promotes reforestation; and PRODEPLAN, which provides subsidies for the development of commercial forestry plantations.

⁴ For instance, several coffee and vanilla producers in Los Tuxtlas and La Chinantla have adopted organic farming methods, fertilizing the soil using *aboneras*, *vermicomposta*, *abonos verdes*: *Mucuna sp*, *Canavalia sp*. and other species and promoting shadow coffee cultivation in agro-forestry systems using native trees, which also provide fuelwood and timber (such as *Inga sp.* , *Alnus acuminata*, *Salix sp.*). Some farmers have further enhanced the system by cultivating non-wood species such as mushrooms, Ixtle or Pita (*Aechmea magdalena*), Palma Camedor, and fruit trees (such as granadilla and chayote) in some instances in combination with apiculture. The variety of crops promotes stability in the system and reduces market and other risks. Coffee farmers that have adopted these methods have increased yields by up to three times. As they have been able to capitalize on domestic green markets for coffee and honey, which offer higher prices than non-certified produce, they have been able to compensate for the initial costs of modifying the system. Another example of a low-cost/ high- benefit system for intensifying farming on hill sides in South-Central Mexico is the *abonera* system, which involves the cultivation of corn or other crops in velvet bean (*Mucuna pruriens*) fields. The bean is mulched upon reaching maturity, providing a rich organic soil fertiliser.

Investment Need (national baseline)	Knowledge/ Technology Gap (barrier)	Environmental Benefit
Expansion of area under permanent tree plantations to provide 1] fuelwood; 2] fodder for livestock; and 3] household construction materials to reduce pressures on remaining forest s	Need to develop silvicultural models that utilize native species as multi-purpose crops; integrate these models with local agrosilvo-pastoral systems; Introduce energy efficient wood stoves (test locally appropriate models) to reduce biomass consumption for energy	Improved habitat quality for wild-life; development of biological corridors between large habitat blocks, restoration of degraded lands, improvement in soil conser-vation, and carbon sequestration;
Improve local livestock husbandry systems through intensification and improvement of animal health, nutrition, and rangeland management	Define best mix of pasture rotation, soil and water management, stall feeding, and pasture enrichment (i.e. plantation of nitrogen fixing legumes) for each site	Reduce rangeland degradation, and indirectly, pressures to clear forests for pastures; decrease intensive use of agro-chemicals, reduce emission of below-ground carbon reserves
Engender sustainable farming system intensification, improve soil fertility through inputs of fertilizer, terracing on steep slopes, crop diversification, marketing and distribution networks, and contribute to the further development of green markets.	Define best agro-forestry systems for each site, using native species as shade trees and living fences, identify most ecologically benign methods of soil conservation, such as mulching and ditching, for each site; identify means of improving on-farm fire management	Improve habitat conditions for flora and fauna at the landscape level; reduce rate of land degradation, carbon emissions and agro-chemical use, and indirectly, the impetus for forest clearance; reduce danger posed by wildfires to forest
Diversify local incomes, investment in feasibility and marketing studies, promotion of new income earning opportunities, training and extension.	Determine means of integrating wild harvests into farming systems on farms and rangelands through 1] enrichment planting for apiculture; and 2] testing on-site culture of minor forest products (ornamental plants, mushrooms etc.)	Increase tree cover; Improve habitat conditions for native flora and fauna, and enhance the relative values of conservation to mono-cultures, and other conservation incompatible land use regimes

20. Protected Areas: While the biological sciences have made the case that biodiversity conservation requires a shift upwards in geographic scale, the management of whole landscapes needs to be coupled with the creation of protected areas as an insurance against the extirpation of gene pools. The Government of Mexico has recently made significant strides in strengthening the Protected Area System (SINAP). 117 PAs have now been formally established. However, because beta diversity is exceptionally high in Mexico, SINAP is not fully representative of biodiversity. In particular, conservation gaps assessments have shown that tropical forest biomes, and particularly montane forest and tropical dry forest biomes such as those found in the target sites need to be better represented⁵. While a Biosphere Reserve with a core area of 155,122 ha. has recently been created in Los Tuxtlas, basic conservation operations have yet to be operationalized there, although the Government is in the process of compensating landholders for foregoing access to the site. In the baseline scenario, the Government of Mexico will fund the establishment of a field station, the purchase and maintenance of office equipment, and the salaries of a Park director, assistant director, program director, technical adviser and administrative assistant. However, rangers are needed for enforcement activities, and ranger posts and ancillary

⁵ Source: National Council on Protected Areas (CONANP),1999. CONANP is a multi-disciplinary consultative body that includes representatives from the governmental, academic/ scientific, private and non-governmental sectors.

equipment, including vehicles are needed to operationalize basic conservation functions. There are no existing protected areas in La Chinantla and La Montaña, and no plans to create such areas in the default scenario, although they are clearly needed to supply refugia for wild species and races. But, given the social, demographic and economic fundamentals of the landscape in these regions, it will clearly not be possible to ‘ring fence’ very large areas as protected areas. The challenge remains of establishing smaller set-asides across the landscape as ‘ecological bricks’.

ALTERNATIVE COURSE OF ACTION:

21. Strategy: The long-term Goal is to protect the biodiversity and ecological functions of a representative sample of forest biomes, within 3 globally significant ecoregions: Tehuantepec Moist Forests, Pacific Dry Tropical Forests, and Sierra Madre del Sur Pine-Oak Forests. The Immediate Objective is to marry global environmental protection and rural sustainable development objectives through demonstration of an integrated ecosystem management paradigm that scales up the focus of environmental management to the bioregional level. As already detailed, 3 sites have been selected as the focus of bioregional management, each containing a mix of natural forest, rangelands, and croplands and abandoned, degraded lands. The project will test and implement new institutional arrangements to coordinate planning, and investment in ecosystem management across sectors, to create a mosaic of conservation-compatible land uses, including 1] new set-asides for biodiversity protection in biologically important areas; 2] tree plantations, using native species, to supply fuelwood, other household wood needs and fodder; protect watersheds and conserve soils, and repair degraded lands; 3] sustainable farming systems in surrounding landscapes that halt encroachment into protected forests; and 4] silvo-pastoral systems, that account for the carrying capacities of rangelands and that prevent their degradation⁶.

22. Pilot Areas: To secure the desired global environmental benefits, conservation efforts will initially focus on a total of 8 pilot areas: 2 in Montaña, 2 in Chinantla and 4 in the Los Tuxtlas PA, capturing the largest remaining blocks of natural habitat and adjacent lands (see maps in Annex G). The intention is to gradually expand the focus of field interventions to cover other areas, as experience is gained in the pilot areas. The pilots aim at protecting large habitat block that cover an area of 271,966 ha. with 120,597 ha. in Chinantla, 111,650ha. in La Montaña and 39,719 ha. in Los Tuxtlas, in addition to protecting forest patches on adjacent lands and creating biodiversity friendly neighboring landscapes. The *ejidos* and *comunidades* with jurisdiction over these areas have a population of 87,651, including: 10,752 in Chinantla, 64% of them Chinanteco Indians, distributed in 58 villages, 36,099 residents in La Montaña in 69 villages, 70% of whom belong to the Tlapanec, Nahuatl or Mixteco ethnic groups; and a population of 40,710 in Tuxtlas distributed in 62 settlements, 65% of them being of Nahuatl, Zoque or Popoluca ethnic origin.

23. The project will be phased to allow an opportunity to learn from and adapt management. Phase 1 will have a duration of 5 years and will focus on demonstration, consensus building and planning within pilot areas. Phase 2 will have a duration of 3 years, and will focus on consolidating and replicating management in each region. A number of pre-requisites to trigger graduation to phase 2 have been established. The sequence of proposed activities and triggers is detailed in the logical framework. The Project has 5 Outputs: 1] the creation of institutional arrangements at the regional and local levels to co-ordinate ecosystem management efforts. This will include the mobilization of villagers within the pilot areas, and broad-based advocacy and

⁶ The 3 sites provide very different ecological landscapes in which to test bioregional management. Preliminary ecosystem pattern analyses show La Chinantla to be the least fragmented, with large additional blocks of contiguous forests, and good internal connectivity between forest blocks. In La Montaña, extensive forest areas have been fragmented, and the forest estate now consists of several larger blocks and numerous patches. In Los Tuxtlas, forest cover has been largely reduced to 4 ‘islands’, with a few forest patches in ravines and in areas with limited accessibility.

awareness raising. 2] The preparation of comprehensive ecosystem management plans within *ejidos* and *comunidades* and on private land holdings, with accompanying monitoring and evaluation systems to facilitate their adaptation. 3] Strengthening environmental impact assessment protocols, instituting user fees, and integrating conservation and development policies by developing new policy prescriptions. 4] systematically adapting investments in the productive sectors to improve their compatibility with conservation goals; and 5] establishing and strengthening conservation set asides in sensitive areas. An 8-year time budget is proposed given the spatial scale of intervention, the number of actors involved, and the need to test and adapt strategies.

24. Stakeholder Involvement in Project Design Work: Great efforts were made to identify and involve all possible stakeholders in design work during project development. These stakeholders included governmental authorities at the national, state and local levels, representatives of local communities and non-Government organizations. These groups were consulted on several occasions, and using different approaches that have sought to reach agreements between stakeholders on management strategies. A start-up workshop was conducted with members of the Federal Government Secretariats, academic institutions, NGOs, farmer organizations from the three states and the private sector to clarify the project concept. SEMARNAP then created an Advisory Board (AB) for the project, with representation from stakeholders attending the workshop. The Board has provided leadership in initiating public consultations, and has helped to define the necessary institutional arrangements needed to ensure project success. Workshops were then conducted in each region with the participation of local communities, engaging a cross-section of different groups. Community outreach teams were employed to canvass views from community leaders and community-based organizations. A total of 58 community assemblies were organized in La Chinantla, 69 in La Montaña, and 62 in Los Tuxtlas, providing a forum for open participatory assessments of threats to forests and management needs throughout the 3 regions. Finally, project design staff worked closely with federal representatives from SEMARNAP and with the three PRODERS Director Generals in each of the three States. Weekly meetings were held with the General Directors of the Interagency Planning and Programming Agreement (BCI) to discuss progress in project development. A series of diagnostic studies have been prepared in parallel, and have helped inform the process of designing project interventions.

OUTPUT 1: INSTITUTIONAL FRAMEWORKS FOR INTEGRATED ECOSYSTEM MANAGEMENT ARE STRENGTHENED AND ARE FUNCTIONING EFFECTIVELY [GEF: US\$4.1173 M COFIN: US\$ 5.2573 M]

25. The project will test new institutional arrangements to coordinate ecosystem management, and adapt them as necessary. The General Directorate of Regional Affairs within SEMARNAP will brief the Interagency Planning and Programming Committee established under PROAREP, and Planning Councils for Regional Development (COPLADES), and provide other support to ensure that participating Federal and State agencies strengthen their programmatic integration. Multi-sectoral Committees for Integrated Ecosystem Management and Biodiversity Protection (COBIDES) will then be established in the regions, with representation from SEMARNAP, SAGAR, SEDESOL, the States, Municipalities NGOs and Farming and Livestock Associations. The COBIDES will be constructed around the existing Technical Committees in La Chinantla and La Montaña, and the Management Committee for the Biosphere Reserve in Los Tuxtlas. Their Terms of Reference will be to advise and assist COPLADES and the Federal and State Government implementing agencies to incorporate global environmental objectives into services extended to the productive sectors, and promote, coordinate and monitor implementation of the Land Use Plans to be developed under Output 2. SEMARNAP will provide secretariat services for each COBIDES. UNDP/GEF will provide technical assistance and training to ensure that they fulfil their functions.

26. The Regional Framework will be complemented by Local Management Committees

(LMC's), each representing a number of *ejidos* and *comunidades* and private landholders and tasked with coordinating land use planning, management and monitoring within them⁷. The geographical focus of each Committee will be determined on the basis of social criteria and sub-watershed boundaries, and flexibility in their focus and composition will be exercised to ensure that the coordination arrangements are socially feasible. By law, as tenure is exercised at the *comunidades*, *ejidos* or private landholder level, these units must be the locus of local land use planning and management. While the LMC's will serve as vehicles for action, ecosystem management will be operationalised within these units. The project will recruit and train teams of community motivators within each LMC jurisdiction to mobilize the participation of communities in the management program. The LMC's will initially be established in the pilot areas identified within each region. Following stakeholder consultations undertaken during project development, and reflecting the physical boundaries of watersheds it is proposed that 5 Committees be established in Chinantla, 6 in La Montaña, and 4 in Los Tuxtlas. UNDP/GEF will provide funding and technical assistance to train LMC Members in strategic planning, negotiation and monitoring, and the community motivators in social engagement, and conflict resolution methods.

27. In order to create a receptive social environment for the institutional frameworks to operate, the project will provide funding for an awareness campaign, seeking to underscore the nexus between global environmental concerns and pressing local economic and social development objectives. The awareness campaign would also provide a vehicle for disseminating information on ecosystem management objectives, Government services, project activities and demonstration work, supported under the other project outputs. Recognizing that written media may be inaccessible to some of the poorer members of local communities, the project will make extensive use of radio for this purpose, although media outreach activities will also utilize newspapers and other channels of communications. A special effort will be made to involve primary school teachers in this campaign, both because primary school is usually the highest educational level reached in the regions, and because of the leadership provided by teachers within the communities. Regular teacher training workshops will be sponsored to provide a forum for collaborative learning and stakeholder mobilization. While some macro-guidelines for the campaigns will be prepared, the intention is to develop locally relevant awareness materials. UNDP/GEF and SEMARNAP will share these costs.

OUTPUT 2: PARTICIPATORY PLANNING AND MONITORING SYSTEMS FOR ADAPTIVE AND INTEGRATED ECOSYSTEM MANAGEMENT ARE ESTABLISHED [GEF: US\$ 2.2623 M COFIN: US\$ 3.7336 M.]

28. Rapid biological and environmental assessments, inventories and studies will be conducted in order to supplement and verify baseline information on land uses, biodiversity and ecological services. Aerial images will be purchased, and ground-truthing exercises conducted at sample plots to assess the physical status of different biomes. This will be complemented by other field demonstration, as necessary. A stock taking exercise will be undertaken upon project commencement to evaluate information already available and define gaps in information, at both spatial and temporal scales. Outputs will include an updated ecosystem pattern/use analysis, identification of conservation hotspots, and quantification of carbon storage in biomass. Information will be used in order to inform land-use planning, and in particular, prioritize areas for biodiversity conservation or corridor restoration—so as to conserve a representative sample of habitats.

29. Social assessment studies will be conducted in the first year to more accurately document social conditions (social organization, land tenure, socio-political conflicts and gender issues,

⁷ These Committees are necessary to coordinate planning and management from the bottom up, and ensure that local-residents, and particularly indigenous groups, are fully engaged in kindling ecosystem management activities.

among other relevant issues), as well as to develop a register of traditional knowledge of area ecology. This will represent the social baseline of the project, and will be central to verifying/adjusting the design of policy, organizational frameworks and financial incentives established under other outputs. Productive systems for agriculture, livestock husbandry, and forestry will be documented and mapped. Participatory rural appraisal methods will be used for this purpose.

30. Data collected through the proposed baseline assessments will be synthesized, rationalized and stored in a multi-attribute data base for use in land use planning, monitoring and evaluation. The project will strengthen Geographic Information Systems in each region, supporting purchases of hardware, programming and data entry. The GIS will be constructed to provide overlays of agro-ecological, biological, geo-physical, productive system, social, demographic and economic indicators with a scale of 1:100,000. Data base management capacities would be developed and training provided to enable end-users to manipulate the system. Information generated through the system will be available to local stakeholders and the public upon request.

31. Integrated ecosystem planning will be orchestrated from the bottom up, through a two-way flow of information between communities and planners that engenders a cross synthesis of Bioregional Conservation Strategies and Local Management Plans. A Bioregional Conservation Strategy will be prepared and continuously updated following land use capability determinations, and will identify large habitat blocks, corridors, patches and other critical areas in need of special protection. This will be overlaid with Local Management Plans within *ejidos*, *comunidades* and private land holdings, to ensure that local planning efforts are congruent with integrated ecosystem management objectives. A framework 10-year Bioregional Conservation Plan will be prepared, to provide a strategic basis for guiding conservation management efforts throughout each of the sites.

32. Local Management Plans will be prepared through an iterative process, overseen by the Local Management Committees, that will combine scientific advances and traditional knowledge in 5 stages: characterization, diagnosis, prognosis (trends), evaluation, and definition of allowable land uses. The effort will be led by a technical team employed through the project, and a group of community workers, comprised of local “*campesino*” members—all of whom will be trained in participatory planning methods, conflict resolution and other skills. Careful attention will be paid to the selection of these workers, to ensure that their skills are matched to this complex task. The social outreach work will be carefully managed, with intensive briefings and debriefings organized.

33. Land use zoning will be based on the methodological norms established by SEMARNAP and with strong public participation. This is composed of three elements: the definition of zones based on land use suitability (conservation set asides, agro-forestry, restoration, biological corridors, intensive agriculture, silvo pastoral areas, settlement areas,); definition of allowable uses within each zone; and identification of specific projects or activities, to operationalize management within the zones, with a financial projection. The agreed zoning scheme will be consolidated into the Bioregional Conservation Plan, with accompanying rules and regulations developed under Output 3 to facilitate conservation, and ensure that land uses conform with the zoning requirements. The Local Management Committees will supervise and provide follow-up, monitoring and evaluation of the Plans and their schedule of activities. Master Plans will be updated every 5 years, but Operational Plans will be adapted annually, based upon the outcomes of monitoring and evaluation.

34. A regular monitoring program will be instituted to gather data and verify trends and impacts, using the database as a reference source. The outputs of the monitoring program will be evaluated, and made available for planning purposes, to inform strategic decision making and adapt management. Outputs would be compared against other data generated by external sources, including the Social Poverty Index (INEGI, SEDESOL), Municipal Development indicators (CEDEMUN), Indigenous Population indicators SEDESOL, INI), rural enterprise data

(FONAES), and Agrarian Census data (Ref. Agraria y su Procu.). While these data are available at a larger scale than that needed for ecosystem management, they will be useful as a control for the project impacts. Finally, the project will establish close linkages with SEMARNAP's early warning system established to prevent wildfires, which will monitor precipitation, alert communities to fire hazards, and support the planning and management efforts engineered locally.

OUTPUT 3: ENABLING POLICY, LEGAL & FINANCIAL MECHANISMS ARE INSTITUTED, PROVIDING INCENTIVES FOR REPLICATING & SUSTAINING MANAGEMENT [GEF: US\$ 1.3232 M COFIN: US\$ 0.6041 M]

35. The project will provide support to adapt local statutes to backstop the Bioregional Conservation Strategy, including, by giving Local Management Plans legal standing, integrating conservation and development policies, incorporating conservation impact requirements into environmental appraisal procedures, and developing incentives for compliance. The latter will address the policy and legal dimensions of enforcement, as well as address the issue of access to public services, including extension services, especially by the rural poor. This support will be provided in several steps. First, a review of policy options will be performed with stakeholder input. Then, a list of recommendations for policy reform will be prepared, and draft policies and regulations processed. The project will work with decision-makers and planners at the regional level to sensitize them to the need for reform, engage them in policy debate, and harness their support for the recommendations. Finally, legal services will be provided to facilitate regulatory reforms UNDP/GEF will finance the cost of technical assistance, while the GoM will finance staff.

36. UNDP/GEF will also finance technical assistance to enhance policy making and enforcement capacities for integrated ecosystem management. This will include the development and application of instruments for integrating conservation objectives into sector policies and programs. Such instruments will include multi-criteria analyses, as a means of evaluating the tradeoffs and externalities associated with different land uses; and reinforced environmental impact assessments for large developments, including of roads and other infrastructure, in ecologically sensitive areas. Safe minimum standards for such development will be defined, with checklists to guide the process of assessment for different categories of land use. Training will be provided to policy makers and planners in conservation impact appraisal methods. A concurrent awareness drive will apprise NGOs and local community groups of these requirements.

37. The recurrent costs of maintaining the new institutional arrangements are estimated at US\$ 0.6 m per annum at current prices, although this estimate will need to be confirmed following their operationalization and possible refitting. This includes the recurrent costs of operating the COBIDES and Local Management Committees, monitoring and evaluation, and maintaining cadres of community forest guards. The principal investments in land use management over the long term will come from substituting baseline expenditures in the productive sectors to enhance their conservation compatibility. The Mexican Government will absorb the bulk of these costs by reorienting its investment priorities in the regions. UNDP/GEF will finance an economic appraisal of the value of ecological services provided by natural ecosystems, as a basis for improving long-term budgetary negotiation positions. To supplement funding for conservation work, particularly in the new protected areas to be created under output 5 in La Chinantla and La Montaña, UNDP/GEF will provide support for the identification and implementation of new fiscal tools to recover a portion of management costs. An investigation of options will be undertaken in Phase 1, taking on board the results of the afore-mentioned valuation exercise, and will include water fees, tolls on the use of infrastructure in ecologically sensitive areas, and recreational use fees. The feasibility of introducing such charges will be assessed, with an appraisal of willingness and ability to pay, and the overhead associated with implementation. UNDP-GEF will then provide support to design the fiscal instruments, where feasible. The agreement of Government agencies to test these systems is a trigger for phase 2.

OUTPUT 4: SUSTAINABLE AND INTEGRATED LAND USE MANAGEMENT MODELS ARE PILOTED AND PROMISING APPROACHES ARE REPLICATED BIOREGIONALLY [GEF: US\$ 4.0249 M; COFIN: US\$ 47.2218 M]

38. During the first phase of the project, targeted field demonstrations of conservation compatible, area-specific, farming, livestock husbandry, forestry, and agroforestry systems and other sustainable land use practices will be sponsored in the pilot areas. The aim is to identify economically and socially feasible means of arresting threats to natural habitats, including by mitigating land degradation and improving the productivity of existing productive systems. The demonstrations will be undertaken with the full participation of local communities, using a network of trained ‘contact farmers’ to facilitate farmer to farmer contact, and an accompanying economic assessment of the costs and benefits of land use options from a social and private (household) perspective. This is essential to ensure that alternatives are economically as well as technically feasible. The range of demonstrations to be supported in each region have been determined following participatory diagnostic assessments performed during project preparation:

- a) In the case of La Montaña, stakeholders have indicated an interest in the following: 1] Developing multi-purpose tree plantations for fuelwood and fodder using native species (*Acacia cochliacantha*, *Acacia pennatula*, *Acacia famesiana*, *Lysiloma divaricata*, *Acacia bilimekii*, *Leucaena esculenta*, *Lysiloma acapulcense* and *Glinclidia sepium*).to complement existing silvicultural tests, which have focused on non-native species. The project would test different silvicultural models to optimize tree growth both on and off- farm⁸. 2] Testing energy-efficient (fuelwood-saving) stoves; the project would develop and field-test locally appropriate stove models. 3] Developing ecologically appropriate silvo-pastoral systems for goats. The project would assess carrying capacities for livestock, and test pasture rotation and ecologically benign pasture improvement methods. 4] Supporting sustainable farming system intensification; the project would pilot agro-forestry systems and soil conservation methods, that improve habitat for native fauna and flora, control burning, protect soil biomass and conserve soil nutrients, including crop rotation, diversification (i.e. ornamental plants), terracing, mulching and ditching. The demonstration will focus on the following crops: corn, rice, fruit, coffee, and Maguey and will be adapted for prevailing agro-ecological conditions.
- b) In Los Tuxtlas, communities have expressed an interest in developing wildlife ranching (honeybees/ iguanas) as a means of conserving habitat and diversifying livelihoods. The project will test ways and means of establishing *in situ* ranches within secondary forests and restoration areas, through site enrichment with native species. The demonstration will build on national efforts to create green markets for honey. Communities have also requested an investment in development of tree plantations using native species, with a focus on fulfilling household demands for fuelwood and timber (candidate species include: *Swetenia macrophylla*, *Enterolobium cyclocarpum*, *Cordia alliodoria*, *Roistonea regia*, *Attalea butyracea*, *Leucaena leucocephala*, and *Enterolobium cyclocarpum*.). The project will adapt local silvicultural trials to test growth rates and productivity enhancement measures for native species. Finally, communities have requested an investment in the promotion of organic agriculture and mixed silvo-pastoral systems. The project would test means of arresting soil degradation and thus reducing emissions of below-ground carbon stores and improving on-farm habitat quality by promoting the cultivation of hedgerows as living fences, mulching, mounding and ditching, and cultivation of nitrogen fixing trees and legumes on croplands and pastures to improve soil and pasture quality. The demonstrations will focus on smallholder cattle husbandry and locally important crops: chilli, tomato, papaya, watermelon and flowers.
- c) In the Chinantla region, communities have requested support for improving the sustainability

⁸ These efforts will be informed by the on-going work of ICRAF to develop such diversified silvicultural regimes.

of agriculture and forestry through development of agro-forestry. The project will support the development of conservation compatible agro-forestry systems on croplands and grazing areas that improve habitat quality for native fauna, reduce agro-chemical intensities, and protect soils. Silvicultural trials and plantation development schemes will be adapted to promote cultivation of native multi-use species, to provide fodder, rehabilitate degraded areas and improve habitats (candidate species include: *Cedrela mexicana*, *Swietenia macrophylla*, *Tapiria mexicana*, *Astronium graveolens*, *Aphananthe monoica*, *Aechmea magdalenae*, *Chamaedorea* spp). Farming system trials, again adapted to suit local agro-ecological conditions, which vary according to elevation, soils and aspect, will focus on mixed cropping of on Ixtle, shade coffee and ornamental palm (“Palma Chamaedorea”). The latter demonstration will be linked to national efforts to create green markets for shade coffee.

39. The demonstrations will build on the existing ‘state of the art’ know-how. Results will be used to inform and adapt land use planning at all levels. The costs of these demonstrations will be shared by UNDP/GEF and the Government of Mexico, with UNDP GEF covering the costs of technical assistance, training and technical assessments, specifically to adapt and integrate productive systems to improve the quality of habitat for native species on crop and range lands, reduce carbon emissions, and, through sustainable intensification, decrease encroachment into the natural forest estate. The Government of Mexico will finance the costs of land, labor and material inputs and technical assistance for activities that, while necessary to generate global benefits, can also be justified in terms of the national cost/ benefit equation. This includes support to improve the quality and productivity of livestock, and crop varieties, marketing, distribution and micro-credit.

40. As a follow on to the demonstrations, and to promote replication of best practices and internalization of good management paradigms within extension systems for the productive sectors, the project would sponsor a comprehensive training program for contact farmers, and extension workers. This program will be based in existing vocational training sectors. The costs will be shared by UNDP/GEF (for the global environmental management dimensions) and the Government of Mexico. A total of 60 extension workers and 1500 contact farmers will benefit from training in the 3 regions. Support packages for the various productive sectors would then be systematically and strategically adapted, including information materials, inputs, marketing, distribution and credit support, so as to promote uptake of the improved production systems, and discourage conservation incompatible uses. The costs of such adaptation, of accompanying investments in plant and materials, and of extension will be borne entirely by the Government of Mexico⁹.

OUTPUT 5: CONSERVATION SET ASIDES ARE ESTABLISHED AND BASIC CONSERVATION FUNCTIONS WITHIN THEM ARE FULLY OPERATIONALIZED [GEF: US\$ 3.5721 M; COFIN: US\$ 4.7782 M]

41. As part of the matrix of land uses, and to protect large habitat blocks as refugia for native species, the project will also contribute towards the establishment of new protected areas, managed as communal or federal reserves, and management of the recently established Biosphere Reserve at Los Tuxtlas¹⁰. At Los Tuxtlas, the project will invest in infrastructure and equipment,

⁹ The log frame provides an estimate of the area to be brought under integrated ecosystem management over the life of the project, by category of land use (natural forest, agro-forestry, silvo-pastoral systems, soil conservation etc.).

¹⁰ A range of conservation functions will be developed, including enforcement (boundary demarcation, surveillance and policing), public education, applied research and monitoring, and management of non timber resource harvests. Besides protecting wildlife, the protected areas will allow for the sustained production of

including ranger posts and vehicles, to meet gaps in the inventory, and will provide funding for additional field staff, including rangers and a public relations officer. In La Chinantla and La Montaña, where protected areas are presently lacking, a comprehensive package of support will be extended to demarcate 3 new reserves (1 in La Chinantla, linking the 2 largest remaining habitat blocks and 2 in La Montaña), and fully operationalize protected area functions within them. The Protected Areas will take the form of a number of set asides, strategically located across the landscape, which will serve as ‘ecological bricks’, providing vital biological connectivity and refugia¹¹. The reserves will be established through an organic process, advanced as an outgrowth of community land management. The project would enter into a dialogue with *Ejidors*, indigenous leaders and large and medium landowners with the objective of reaching agreement on the protection of contiguous habitat blocks, defining appropriate land uses, and developing regulations. This work will be directed by a technical team, which will work in parallel with the community land use planners. The regulations and management plan(s) that result from these parallel processes will be integrated, to synergize management within the 3 reserves and their adjacent landscapes. The LMCs will oversee monitoring & evaluation with the support of SEMARNAP.

42. Technical assistance will be extended to the regional PROFEPA offices to improve the rate of interception and successful prosecution of malfeasance under the new policies and management statutes. This will include the development of cadres of community forest rangers, improved ‘intelligence’ systems using networks of local informants, and definition of effective strategies for intercepting offenders. While the focus of the project is on creating positive incentives for ecosystem management with active community support, such action is needed to uphold the law. A training program, jointly designed by PROFEPA and local communities, will train these teams.

43. The GEF will fund construction of PA infrastructure, and supply equipment for surveillance, enforcement, outreach and other conservation functions. Depending on the site, infrastructure/equipment will include staff offices, vehicles, living quarters, interpretation centers, office equipment, communications equipment, and basic monitoring tools. Incremental operational costs, including recurrent staffing, utilities, outreach and maintenance costs, etc. would be shared between the GEF and the GoM, with GEF contributions decreasing over time.

44. Expected Benefits: The Global Community will benefit significantly from the protection of direct and indirect use values associated with forests, including carbon storage values. The project sites will provide an important repository of globally important flora and fauna, including a number of endemic species, at risk of extirpation elsewhere in Mexico, and the proposed bioregional management model has potential application in other globally important ecoregions within Mexico, for instance by providing a means for buffering threats to threatened protected areas. Carbon storage benefits will accrue from the protection of natural forests that otherwise might have faced conversion, natural restoration of degraded forests, and from investment in tree plantations. These potential benefits, to be ground-truthed during implementation, are as follows:

TABLE 3: CARBON SEQUESTRATION BENEFITS

environmental goods and services, including non timber resources, water, and pasture, and will secure future outdoor recreational use options.

¹¹ The protected areas would be categorized during implementation. [There are currently 6 main categories of Protected Area in Mexico, with affinities to the IUCN categories.] Assessments undertaken during project preparation suggest that they be established as Special Biosphere Reserves, analogous to Category VI of the IUCN PA Categorization. This would distinguish the focus of support for PA management under this project to that being orchestrated under other proposed GEF initiatives (see Annex D), which are mainly geared to Category I and II PAs.

TECHNOLOGY	LOS TUXTLAS	LA MONTAÑA	LA CHINANTLA	CARBON SAVINGS, in Millions of Metric Tons of Carbon
Forest Protection	3.92-6.0	1.24-2.276	5.073-8.61	10.233-16.89
Natural Forest Management	.1110-.1365	.686-.938	.3479-.4757	.5275-.706
Timber Plantations	.0672-.07875	.0283-.0385	.0329-.0401	.1284-.1572
Agroforestry	.01715-.0259	.049-.074	.0546-.0833	.1207-.1832
Fuelwood Plantations	.039	.499	.538	1.075
Totals	4.15-6.28	2.557-3.826	6.046-10.4968	12.35-18.74

Note: Carbon benefits result both from sequestration and emissions avoidance. Savings were calculated using co-efficients generated under the National Climate Action Program of Mexico, and assessments of probable land use with and without the project over a 20 year horizon. This Program, implemented by the National Institute of Ecology/SEMARNAP, was supported by USAID as part of the GCC Country Studies initiative. The principal investigators responsible for the national data (see Refs. 1997 and 1995b), are Omar Masera and Jose A. Benjamin Ordonez. A ground-truthing exercise at the three sites is planned in 2001.

45. Local communities, 78% of whom are indigenous, constitute the primary domestic beneficiaries. These communities receive a number of ecological goods and services from forests, and social assessment work undertaken during project development has revealed an interest on their part in avoiding land degradation and other adverse manifestations of environmental deterioration. As economic and demographic changes in these communities have outpaced their ability to adapt land use practices to engender ecological sustainability, they have become locked in a cycle of degradation. The project will provide these communities with the technologies, know-how and inputs to adapt their land uses in ways that optimize their economic welfare while preserving the forest ecosystem. SEMARNAP staff will also benefit directly through exposure to new ecosystem management approaches, training opportunities and improvement in relations with their clients in local communities. Secondary beneficiaries—intermediaries in the delivery of project related services—include several non-government organizations, and government agencies, which will benefit from training. Given that the 3 regions are major catchment areas, the project will benefit downstream communities by reducing off-site externalities from watershed mismanagement (i.e. the sedimentation of waterways and flooding from storm-flows).

46. Eligibility for GEF Financing: The project fulfils the objectives of the Convention on Biological Diversity by supporting *in situ* conservation (Article 8), ensuring the equitable distribution of benefits derived from biodiversity management (Articles 10,16 and 18), monitoring (Art. 7), awareness raising (Article 13), and institutional reinforcement (Article 12). The project also meets eligibility criteria for funding under the Framework Convention on Climate Change, and in particular, the provisions of Article 4 (1.b), (1.c),(1.d), (1.h), and Article 6 (a.iii). The project is fully consistent with the provisions of Operational Programme 12, Integrated Ecosystem Management, placing a significant emphasis on financial leverage, creating an enabling policy, legal and institutional environment for management, strengthening the capacities of institutions to coordinate responses to environmental dilemmas, and through providing technical assistance for field demonstration, removing constraints to uptake of improved production systems, compatible with conservation management objectives. The project will also generate benefits in 3 of the 4 focal environmental concerns targeted by the Programme.

47. Complementarity with other GEF Projects: The GEF is supporting a number of conservation projects in Mexico that meet priorities outlined in the National Biodiversity Action Plan. These aim at enhancing know-how on different conservation approaches, and thus at

expanding the range of available management tools, while expanding conservation coverage to embrace a bio-geographically representative sample of landscapes. This project will provide a model for bioregional management of ecosystems, as a means of progressively integrating biodiversity management objectives across sectors. As such, the project directly complements other approved and proposed GEF interventions that will 1] improve management of protected areas [WB-GEF Consolidation of Protected Areas Project, UNDP-GEF Biodiversity Conservation in the Sierra Gorda Biosphere Reserve]; 2] invest in the creation of a biological corridor [WB-GEF, Mesoamerican Biological Corridor]; and 3] integrate conservation objectives and strategies into management frameworks for indigenous reserves [WB-GEF Indigenous and Community Conservation Project]. The project has been developed following close consultation with the other GEF Implementing Agencies through the in-country Inter-agency GEF Coordination Committee and the National GEF Project Coordination Committee. Further information on the synergies with the other GEF interventions in Mexico is provided in Annex D.

48. UNDP CCF: UNDP's Country Cooperation Framework (CCF) for Mexico supports interventions that combine natural resource use with environmental protection measures. UNDP is assisting the Government of Mexico to meet its international commitments under the Environmental Conventions through leveraging funding and supplying technical assistance. UNDP-Mexico also supports the GoM's efforts to engineer the active participation of civil society in the design, execution, and evaluation of environmental programmes. This project incorporates both the afore-mentioned support elements, and UNDP will play a key role in brokering agreements between stakeholders, and ensuring that institutional covenants are honored.

IMPLEMENTATION ARRANGEMENTS

49. The Project will be executed by SEMARNAP, with the support of the UNDP-Mexico Country Office. Tight accountability for financial and personnel management will be exercised by UNDP. A Project Steering Committee, established under the preparatory phase, will meet twice annually with the role of overseeing project planning and performance, making policy recommendations, and supervising, supporting and promoting the initiatives of the project coordinators. Members will include SEMARNAP, UNDP, SAGAR, SEDESOL, the Chair of the 3 Regional PRODERS Boards, State Governments, and a representative of the NGO community. UNDP will play a key role in ensuring that the Steering Committee functions effectively, and the various Federal Secretariats honor their funding and technical commitments to PRODERS.

50. The Project will establish a small General Coordinating Unit, led by a Project Coordinator, backstopped by a finance officer and administrative assistant. Technical expertise, including a sociologist and resource economist will be inducted into the Unit during Phase 1. UNDP will administer project funds, and, in partnership with SEMARNAP, will monitor the appropriation of counterpart funding for the project. The Project Coordinator and his/her staff will serve as the permanent link between Regional Coordinators, assigned to the regions, and UNDP. He/she will backstop and provide assistance to field staff and promote/support project initiatives at the national level. Three Site Coordination Units (UCS), will be created in Los Tuxtlas, Chinantla and Montaña, each staffed by a Regional Coordinator, administrative staff and technical specialists, as locally required. [Typically a Site Coordinating Unit would have a specialist in community and land use planning, as well as biodiversity, agriculture, agroforestry, and other specialists, as needed.] The role of these technical groups is to implement project actions, provide follow-up, and carry out promotion. Finally, the Technical Teams would be complemented by teams of contact farmers, comprising local landowners (either smallholder farmers or pastoralists) engaged in the implementation of the proposed technical demonstrations.

51. Both State and federal Government agencies have shown interest and willingness to actively participate in the development of the project. This support is reflected in their

commitment of funding. The General Director of PRODERS meets on a weekly basis with the General Directors of the 8 Secretariats that collaborate under the “Inter-institutional Cooperation Bases” (BCI) policy framework. Three of the most active Secretariats are SAGAR, SEDESOL and INI. The BCI framework will be capitalized upon fully in order to facilitate high-level co-ordination of policies.

FINANCIAL ARRANGEMENTS

52. Incremental Costs: The total cost of the project amounts to US\$ 76.8951 million of which 20% or US\$ 15.3000 million will be appropriated by the GEF to cover the incremental costs of integrated ecosystem management, and US\$ 61.5951 million by the Government of Mexico. The baseline is estimated at US\$ 154.4970 million. The GEF grant amounts to a modest 7% of the total cost of the GEF Alternative. Co-financing has been committed by 3 federal agencies, namely SEMARNAP, SAGAR and SEDESOL, and by the State Governments. In general terms, these Secretariats will finance the costs of sustainable development activities, generating tangible domestic benefits. In particular, this will include funding for community resource planning and management, farm extension services, infrastructure (nurseries), and inputs for intensified farming and improved silvo-pastoralism. The GEF contribution is geared towards removing technical and institutional barriers to integrated ecosystem management. The GEF will fund activities with uncertain, diffuse or long-term benefits, including the cost of operationalising protected areas, gathering data on biodiversity, providing technical assistance to modify natural resource management practices to sustain that diversity, creating or reinforcing institutional capacities for integrated ecosystem management and monitoring carbon sequestration. Project cost data are presented below, differentiated by source of funding, and by each project phase.

OUTPUTS	PHASE 1 (US\$)			PHASE 2 (US\$)			TOTAL
	GEF		CO-FINANCING	GEF		CO-FINANCING	
Output 1			0.0002				
		SAGAR	1.8836		SAGAR	0.9862	
		SEMARNAP	1.5845		SEMARNAP	0.8028	
	2.8533		3.4683	1.2640		1.789	9.3746
Output 2		CONABIO	0.3733		CONABIO	0.1867	
		SEMARNAP	2.797		SEMARNAP	0.3766	
	1.7096		3.1703	0.5528		0.5633	5.9960
Output 3		SEMARNAP	0.3776		SEMARNAP	0.2265	
	0.9380		0.3776	0.3853		0.2265	1.9273
Output 4		SAGAR	12.0939		SAGAR	4.1769	
		SEMARNAP	6.0015		SEMARNAP	3.6009	
		SEDESOL	13.0572		SEDESOL	7.8344	
		SEDAP	0.2856		SEDAP	0.1714	
	3.4606		31.4382	0.5644		15.7836	51.2468
Output 5		SEMARNAP	1.6714		SEMARNAP	1.3029	
		SEDESOL	0.5928		SEDESOL	0.3556	
		SEDAP	0.5347		SEDAP	0.3208	
	1.6557		2.7989	1.9164		1.9793	8.3504
Full Project	10.6172		41.2533	4.6828		20.3418	76.8951

OUTPUTS	PHASE 1 (US\$)		PHASE 2 (US\$)			TOTAL
	GEF	CO-FINANCING	GEF	CO-FINANCING		
Project Preparation	GEF: US\$.3500 GoM: US\$.1200					
Grand Total Phase 1 + Phase 2			GEF	Cofinancing	Total	
			15.6500	61.7151	77.3651	

53. Cost-effectiveness: In the past, enormous amounts of funds have been targeted towards regional sustainable development and conservation in Mexico in an uncoordinated manner. These programs have been often ineffective in conserving biodiversity and improving rural welfare because they have failed to explicitly recognize the interconnectedness of social, economic and ecological systems. Ecological degradation has imposed off-site externalities on local and global communities, not factored into the cost-benefit calculus of development. This project will address these shortcomings, and, by better integrating economic policy objectives and development strategies with conservation, should improve the efficacy of both rural development and forest conservation efforts. In the longer term, the integrated approach is expected to enhance the cost-effectiveness of conservation management. Also, management intervention in the 3 ecoregions will be more cost effective now rather than later, when degradation in some areas may be irreversible.

SUSTAINABILITY OF PROJECT RESULTS

54. Sustainability: The strongest argument in support of this project lies in fact that all the proposed activities have been developed following extensive liaison with affected local communities. In the long-term, global environmental benefit flows will hinge upon the ability of communities to recover tangible benefits from environmental management, through development, and to internalize the costs and benefits of conservation in their land use allocation decisions. This fundamental is intrinsic to the project's objectives and strategies. Demonstration initiatives aim at identifying means of optimizing economic returns from land uses that are also more ecologically benign than current practices, factoring in the costs and benefits to stakeholders. The mobilization of significant co-financing, and institutional agreements with SEMARNAP, SAGAR, SEDESOL and the States demonstrates the Government's commitment to the approach. This commitment will be important to achieving long-term institutional and financial sustainability. But a major investment will also be made in advocacy /awareness raising to strengthen environmental consciousness amongst stakeholders so as to deepen commitment.

55. Project Risks: This Project is experimental, and has several attached risks, which are described in brief below. The assumptions underpinning design are provided in the logical frame in Annex B. The risks need to be judged against the global benefits deriving from successful intervention, particularly given the 'spin-off' effects from replication in other regions of Mexico. A number of abatement measures have been internalized into project design to manage risks.

Risk	Rating	Abatement Measure
Lack of local interest in adopting new technologies, farming and silvo-pastoral systems.	M	Local communities have been actively involved in planning the proposed demonstrations, lessening the risk. This risk will be further diminished through a careful and structured campaign to involve communities in planning and designing new management systems. System design will be informed by an economic appraisal of the relative costs, benefits and risks of technological innovation.
Breakdown in agreement between Federal and State authorities on ecosystem management fundamentals,	L	The Steering Committee will play an active role in negotiating coordination agreements and resolving institutional conflicts. The phased approach is designed to enhance the policy leverage exercised through the project. The careful cultivation of partnerships with non-Government organizations and

Risk	Rating	Abatement Measure
causes mis-match between management needs & agency response. Delays in the appropriation of financial commitments.	M	communities initiated during the preparatory phase aims at building new constituencies for management that can demand accountability for service delivery. The appropriation of co-financing in phase 1 is a pre-requisite for graduation to phase 2. Additionally, SEMARNAP will commit co-financing for Outputs 1 and 4 through UNDP under a special agreement (providing greater predictability regarding budgetary appropriations) A disbursement plan for co-financing will be prepared as part of the project document; this will be reviewed every year, and the release of project resources will be contingent on realization of the plan.
Conflicts of interest among stakeholders delay consensus building and problem solving.	M-L	The regions have been selected in part because they are served by an active and organized non-Government sector, able to challenge vested industrial interests. A heavy investment in conflict resolution is planned under output 1. The strategy will forge strategic partnerships with key decision-makers to build consensus. Careful weight will be placed on negotiation skills in selecting project staff.

H=high; M= medium;L= low

MONITORING AND EVALUATION

56. Monitoring. A number of indicators of impact have been selected, and will be monitored closely under the project. These include the area of largest habitat blocks, area under cultivation, number and area of livestock ranches, frequency and intensity of wildfires and storm flows, sediment loads, and area under restoration. Specific targets for these indicators are provided in the log frame (Annex B). These parameters will be monitored at 3 points: year 1, to ground truth baselines, year 4 and year 8 of implementation, using a variety of tools, including aerial imagery, field verification, and reports from informants. Impact monitoring will be accompanied by process monitoring to uncover the determinants of social, economic and other determinants of impact, whether observed trends be positive or negative, to provide a basis for adapting the management system. Such monitoring, which will be undertaken biennially, will include a social assessment to define social impacts and social responses to management, assess the costs and benefits faced by different groups (smallholders, indigenous groups, women etc), the spatial distribution of costs and benefits, and changes in the composition of target stake-holding groups.

57. Evaluation. Project activities will be regularly evaluated by the project team, SEMARNAP and the Steering Committee. Annual mandatory evaluations will be performed, and results will be used to adapt project strategies. Additionally, annual-planning exercises carried out with the participation of community members, peasant organizations and NGOs will provide an organic process for informing strategies. UNDP will inform GEF of these evaluations during the annual Project Implementation Review. Evaluation reports will also be made available to the public, and will be shared with other conservation projects sponsored by the GEF in Mexico as well as with Meso American Biological Corridor initiative. Close cooperation with these initiatives will facilitate mutual learning, and strengthen strategic planning and management adaptation. Two mandatory Independent Evaluations are scheduled, one in year 5, prior to the completion of phase 1 and the second upon project termination. The phase 1 review will check to ensure that the triggers for commencement of phase 2 have been satisfied. The terminal evaluation will document the lessons learned from the project—to inform policy development.

LIST OF ANNEXES

- Annex A. Incremental Cost Analysis**
- Annex B. Logical Framework Matrix**
- Annex C STAP Review**
- Annex C1 Amendments made following the STAP Review**

List of Optional Annexes:

- Annex D: Note on Synergies between UNDP/GEF and World Bank/GEF projects:** Outlines the programmatic links between this project, and World Bank/ GEF Projects.
- Annex E: Threats, Root Causes and Ecosystem Management Issues:** Describes the threats to ecosystem integrity at the 3 project sites, and explains how they will be attenuated.
- Annex F: Institutional Involvement Matrix:** Summarizes the functions of key Federal, and State Government Agencies, non Government organizations and Producer Associations, and articulates the probable role each will play in executing the project.
- Annex G: Environmental Overview and Maps:** Supplies information on the environmental attributes of the sites (biodiversity, carbon storage) together with Maps of the sites.
- Annex H: List of References:** List of published and grey literature consulted during project design

ANNEX A INCREMENTAL COST ASSESSMENT

1. Broad Development Objectives:

1.1 Mexico's population has reached nearly 100 million. Approximately 48% of Mexicans, including much of the indigenous populace, live in poverty. Many of the poor are concentrated in rural areas, often in biodiversity-rich areas, as is the case in the Chinantla, Montaña and Los Tuxtlas regions. Accordingly, poverty alleviation remains the primary development objective of the Government in these areas. Nevertheless, Mexico is also committed to protecting the global environment and particularly its biologically important forest estate, having ratified the CBD and FCCC in 1993. The country has established a number of strategies to protect forests, which include the maintenance of a protected area system (ANP), and the allocation of other lands (UMAS) for sustainable wildlife management. The Government is committed to mainstreaming environmental management and poverty eradication, and, to this end, has created the Sustainable Regional Environment Program (PRODERS), which aims, *inter alia*, at developing institutional frameworks, adapting resource management and cultivating public support for the integration of environment and development in 24 regions across Mexico. PRODERS provides an unparalleled opportunity to adapt land management systems for agriculture, livestock and forestry so as to improve their conservation congruence. But its potential has yet to be fully realized, partly because its institutional dimensions remain untested, and because the technical know-how to adapt productive activities is often lacking.

2. Global Environmental Objectives

2.1 The project will integrate global environmental objectives into the operations of PRODERS by operationalizing and adapting an integrated approach to ecosystem management in the La Chinantla, Montaña and Los Tuxtlas regions of Southern and Central Mexico. Global environmental benefits will be captured through the protection of a representative sample of 3 globally important ecoregions, and the protection and restoration of forest carbon sinks. There are also expected to be accompanying global benefits associated with a diminishment of land degradation. For the first time in Mexico, activities will spearhead approaches to establishing biodiversity-friendly productive landscapes—providing a vehicle for addressing conservation aims at a bioregional scale. The approach provides a means of combating wild-land fragmentation, and resultant biogenetic insularization, by improving the quality of natural habitat in anthropologically modified landscapes.

3. Baseline:

3.1 Deforestation and habitat fragmentation constitute the principal threats to ecosystem integrity, fueled by expansion of the agricultural estate, and collateral damage from land degradation that is forcing land abandonment and forest clearance. Ecosystem integrity is also compromised by frequent wildfires, caused by poor fire management on farms, and by defaunation, driven by habitat fragmentation and unsustainable consumptive and productive uses of some flora and fauna. These problems are leading to the depletion of biodiversity, loss of forest carbon sinks, and degradation of lands in upstream catchments. In the default scenario, absent GEF investment, Government actions would focus on regulating environmental management, through instruments of command and control, but without an overall vision for managing the greater ecosystem. The programmatic baseline is described below¹². A break-down of cost aggregates is provided in the incremental cost matrix.

Institutional Strengthening: Basic institutional structures to advance programmatic integration between Federal and State agencies and abet administrative decentralization have been created. In the baseline situation, the Government of Mexico would appropriate funds for the operations of 3 State Development Planning Committees (COPLADES) in Oaxaca, Guerrero and Veracruz States, as well

¹² This excludes activities that will be modified under the Project to create a 'Sustainable Development' Baseline.

as for 2 Committees for Natural Resource Management in Chinantla, and the Regional Sustainable Development Council in Montaña, both established as part of the preparatory work of PRODERS. These Committees, while providing a means of coordinating local development work, will lack technical skills in conservation management. Thus environmental management capacities would remain weak. Funds would also be allocated towards the operations of the Technical Advisory Committee for the new Biosphere Reserve created in Los Tuxtlas, although the remit of this Committee does not extend to the integration of environmental management and development. At a local level, a number of small producer associations will work towards the development of sustainable agriculture and other livelihoods. These include a strong producer organization in Chinantla that promotes vanilla, ixtle and shade coffee production, a producer organization for coffee and social forestry in Montaña and associations for tourism, aquaculture and handicrafts at Los Tuxtlas. The Rockefeller Foundation will provide funding in Montaña and Los Tuxtlas to promote producer networks. Additionally, several NGOs provide capacity support for community mobilization, including Methodus, Mesofila, and ERA in Chinantla, PAIR in Montaña, and Luisa Pare, Sierra Santa Marta, Alicea in Los Tuxtlas. While small, this support is important to strengthen social relations and build trust between actors. SEDESOL will provide limited funding to organize women and indigenous groups into producer associations. Finally, two Federal Agencies, namely the Secretariat of Agrarian Reform (SRA) and SEDESOL will allocate funds towards local conflict mediation (mainly to settle local property disputes). Very limited funding for environmental awareness raising is available. Several NGO's have obtained funding and will continue to raise funds for this activity. SEMARNAP will sponsor a small awareness campaign in the immediate vicinity of the Los Tuxtlas Reserve, and the Secretariat of Agrarian Reform (SRA) will provide some funds for education on land use management. The baseline for this component is estimated at US\$ 2.2963 m.

Adaptive Planning: Some biological inventories have already been completed in the regions, and Conservation International will supply additional funds to stock-take biodiversity in Montaña, where the inventory remains incomplete. This information will abet conservation work. However, there would be no direct funding available for conservation planning in either La Chinantla or La Montaña, where there are no protected areas, and planning activity would be restricted to the preparation of Development Plans, with basic zoning regimen by local Municipalities, and forestry plans by SEMARNAP-PRODEFOR. Also, the States would appropriate funds under the ongoing decentralization program to create State Development Plans, translating the NDP to the regional context. In Los Tuxtlas, SEMARNAP would appropriate funds to finalize and update a Management Plan for the Biosphere Reserve. A basic GIS (at a scale of 1:250,000) has been developed, and SEMARNAP would invest in managing the database, and purchasing low-resolution aerial images for monitoring. DFID is the development of a general monitoring framework for PRODERS; and will provide limited funding to test the M&E systems at a regional scale, but not at the project sites. In the Los Tuxtlas Biosphere Reserve, PROFEPA has put a natural resource monitoring program into place. Finally, while there are no plans to finance social assessments, SEDESOL, CEDEMUN, SRA and FONAES will collect data to construct the poverty index and municipal development comparators. The baseline appropriation for these activities has been costed at US\$.2732

Integrated Policy Development: While SEMARNAP invests in national policy development, in the default situation, there would be no baseline funding available for integrated ecosystem management at the sites, or for creating the necessary policy and regulatory instruments that such management will require. However, SEMARNAP has plans to invest in updating forestry laws, including by better integrating conservation with other forestry programs. The baseline has been costed at US\$ 1.0572 m.

Sustainable Livelihoods: Several agencies will service rural livelihoods in the default scenario. SAGAR will deliver a program of agricultural support, including extension, input supply (including seeds and fertilizer), marketing, distribution and other services. Through its *Alianza para el campo* program, SAGAR will provide funding for irrigation works, needed to intensify farming systems in some areas, to improve livestock health, and increase animal productivity through other means, and to promote mechanization within farming systems. SEDENA, the Secretariat for National Defense will provide

funding for rehabilitation work, following floods, landslips and other natural disasters. SEMARNAP-PRODEFOR will provide funding for the management of tree plantations. SEDESOL will provide funds for the promotion of micro-enterprises and income diversification, through its Institute for Indigenous Affairs and FONAES, the National Fund for Social Enterprises, and for temporary employment programs, generally through investment in labor intensive public works programs. SEDESOL will also appropriate funding for the agricultural and livestock sectors, providing a source of micro-credit for the rural poor, and technical assistance to producer associations. The aggregate cost of these various programs has been estimated at US\$ 149.96 m¹³.

None of the afore-mentioned initiatives are explicitly geared towards addressing the environmental dimensions of sustainable development. But there will be some additional investment in promoting ecologically sustainable development. Several producer associations are experimenting on a small scale with agroforestry systems, with some success. The Rockefeller Foundation would provide some funding in Los Tuxtlas to monitor nitrogen cycles on croplands, and the Kellogg Foundation in improving the productivity of home garden plots. The total cost is small, estimated at US\$.0620 m. In addition, the MacArthur Foundation has provided funds to local NGOs in Los Tuxtlas to study the ecology and use of Camedor Palm, and the FAO has recently funded an evaluation of fuel wood use in La Montaña. As these constitute sunk costs, they have been omitted from the baseline calculation.

Field Management Operations: SEMARNAP has deployed fire-fighting squads in several hotspots throughout the regions to detect and fight wildfires. While substantial funding will be allocated to these efforts, for both staff and equipment, there would be little investment in fire prevention. There would be no investment in the creation and management of protected areas in either Chinantla or Montaña. This will threaten the survival of the largest remaining habitat blocks in these areas. In Los Tuxtlas, where a Biosphere Reserve has been created, the State will appropriate resources for operational planning, administration and some enforcement activities. However, these resources will not extend to management of surrounding landscapes, where threats to the Reserve have their genesis. Regional PROFEPA offices will coordinate enforcement of environmental statutes, but without a specific focus on ecologically sensitive areas. The total appropriation for environmental management operations is estimated at US\$.9102 m over 8 years, entirely allocated by SEMARNAP.

4. GEF Alternative

4.1 The Environmental Strategy is founded on the premise that stable conservation hinges in the long-term upon the ability to manage a mosaic of land uses, including protected areas, but also corridors, riparian strips, protected patches and biodiversity friendly landscapes within greater ecosystems. This in turn will require that ecosystem management approaches be integrated across sectors. The GEF Alternative aims at removing a number of constraints or barriers to integrated ecosystem management. Despite the probable benefits, and growing consensus within the scientific community of its justification, this management paradigm remains untested in Mexico, and both institutional and technical barriers to its execution and adaptation in the field will need to be overcome.

Institutional Frameworks: While the creation of the Federal BCI and regional COPLADES frameworks are an important step towards programmatic integration across key public sector agencies, these frameworks, of and by themselves will not be sufficient to integrate ecosystem management. Technical consultative groups are needed, to provide technical assistance for management. This constraint will be addressed by establishing Committees for Integrated Ecosystem Management and Biodiversity Protection, to be known as COBIDES. The project will help to define the optimal composition of these Committees, and gradually build their management oversight capacities. A second barrier is presented

¹³ Over the duration of the project, funding for some of these programs will be progressively transferred to the States as part of the Government's on-going decentralization drive. This is not expected to reduce baseline appropriations.

by the absence of corresponding institutional co-ordination structures at the local level. Clearly, command and control is not a viable approach to integrated ecosystem management, and the commitment and active collaboration of communities will be vital. The project would address this need by establishing Local Management Committees at the sub-watershed level, defining their geographical and administrative jurisdictions, and building their capacities to coordinate participatory planning, monitoring, enforcement and other needed activities. Teams of community motivators would be recruited in villages to mobilize community participation in management efforts, and awareness raising will be supported to impart conservation values. The GEF and SEMARNAP will share the costs of activities [GEF USD4.1 m; co-financing USD5.25 m].

Planning, Monitoring and Data Management: The key barrier here is the lack of data and capacities for adaptive management planning and impact and process monitoring. The Project will provide support for collecting and ground-truthing raw data, covering the biological, geographical and social parameters of land use management. Landscape pattern analyses will identify large habitat blocks, possible corridors and forest patches in need of protection. Technical assistance will then be provided to local communities to define and reach consensus on management solutions that integrate their development objectives with conservation. This consensus will be reflected in Local Management Plans, identifying activities and defining the functions and responsibilities of collaborating institutions, and elaborating rules and regulations for community lands. Capacities to monitor implementation of the Plans and evaluate their impacts will then be systematically strengthened. The GEF will cover the costs of these activities in identified pilot areas, including and surrounding the largest remaining blocks of natural habitat at each site. The GoM will assume the financial and technical burden of replicating the approach elsewhere. The costs of these efforts will be shared by the GEF, and SEMARNAP / Municipalities. [GEF USD2.26 m; other USD3.73 m].

Policy and Regulatory Framework: The principal barriers here include the absence of legal codes to give backing by Law to the proposed new institutional frameworks and Management Plans, the need to devise policy prescriptions across sectors for integrated ecosystem management, which warrants that policy constraints be further investigated, and the absence of tools for integrating environmental objectives into policy-making. The Project will address these shortcomings by supporting strategic demonstrations, and regulatory reform, and developing new, locally geared, instruments for policy making. The costs of executing the management paradigm will be met largely by re-orienting public spending priorities in each region, and through cost savings derived from improving resource use efficiency. But the project will also investigate the feasibility of introducing a user-pays framework for new infrastructural developments and down-stream water consumption. The GEF would finance technical assistance, while the GoM will cover other costs [GEF: USD 1.3 m; other: USD 0.60 m].

Adapting Management of the Productive Sectors: The technologies to adapt land use management remain poorly defined, and integrated ecosystem management will necessitate the systematic trial and adjustment of promising technologies and land management practices, to local geographical and socio-economic fundamentals. Following field-work and public consultations engineered during project development, several areas have been identified as needing technological adaptation:. These are: 1] silvicultural regimes, to increase culture of native species on farms and plantations; 2] development of improved silvo-pastoral systems, that improve the productivity of rangelands; 3] definition of locally appropriate and sustainable farming intensification practices, employing adapted agro-forestry systems, integrated natural pest management systems, and soil conservation methods; 4] means of integrating wildlife ranching (i.e apiculture) into farming systems, through habitat enrichment; and 5] the development of locally appropriate energy efficient fuel stoves. The GEF would meet the costs of technical assistance and training for adaptation, while SEMARNAP and SAGAR would cover the costs of materials, land and labor costs. The GEF would also meet the costs of appraising success and will share the costs of training contact farmers, extension workers and other agents of technological dissemination. Government Agencies [SEMARNAP, SAGAR & SEDESOL] will finance replication of the models at the sites.[GEF: USD 4 m; Cofin: USD 47.2 m]

Creating Protected Areas: Protected Areas and set asides need to be created as an insurance against the loss of biodiversity in each landscape, and to provide refugia and recruitment areas for fauna and flora. The lack of Protected Areas in La Chinantla and La Montaña is a constraint to integrated ecosystem management in these regions. The Project will provide support for negotiating conservation easements and covenants with land owners, obtain local agreement from *ejidos* and *comunidades* to allocate lands for protection, demarcate boundaries, develop operational plans and provide staff, infrastructure and equipment to operationalize basic conservation functions. The GEF will limit its inputs to the establishment of infrastructure and will share a portion of the recurrent management costs on a declining ratio, with the GoM. [GEF: USD 3.57 m; other: USD 4.77 m]

5. Scope of Analysis:

5.1 Incremental costs have been assessed temporally, over the planned eight-year time frame of the GEF intervention, and geographically, by the administrative frontiers of the three project sites. The scope of analysis covers a total area of 1,318,000 ha., in 3 States, and 39 municipalities. Thematically, the analysis covers the suite of interventions necessary to ameliorate the proximate threats to forests, based on the diagnostic assessments performed as part of project formulation. Finally, the analysis captures the expenditures of 17 Government and non-Government institutions.

6. Incremental Costs and Benefits:

6.1 The Incremental Cost Matrix provides cost aggregates for the baseline and GEF Alternative. The GEF Alternative is costed at US\$ 231.3921 m, and the Baseline at US\$ 154.4970 m. The differential costs between the GEF Alternative and the Baseline are separated into a Sustainable Development Baseline, costed at US\$ 47.2218 m. and comprising activities that will generate primarily domestic benefits, and incremental costs, financed by the GEF [US\$ 15.3000 m.], and by the Government of Mexico [US\$ 14.3733]. These constitute the costs of interventions required to generate global environmental benefits by removing barriers to integrating ecosystem management.

6.2 Over the long term, integrated ecosystem management should benefit a mix of global and domestic benefits. The global benefits include the protection of alpha and beta bio-diversity, with an attached existence, indirect use, and option value that could otherwise be forfeited. The project will also define a viable approach towards arresting the depletion of vital forest carbon reservoirs. Other, lesser, global environmental benefits will accrue from the foreclosure of land degradation in watersheds, reducing the export of soil and nutrients into the Gulf of Mexico, and, through the improvement of soil conservation measures and integrated pest management, the intensity of agro-chemical use. Over the long term, these benefits will be magnified through the replication of the suggested management paradigm in other ecoregions, throughout Mexico, and elsewhere in Central America. The domestic benefits will provide incentives to sustain the paradigm. Over the long-term these benefits include the enhancement of productivity in the agriculture, livestock and forestry industries, the avoidance of costs associated with intensifying agriculture and livestock production, and sedimentation, storm flows and other costs connected with land degradation in water catchment areas. These costs are offset by the financial capital inputs pledged by the Government of Mexico.

3.2 A GEF grant is justified to remove barriers towards integrated ecosystem management of large landscapes. While, over the longer term, the management model is expected to incur negative incremental costs, with global benefits accrued in the course of pursuing national sustainable development objectives, the incremental costs of barrier-removal are positive. Also, domestic benefits are unlikely to be fully recovered over the short-medium term and, over immediate political and business cycles, are diffuse, and difficult to recover. This provides an immediate political and financial disincentive against investment in this arena. A contribution from the GEF in defraying barrier-removal costs will improve the cost-benefit calculus underpinning public investment decisions.

INCREMENTAL COST MATRIX

Component	Cost Category	Cost (in millions)	Domestic Benefit	Global Benefit
Institutional Framework	Baseline	Ignacio Irurita 0.0011 m. Luisa Paré 0.0004 m. PSSM, A.C. 0.0187 m. SAGAR 0.1653 m. SEDESOL 1.5980 m SEMARNAP 0.1277 m. Government of Veracruz 0.3722 m. UNAM-CONACYT 0.0128 m. Total= US\$ 2.2963 m.	Lack of institutional frameworks for engendering the participation of local communities in PRODERS and collaboration between local communities.	Lack of institutional frameworks for promoting integrated ecosystem management at bioregional scales.
	Increment	GEF: 4.1173 m Ignacio Irurita 0.0002 m SAGAR 2.9448 m SEMARNAP: 2.3123 m Total: US\$ 9.3746 m.	Replicable models for community participation in PRODERS are tested and adapted, collaboration at the community level is improved, and local dispute resolution abilities are enhanced.	Institutional arrangements for integrated ecosystem management are strengthened locally and bioregionally
	GEF Alternative	Total= US\$ 11.6709 m.		
Planning, Data Management & Monitoring	Baseline	Conservation International 0.150 m SAGAR 0.0026 m. SRA 0.1206 m. Total =US\$ 0.2732 m.	Understanding of systems processes linking the environment with development are limited, and the planning framework for programmatic integration between public agencies is weakly articulated.	Lack of data, plans, and monitoring and evaluation operations for integrated ecosystem management, hampers prioritization, and effective adaptation of conservation and development efforts to abate threats to global environmental values.
	Increment	SEMARNAP: 3.1736 m. CONABIO 0.5600 m GEF: 2.2623 m. Total: US\$ 5.9959 m.	Enhanced programmatic integration between public agencies, facilitates better gearing of investments towards foreclosing land and water degradation, and other externalities associated with the depletion of ecological capital	Data on biodiversity and carbon storage are collected and interpreted, monitoring programs are installed, and inform adaptive management planning and resource allocation within a representative sample of the 3 focus ecoregions.
	GEF Alternative	Total= US\$ 6.2691m.		
Policy, Legal and Financial Mechanisms	Baseline	SEMARNAP: 1.0364 m. Demos Foundation 0.0209 m Total=US\$ 1.0572 m.	Lack of capacities for effectively integrating public policies to achieve national sustainable development objectives	Global environmental objectives are weakly integrated into sector policies and the regulatory frame for promoting integrated ecosystem management needs strengthening.
	Increment	GEF: US\$ 1.3232 m. SEMARNAP .6041m Total: US\$ 1.9273 m.	Generation of new decision making instruments for sustainable development	New policy prescriptions, decision making tools and statutes advance integrated ecosystem management objectives and create a foundation for sustaining management over time

Component	Cost Category	Cost (in millions)	Domestic Benefit	Global Benefit
	GEF Alternative	Total= US\$ 2.9845m.		
Land Use Management Pilots	Baseline	SAGAR: 89.3062 m. SEMARNAP 1.1420 m. SEDESOL: 58.9747 m. Demos Foundation: 0.0171 m. SEDAP: 0.3986 m. Rockefeller F: 0.0168 m. Kellogg F: 0.0452 m. Government of the State: 0.0208 m. MacArthur F: 0.0241 m Maya Institute: 0.0145 m Total= US\$ 149.9601 m	Accelerating soil and water degradation is threatening the long term economic sustainability of productive systems, and thus community welfare and threatens a number of down stream externalities (sedimentation and storm flows)	Progressive roll back of the natural ecological frontier as social, economic and demographic changes overwhelm traditional conservation practices; forest fragmentation leads to bio-genetic insularization and gradual loss of biological diversity
	Sustainable Development Baseline	51.2467 m SAGAR: 16.2708 m SEDAP: 0.4570 m SEDESOL: 20.8916 m SEMARNAP: 9.6024 m Total: 47.2218 m	Improvement of know how , enables the systematic integration of ecologically benign and cost effective soil and water management systems into the productive systems, and reduces the risk of disturbance to vital hydrological cycles.	N/A
	Increment	GEF: US\$ 4.0249 m. Total: US\$ 4.0249 m.	Protection of option values for scarce natural ecological capital.	Demonstration of biologically, social and economically viable means of creating biologically friendly landscapes on crop and rangelands and plantations expands available habitat for flora and fauna and restores forest carbon sinks.
	GEF Alternative	Total= US\$ 201.2068 m.		
PA Creation	Baseline	Government of the State: 0.0067 m SEMARNAP: .9035m Total= US\$.9102 m.	Lack of effective protection of large forest blocks threatens the loss of direct use values from wild harvesting, and wild gene pools of medicinal plants and other locally important species.	Lack of effective protected areas threatens the gradual decay of refugia needed to maintain gene pools of local flora and fauna of global significance; lack of protection of large forest blocks threatens the release of forest carbon.
	Increment	GEF: US\$ 3.5721 m. SEDAP Government of Veracruz .8556 m. SEDESOL: 0.7781 m SEMARNAP: 3.1446m Total: US\$ 8.3504 m.	Consumptive use benefits from the carefully regulated harvest of wild flora and fauna, in PAs and protection of future use values derived from recreational use.	Effectively operated protected areas provide insurance against species extirpation gene pools for the gradual re-colonization by wildlife of anthropologically modified landscapes and secures carbon sinks
	GEF Alternative	Total= US\$ 9.2606m.		
Total	GEF Alternative	US\$ 231.3921 m.		
	Baseline	US\$ 154.4970 m.		
	SD Baseline	US\$ 47.2218 m		

Component	Cost Category	Cost (in millions)	Domestic Benefit	Global Benefit
	Incremental Cost			
	Full Project			
	GEF	US\$ 15.3000m.		
	Non-GEF	US\$ 14.3733 m.		
	Total	US\$ 76.8951 m.		
	Preparation			
	GEF	US\$ 0.35 m.		
	GOM	US\$ 0.12 m.		
	Total	US\$ 0.47m.		
	Grand Total	US\$ 77.3651 m.		

LOGICAL FRAMEWORK MATRIX

Objectives	Indicator	Means of verification	Assumptions & Risks																																																																														
GOAL:	Ecoregions: 1) Tehuantepec Moist Forest; 2) Sierra Madre del Sur Pine-Oak Forest; 3) Pacific Dry Forest																																																																																
Ecologically sustainable development protects biological diversity, carbon sinks and hydrological functions Z in a representative sample of three ecoregions.	1 Percentage of forest types in each site no less than 80% of 2001 baseline at project closure. <table border="1" style="margin-left: 20px; width: 80%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">FOREST TYPE</th> <th style="text-align: center;">BASELINE Ha</th> <th style="text-align: center;">% BASELINE IN 2009</th> </tr> </thead> <tbody> <tr> <td>Pine-Oak Forest</td> <td style="text-align: center;">271,871 Ha.</td> <td style="text-align: center;">217,503-271,871 Ha.</td> </tr> <tr> <td>Trop.Dry Forest</td> <td style="text-align: center;">72,534 Ha.</td> <td style="text-align: center;">58,027-72,534 Ha.</td> </tr> <tr> <td>Cloud Forest</td> <td style="text-align: center;">44,466 Ha.</td> <td style="text-align: center;">35,573-44,466 Ha.</td> </tr> <tr> <td>Mangroves</td> <td style="text-align: center;">523 Ha.</td> <td style="text-align: center;">418-523 Ha.</td> </tr> <tr> <td>Trop.Rain Forest</td> <td style="text-align: center;">204,050 Ha.</td> <td style="text-align: center;">163,240-204,050 Ha.</td> </tr> </tbody> </table>	FOREST TYPE	BASELINE Ha	% BASELINE IN 2009	Pine-Oak Forest	271,871 Ha.	217,503-271,871 Ha.	Trop.Dry Forest	72,534 Ha.	58,027-72,534 Ha.	Cloud Forest	44,466 Ha.	35,573-44,466 Ha.	Mangroves	523 Ha.	418-523 Ha.	Trop.Rain Forest	204,050 Ha.	163,240-204,050 Ha.	1: GIS maps of land use +3: Environmental monitoring studies and sampling surveys T-3: Field records and project evaluations	<ul style="list-style-type: none"> ▪ Mexico maintains political and economic stability ▪ No significant increase in environmental threats (global warming, wildfires, earthquakes) ▪ No major infrastructure projects carried out without application of integrated ecosystems management criteria ▪ Focal sites are of sufficient size to maintain long-term ecological processes 																																																												
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	<ul style="list-style-type: none"> 75% of the pilot area farmers and 5% of site farmers have adopted at least one project-promoted sustainable practice by project closure <table border="1" data-bbox="558 285 1304 461"> <thead> <tr> <th colspan="4">Number of Local Management Committees Established</th> </tr> <tr> <th>SITE</th> <th>Los Tuxtlas</th> <th>Montana</th> <th>Chinantla</th> </tr> </thead> <tbody> <tr> <td>Year 1</td> <td>1</td> <td>2</td> <td>2</td> </tr> <tr> <td>Year 2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Year 3</td> <td>1</td> <td>2</td> <td>1</td> </tr> <tr> <td>TOTALS:</td> <td>--- 4</td> <td>---- 6</td> <td>----- 5</td> </tr> </tbody> </table>	Number of Local Management Committees Established				SITE	Los Tuxtlas	Montana	Chinantla	Year 1	1	2	2	Year 2	2	2	2	Year 3	1	2	1	TOTALS:	--- 4	---- 6	----- 5	<p>2: Project field records, progress reports and evaluations</p>	<p>eight primary rural development Secretariats</p> <ul style="list-style-type: none"> GoM supports NGO involvement and democratic processes in conservation work Local residents are willing to change land use practices for conservation benefits
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<p>Output 1: Institutional frameworks for integrated ecosystem management strengthened and functioning effectively at each site</p>	<ol style="list-style-type: none"> One COBIDES established and operating effectively (scorecard) in each site by the end of year one Local Management Committees established and covering 100% of the sub watershed communities in pilot areas, according to schedule (trigger for phase 2). Regional awareness campaign designed and approved by the SCU in each site by the end of year one Level of environmental awareness in children, Government officials and the general public meets campaign goals by years five and eight 	<ol style="list-style-type: none"> 1: Technical progress reports and project evaluations 2: Project progress reports, SCU meeting minutes, project evaluations; and independent assessments 3: Project/SCU progress reports, and campaign plans 4: Sociometric surveys 	<ul style="list-style-type: none"> Continuity in local leadership provides a locus for learning and awareness Education and media institutions willing to collaborate with project awareness activities Government institutions open to awareness-raising Institutional rigidities to cross-sector collaboration can be overcome 																								
<p>Output 2: Participatory planning system integrated established</p>	<ol style="list-style-type: none"> 1 Baseline biological and socioeconomic assessments completed and regional plans by year three, updated by year and updated annually (remote sensing and GIS) showing trends, established and utilized according to plans, by year 3 3 Communities have developed and approved conservation plans in sub watersheds according to schedule (trigger for phase 2). 	<ol style="list-style-type: none"> 1: Project progress reports; assessments and plans 2: Geographic and database systems, and assessments; remote sensing imagery 3: Management plans; assembly meetings/acts, and agreement documentation 	<ul style="list-style-type: none"> Community and other stakeholder conflicts can be resolved Communities support and collaborate with the project, and governments support and collaborate with local communities Local land tenure conflicts are resolvable Baselines will faithfully represent “background” trends Minimum infrastructure exists to support local information management Local communities will share information regarding resource practices, economics, etc. 																								

	<ol style="list-style-type: none"> 4 Annual monitoring and evaluation exercises completed, demonstrating acceptable accomplishment of results 5 Two or more cases of local participatory planning adopted in any site by year five 	<p>4: Monitoring and evaluation reports; technical progress reports</p> <p>5: Project evaluations and site survey</p>	
<p>Output 3: <i>Enabling policy, legal and financial mechanisms and frameworks are instituted, providing incentives for replicating and sustaining management</i></p>	<ol style="list-style-type: none"> 1 “Mainstreamed” resources (human and financial) for priority regions meeting leveraging targets by project closure 2 Baseline funding provided according to plan, and meeting annual leveraging targets by year five (trigger for phase 2) 3 Site-specific policy needs assessment and strengthening plans developed by year two and implementation of key recommendations initiated by year four (trigger for phase 2) 4 Feasibility of user fees (water, recreation, etc.) demonstrated, and instruments designed and approved by relevant authorities by year five (trigger for phase 2), and implemented by year six 5 Training and complementary technical assistance completed successfully for multi-level and multi-criteria analysis, strengthening of environmental impact review/mitigation, and local statute adaptation/adoption by year three 	<p>1& 2: Project accounting reports, and technical progress reports</p> <p>3: Policy assessments/plans; project progress reports</p> <p>4: Technical and feasibility studies on financial mechanisms; agreements; project progress reports</p> <p>5: Technical reports, project evaluations and progress reports</p>	<ul style="list-style-type: none"> • Institutions willing to carry out policy and regulatory reform • Political and economic will exists to “internalize” environmental costs • The public is willing to pay for conservation benefits • Local populations are receptive to policy and regulatory prescriptions
<p>Output 4: <i>Sustainable use management models are piloted and promising approaches are replicated on a bio-regional scale</i></p>	<ol style="list-style-type: none"> 1. Demonstration models planned and implemented successfully, according to schedule 2. 65% percent of the farm population of the pilot areas have adopted project-promoted sustainable land management practices by 2009 3. 1500 contact farmers in pilot areas recruited and demonstrating sustainable land management approaches by 2006. 4. 50% or more of project-promoted models demonstrating social, economic and environmental feasibility by year four 5. Two or more cases of successful replication/adoption of each promising model in any site by year five 	<p>1: Project progress reports and evaluations</p> <p>2: Official census figures and censuses of beneficiaries; technical assessments</p> <p>3: Surveys of module operation and maintenance</p> <p>4: Site-level technical assessments and surveys</p> <p>5: Independent technical assessments</p>	<ul style="list-style-type: none"> • Sustainable practices exist for marginal lands of the focal sites • Impact of population growth within sites remains manageable • No major change in relative prices occurs against conservation compatible practices and land uses
<p>Output 5: <i>Three new conservation set asides established [one in Chinantla and two in Montana,] and</i></p>	<ol style="list-style-type: none"> 1. Three reserves with adequate management and infrastructure (scorecard), by project closure 2. Three protected areas decreed (one in Chinantla and two in Montaña), with broad stakeholder consensus and participation, by 	<p>1: PA Monitoring/scorecard results; GIS</p> <p>2: PA zoning maps and decrees</p>	<ul style="list-style-type: none"> • SEMARNAP will have the will and resources to support additional PAs • Qualified PA staff candidates exist

<i>conservation functions operationalized</i>	<p>year 5 (trigger for phase 2)</p> <ol style="list-style-type: none"> 3. Four zoning plans completed for the Chinantla (2) and Montaña (2) pilot areas with community consensus by 2004 4. Consensus agreements covering 189 communities reached by year five 	<p>3: Zoning plans; project field records, and progress reports 4: Community agreements, assembly meeting minutes</p>	<p>to work in the area</p> <ul style="list-style-type: none"> • Local communities will have incentives to support protected areas
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PROJECT ACTIVITIES

<i>Phase I Activities (Year 1-5)</i>	<i>Phase II Activities (Year 6-8)</i>
OUTPUT 1 - 1.1 Project Establishment/Orientation:	
<p>Activity: 1.1.1 Establish and orient the project team</p> <ol style="list-style-type: none"> 1 Recruit project staff 2 Establish Steering Committee 3 Train and orient project field staff, familiarize entire team with project Log Frame and expected results. <p>Activity: 1.1.2 Establish field offices.</p> <p>Activity: 1.1.3 Promote and strengthen BCI Linkages</p> <ol style="list-style-type: none"> 1 Share information and coordinate project initiation at all BCI levels: central, site, and pilot area 2 SEMARNAP/DGPR coordinates activities and promotes collaboration with PRODERS and PROAREP partners 3 Strengthen communication and coordination with target COPLADES 	<p>Activity 1.1.4 Evaluate staff capabilities vis-à-vis phase II and revise TORs</p> <p>Activity 1.1.5 Revise and reinforce staff structure and capabilities for replication work at site level.</p> <p>Activity 1.1.6 Establish outreach points for replication work at the site level</p>
1.2 Training/Technical Assistance	
<p>Activity: 1.2.1 Develop and implement a training/TA plan for all levels</p> <p>Activity: 1.2.2 Carry out training</p> <ol style="list-style-type: none"> 1 Formation of target groups of men and women 2 Train LMC members in strategic planning, social engagement, conflict resolution, negotiation methods, and environmental management 3 Provide targeted training and assistance in environmental law and land tenure conflict resolution 	<p>Activity 1.2.3 Develop plans for training and strengthening of local capacities (beyond initial pilot site communities).</p> <p>Activity: 1.2.4 Train/re-engineer project staff for phase II</p> <p>Activity: 1.2.5 Formation of new groups of men and women at the site level</p> <ol style="list-style-type: none"> 1 Assess the interest of other site communities and groups outside of the pilot areas 2 Carry out expanded training/TA activities at the site level 3 Continue training as necessary to develop monitoring and assessment capacities
1.3 Awareness:	
<p>Activity 1.3.1: Develop and implement an awareness/environmental education campaign at the regional/site level</p> <ol style="list-style-type: none"> 1 Develop strategies for awareness building, training, and outreach. 2 Design and develop training and promotional materials; initiate media outreach actions 3 Design and implement specific actions focusing on Government officials, and the general public 4 Orient and involve primary school teachers in the media campaign. 	<p>Activity 1.3.2 Adapt conservation operations in accordance with emergent management issues and priorities</p> <p>Activity 1.3.3 Refine and extend awareness and environmental education activities to other areas within the site</p>
1.4 Institutional Strengthening, Interinstitutional Coordination, and Mainstreaming:	

<p>Activity 1.4.1 Set up one COBIDES at each site by 2001; strengthen the Los Tuxtlas TAC</p> <p>Activity 1.4.2 Form Local Management Committees in all pilot areas</p> <p>Activity 1.4.3 Develop in year one an integrated (BCI) site-specific development plan, to be revised and updated every three years</p> <p>Activity 1.4.4 Develop an annual operational plan and budget for interinstitutional cooperation among the eight BCI Ministries, identifying monetary and institutional support; monitor compliance with this plan</p> <p>Activity 1.4.5 Strengthen over time the LMCs, “campesino” technical committees/work groups and sub watershed committees in pilot areas</p> <p>Activity 1.4.6 Execute cycles of capacity development for target communities in pilot areas</p>	<p>Activity 1.4.7 Review and strengthen these “mainstreaming” mechanisms.</p> <p>Activity 1.4.8 Expand the BCI focus to the site level in year six.</p> <p>Activity 1.4.9 Coordinate “second-tier” actions re. watershed management and water services with CNA, and reserve management with INE. Facilitate carbon sequestration plans through the Climate Change Office of INE</p> <p>Activity 1.4.10 Form/strengthen “campesino” planning and technical committees and work groups at the sub-watershed level</p> <p>Activity 1.4.11 Develop and strengthen “campesino” associations and work groups to coordinate and implement user financial mechanisms</p> <p>Activity 1.4.12 Support and promote the development of environmental and development NGOs in the sites</p>
<p>OUTPUT 2 - 2.1 Database/Information Management:</p>	
<p>Activity 2.1.1 Design and construct at the site level the GIS and project SIRD database;</p> <ol style="list-style-type: none"> 1. link with central information management functions; 2. periodically acquire and update remote sensing information (1:15,000 scale) <p>Activity 2.1.2 Establish and/or refine comprehensive baseline on biodiversity, carbon storage, and watershed functions. Ground-truth baseline information</p> <p>Activity 2.1.3 Conduct social assessment of pilot area communities using workshops (rapid rural appraisal techniques) and field assessments</p> <p>Activity 2.1.4 Prepare agro-ecological and forestry production studies (techniques, costs, benefits, etc.);</p> <p>Activity 2.1.5 Synthesize environmental and socioeconomic information; process and distribute this project information “at cost”</p>	<p>Activity 2.1.6 Evaluate, process and publish project results;</p> <p>Activity 2.1.7 Develop extension materials for distribution outside of the pilot areas</p> <p>Activity 2.1.8 Update the biological, ecological, social and economic databases and incorporate findings in the GIS</p> <p>Activity 2.1.9 Ground-truth baseline information</p>
<p>2.2 Supportive Applied Demonstrations:</p>	
<p>Activity 2.2.1 Establish an applied demonstrations/IEM framework</p> <p>Activity 2.2.2 Carry out environmental inventories (biological, geo-physical), and production system (especially cost/benefit) studies</p> <p>Activity 2.2.3 Characterize and register traditional knowledge systems re. environment, natural resource and production systems</p> <p>Activity 2.2.4 Assess gender roles/issues and refine the project design</p>	<p>Activity 2.2.5 Refine demonstrations to focus on production and conservation constraints</p> <p>Activity 2.2.6 Publish and distribute findings</p>
<p>2.3 Project & Participatory Planning:</p>	
<p>Activity 2.3.1 Do stock taking, information gathering and assessment of spatial/informational/temporal gaps</p> <p>Activity 2.3.2 Prepare annual operational plans; Bio-regional Master/Management plan; and site-specific conservation strategies;</p> <p>Activity 2.3.3 Integrate Master Plan with BCI Unitary Sust. Dev. Plan</p> <p>Activity 2.3.4 Design and implement inter-institutional coordination mechanisms for all three sites, as appropriate, with all 8 Secretariats.</p> <p>Activity 2.3.5 Establish communication systems and linkages between all eight focal areas, and project regional and central levels.</p> <p>Activity 2.3.6 Coordinate decision-making between all levels (central, regional/site,</p>	<p>Activity 2.3.10 Evaluate and revise operational plans to improve adaptive management</p> <p>Activity 2.3.11 Update project Log Frame: targets, indicators and expected results, as necessary.</p> <p>Activity 2.3.12 Prepare revised Bioregional Master/Management plan after fifth year; rework conservation strategies.</p> <p>Activity 2.3.13 Review conservation plans vis-à-vis forest fragmentation and status information; village management information/plans; riparian and corridor management opportunities; etc.</p> <p>Activity 2.3.14 Develop and reach consensus on PA and sub watershed plans</p> <p>Activity 2.3.15 Institutionalize the participatory planning process</p> <p>Activity 2.3.16 Support village and sub-watershed management plans</p>

<p>and local/pilot areas); and define roles and develop work plans for all major participating groups/team members (the project team [SEMARNAP/DGPR/UCAI, UNDP, GCU, SCUs], COPLADE, COBIDES, Regional Development Council, LMC)</p> <p>Activity 2.3.7 Share project information, and select and orient target communities within the pilot areas</p> <p>Activity 2.3.8 Carry out workshops & studies to develop cartographic information, plans and zoning agreements at the community and sub-watershed level;</p> <p>Activity 2.3.9 Develop and reach consensus on plans (<i>Ordenamientos Comunitarios</i>)</p>	
2.4 Monitoring	
<p>Activity 2.4.1 Undertake biennial monitoring of land use, ecological and biological impacts;</p> <p>Activity 2.4.2 Maintain a GIS-based history of land use changes</p> <p>Activity 2.4.3 Periodically assess forest status and degree of forest fragmentation, and monitor carbon contents and water quality/quantity</p> <p>Activity 2.4.4 Join SEMARNAP wildfire prevention/suppression program</p> <p>Activity 2.4.5 Evaluate & monitor community activities, gender specific.</p>	<p>Activity 2.4.6 Monitor and evaluate biological, ecological, and watershed impacts and evaluate trends for adaptive management purposes.</p> <p>Activity 2.4.7 Monitor and evaluate social/economic change in the pilot areas</p>
OUTPUT 3 - 3.1 Regulatory and Policy Analysis:	
<p>Activity 3.1.1 Using the project social baseline information, develop of a policy/legal reform plan in each pilot area (by the local project staff), and implement identified as part of the annual work plan</p> <p>Activity 3.1.2 Analyze how to incorporate integrated ecosystem management criteria into sector policies and programs in the pilot areas</p>	<p>Activity 3.1.3 Analyze constraints to land use planning and zoning methodologies throughout the site</p> <p>Activity 3.1.4 Analyze how to incorporate integrated ecosystem management criteria into sector policies and programs at the site/regional level</p>
3.2 Enabling of Local Policy and Legal Frameworks:	
<p>Activity 3.2.1 Assess constraints and needs re. the adoption of local statutes and management regimes</p> <p>Activity 3.2.2 Support adoption and establishment of zoning and environmental planning,/management regulations, methodologies and procedures in pilot area municipalities, using training and technical materials developed by SEMARNAP</p>	<p>Activity 3.2.3 Based on phase I experiences, promote land use planning techniques and zoning methodologies in interested municipalities at the site level</p> <p>Activity 3.2.4 Instrument integrated ecosystem management policies within regional programs and sector policies</p> <p>Activity 3.2.5 Promote incentive mechanisms at the site level</p>
3.3 Land tenure conflict resolution:	
<p>Activity 3.3.1 Provide technical and legal assistance to pilot site participants to resolve land tenure problems and mitigate or avoid agrarian conflicts in support of conservation objectives</p>	<p>Activity 3.3.2 Follow-up with technical and legal assistance</p>
3.4 Enforcement and Compliance:	
<p>Activity 3.4.1 Develop and distribute environmental assessment & safe minimum standard guidelines to decision makers</p> <p>Activity 3.4.2 Provide training to planners in environmental review and impact mitigation</p>	
3.5 Financial Sustainability:	
<p>Activity 3.5.1 Perform an economic assessment of the value of ecological goods and services supplied through integrated ecosystem management</p> <p>Activity 3.5.2 Assess the feasibility of instituting user fees for ecological services in</p>	<p>Activity 3.5.7 Assure that SEMARNAP negotiates and acquires necessary policy and legal sanctions for implementation of financial mechanisms</p> <p>Activity 3.5.8 Mechanism Implementation:</p>

<p>order to recover a portion of management costs, including by appraising ability to pay</p> <p>Activity 3.5.3 Design user fee mechanisms, including revenue collection, and financial management, reporting and disbursement systems, in accordance with Mexican Law</p> <p>Activity 3.5.4 Develop a sustainable financing plan as part of ecosystem management plans</p> <p>Activity 3.5.5 Confirm co-financing for phase 2 (trigger for phase 2).</p> <p>Activity 3.5.6 Obtain formal clearances from the concerned authorities to institute user fee regime, where proven to be feasible and cost-effective (trigger for phase 2).</p>	<p>1 Supply technical assistance (legal, economic and financial services) to institute agreed mechanisms</p> <p>2 Implement mechanisms and monitor performance (fee collection, compliance and disbursements)</p>
3.6 Access to Development Assistance:	
Activity 3.6.1 Refine PRODERS procurement and assistance mechanisms for the pilot sites (sustainable production models, training and extension services, financial and legal assistance, etc.)	Activity 3.6.2 Promote these extension methodologies and practices at the site level
OUTPUT 4 - 4.1 Technology Assessment:	
Activity 4.1.1 Refine community assessments and identify opportunities for appropriate technologies; incorporate traditional use knowledge	Activity 4.1.4 Review preliminary criteria, cost/benefit relationships. Refine models
Activity 4.1.2 Carry out studies of alternatives and design or adapt modules to local conditions	Activity 4.1.5 Compare project experiences with “common practices” of regional-programs (technologies and inputs), and assist via workshops, field days and mobile seminars cooperating agencies to add sustainability elements
Activity 4.1.3 Determine feasibility criteria and estimate costs and benefits	Activity 4.1.6 Carry out studies to design or adapt and/or determine the feasibility of new modules
4.2 Pilots/Field Demonstration:	
Activity 4.2.1 Determine the number/type of modules needed and site them within the pilot areas	Activity 4.2.4 Determine the need for new models, the number of modules and location of the pilots within both the pilot areas and sites
Activity 4.2.2 Refine and disseminate eligibility criteria, methods and procedures for implementation	Activity 4.2.5 Promote the demonstration idea in the new locations and select men and women leaders to participate in the activity
Activity 4.2.3 Promote the demonstration idea and select men and women leaders interested to participate in the activity	
4.3 Establishment of Modules:	
Activity 4.3.1 Procure inputs, equipment and supplies needed	Activity 4.3.5 Promote and selection of men and women interested in participating in phase 2, at the site level
Activity 4.3.2 Establish models on the farms of contact “leader farmers”	Activity 4.3.6 Establish and support these new modules
Activity 4.3.3 Train participants (“contact farmers”) in the application of the technological packages	
Activity 4.3.4 Carefully record inputs, costs, benefits, productivity, labor requirements, problems encountered, etc.	
4.4 Technical assistance and follow-up:	
Activity 4.4.1 Provide technical assistance and follow-up	Activity 4.4.3 Continue with technical assistance, evaluation and follow-up for modules established in phase 1, working to “hand-off” these models to NGOs and the private sector
Activity 4.4.2 Regularly assess farmer opinions and level-of-adoption of the models.	
4.5 Assessment and Evaluation:	
Activity 4.5.1 Carry out external evaluation of model results.	Activity 4.5.3 Feedback “lessons learned” for the improvement of new models.
Activity 4.5.2 Hold field days and mobile seminars among farmer groups to assess experiences and develop and publicize “lessons learned”	
4.6 Replication:	
Activity 4.6.1 Provide support for the adoption and replication of models from the	Activity 4.6.5 Select locations within the sites for replication of phase 1 practices

<p>“leader farmers” to other members of the pilot areas</p> <p>Activity 4.6.2 Engage private sector/vendors to support/promote models</p> <p>Activity 4.6.3 Help standardize, regulate and certify “best practices”</p> <p>Activity 4.6.4 Develop and disseminate broadly extension materials</p>	<p>Activity 4.6.6 Promote replication at the site level via field days, workshops, distribution of extension materials, etc. beyond the pilot areas.</p> <p>Activity 4.6.7 Promote replication through other agencies, especially SAGAR and SEDESOL; expand successful modules via co-financing, credit and market forces</p>
OUTPUT 5 - 5.1 Protected Areas Planning:	
<p>Activity 5.1.1 Develop a site-level conservation strategy, including conservation needs & opportunities for integrated ecosystem management</p> <p>Activity 5.1.2 Carry out management studies for Chinantla and Montaña, including ecologically sensitive areas and corridors (Chinantla).</p> <p>Activity 5.1.3 Progressively incorporate the findings of the community planning and zoning work into the PA plans</p> <p>Activity 5.1.4 Develop for each pilot a PA proposal and zoning concept</p>	<p>Activity 5.1.5. Carry out the decree for each new PA; if the site is to become a federal reserve, accord and plan the PA “hand off” in coordination with INE</p> <p>Activity 5.1.6 Consolidate and publish the management plan for the PA</p> <p>Activity 5.1.7 Develop an operational plan for each PA</p> <p>Activity 5.1.8 Assess opportunities and needs for other site conservation set-asides in each site, integrating PA & sub watershed planning and linking to larger and longer-term river basin management</p>
5.2 PA Establishment and Management:	
<p>Activity 5.2.1 Use baseline/community studies, refine management plan</p> <p>Activity 5.2.2 Define incentive, compensation, and financing packages for each reserve and negotiate agreements with the local communities and other stakeholders (linked with Output 3)</p> <p>Activity 5.2.3 Reach consensus on each management and the proposed type of reserve (federal, state, private, ejido, community)</p> <p>Activity 5.2.4 Define the legal status sought for decreeing each protected area within each site (traditional PA or a new model)</p>	<p>Activity 5.2.5 Reserve Management:</p> <p>Activity 5.2.6 Initiate implementation of the management and operational plans.</p> <p>Activity 5.2.7 Select and contract staff for each PA</p> <p>Activity 5.2.8 Procure the infrastructure and equipment needed for each PA</p> <p>Activity 5.2.9 Develop and train PA management teams.</p> <p>Activity 5.2.10 Strengthen site management and enforcement capabilities and local rangers/brigades to attend to the needs of larger geographic regions</p>
5.3 PA Consolidation:	
	<p>Activity 5.3.1 Pursue PA consolidation, focusing on standard activities and issues, including: physical infrastructure, on-site personnel, training, land tenure, threat analysis, area declaration and management arrangements, site zoning, management and operational planning, science needs, monitoring, NGO self-sufficiency, financial sustainability, local management committee, sustainable resource use, policy agenda/reform, and environmental education and community outreach.</p> <p>Activity 5.3.2 Ensure regular maintenance of project infrastructure and equipment</p>

STAP REVIEW

1. Overall Impression:

This is a well-prepared proposal that has obviously involved considerable conceptual and practical analysis and careful preparation. It addresses central issues for mainstreaming biodiversity into the development process. The project captures the opportunity to address both biodiversity and carbon management synergistically. While calling for complex organizational and management arrangements, the approach holds high promise for success.

2. Relevance and Priority:

The relevance of the proposed interventions is very high. Biodiversity can only be expected to survive in the rural landscapes of Mexico if there is comprehensive work to integrate conservation efforts with steps to address root causes of deforestation and land degradation. Given the high population densities the option for establishing several large traditional protected areas (IUCN Categories I- III) are not possible. Thus, the approach recommended in the proposal of working with rural communities to establish biodiversity-friendly land uses, and corridors that link remaining patches of forest and wildland is highly relevant.

The priority is also high. These ecosystems warrant international cooperation to conserve. They are being reduced rapidly, are unique, and rich in biodiversity.

3. Background and Justification:

The background information provided in the text and annexes, and especially Annex G, are most helpful. The justification for the project is clear and strong, especially as presented in the Project Context section of the proposal. I see no need for further detail.

4. Scientific and Technical Soundness:

The proposal is scientifically and technically solid. Perhaps the only aspect that requires possible additional research is on new conservation-friendly technologies for use in agriculture and forestry. This will be noted below. Otherwise, the underlying knowledge for this work already exists, and techniques for management are available. Naturally, considerable adaptation and testing will be needed, and the proposal provides well for this aspect.

5. Objectives:

The objectives are clearly derived from the overall project goal. Added up, the objectives serve to direct project activities towards that end.

6. Activities:

The activities too are well defined, and added up, promise to achieve the objectives to which they are related.

7. Participatory Aspects:

The project involves an unusual process of cooperative planning and management with local communities, both in the *ejidos* and indigenous areas. The approach proposed appears to be adapted to the distinctions among the various local community cultures and natural environments. It has also avoids "one-side-fits-all" models.

8. Global Benefits:

The proposal makes a strong case for the anticipated global benefits from the project, as set out in the Incremental Cost Matrix on page A-5, and in paragraph 6.2. Indeed, the global community would lose considerable benefit were it not for the investments planned by GEF in this project. A prime example in addition to biodiversity and carbon is the reduction of erosion into the Gulf of Mexico and the reduction of agrochemical use.

9. GEF Strategies and Plans:

The central strategy of the project is to "complement other biodiversity management initiatives...by nesting conservation and regional development strategies within an integrated approach to ecosystem management." It will work at "bioregional scales and across the productive sectors." The strategy is consistent with CBD decisions on ecosystem management, and interest in synergies with the Climate Change and Desertification/Land Degradation Conventions, and the increasing global concern for fresh water quality and quantity.

The plans for the project are bold yet pragmatic. Bold, because they seek to work at national, state, regional and local administrative and political scales at the same time. And, in parallel, they propose activities at regional and local scales simultaneously. They are pragmatic because the activities and the process include bottom-up incremental step-by-step interventions with local communities, while coordinating with ministerial policies and across the economic sectors.

10. Replicability:

By establishing pilot areas and demonstration sites, and working at three regions that provide varied cultural and environmental contexts, the project sets the stage for replicability elsewhere in Mexico and Central America. In fact, as one actively engaged in the Mesoamerican Biological Corridor program, I find this project design of particular interest and potential utility in that effort. Specifically, thus far, the MBC program has failed to develop the cultural, social and economic aspects of the region. This has resulted in the lack of "buy in" by local communities, and the absence of a viable model for the identification of corridor linkages on the ground in any practical sense. Thus, I would suggest early engagement between this project and the MBC.

11. Capacity Building:

There are training components throughout the proposal. Training opportunities are provided for local community leaders, NGOs, and ministry workers. Importantly, the training activities are provided on site, in the field, in practical forms.

12. Project Funding:

The high leverage-value of the proposal is noteworthy. GEF contributes \$15.65 million to be complemented by the Government of Mexico with \$61.71 million.

Without full details in the documentation at this state, it would appear the these funds are well distributed among the 5 project outputs.

13. Time Frame:

The phasing of the work over 8 years is totally appropriate given the nature of the interventions. Placing pilot activities and demonstrations on the ground at scales relevant for testing applicability require several years. Achieving buy-in from the communities after that again requires time. Building institutions, changing policies, and developing cooperative arrangements among organizations all take time.

14. Secondary Issues:

As noted, I would propose that project proponents at UNDP seek ways to communicate and synergize with their counterparts working on the MBC.

15. Additional Comments:

P. 5 – 6. Paragraph 11. The bulleted points are appropriate. They could serve to describe many other regions, and comprise a good statement of the biodiversity development challenge.

P. 6. Paragraph 12. It is ironic that Mexico's "current conservation activities are focused at the local level"...while they are "...often poorly married with regional development activities, including policies, planning and investment operations." In most cases, action remains caught at the central bureaucratic level, with little activity reaching the ground. Why is Mexico different?

P. 7. Paragraphs 15, and 16. This proposal is pioneering a somewhat new language and terminology that is well-used and appropriate for general use. Namely, "bioregional land use management plan", and "integrated monitoring and evaluation program which informs management planning...to create and adaptive framework for management." Also see Paragraph 18: "conservation-compatible production systems," Paragraph 19: "biodiversity friendly landscapes," Paragraph 31: "bioregional conservation strategies," and "biodiversity-friendly productive landscapes" in Paragraph 2.1 of P. A – 1.

P. 8. Paragraph 18. It would strengthen this paragraph to have a short illustration of an "enhanced system," where the risks are low, and benefits per unit of work high. This is a very significant point.

P. 9. Paragraph 20. Compensating landholders for foregoing access to resources is a critical issue for avoiding the negative impact of reserve establishment. The legacy of past governmental practice in this regard in Mexico and elsewhere has created strong and continuing difficulties for biodiversity conservation. It is not clear in this paragraph exactly how the GOM anticipates providing this compensation?

I am delighted to see the line: "protected area management will need to be an important accompaniment to any bit to create and manage biodiversity friendly landscapes and to protect vital ecological services." All too often proposals are falling into the trap of "politically correct" "socio-environmentalism" by claiming that there is no need for core wildland reserves to avoid the hard decisions involved in their establishment. Scientists are very clear about the need for these core areas.

The closing sentence in this paragraph is also very important and accurate.

P. 9. Paragraph 21. The concept of a "mosaic of conservation-compatible land uses" is also a modern concept, and key to the success of this project, especially in landscapes that are densely settled. Testing new institutional arrangements is also significant. There are few more topics requiring urgent attention than developing new governance arrangements. As noted in this project, the days of centralist, command and control models are slipping away. But what will take their place? This project can contribute significantly not only in Mexico but also more broadly to that challenge. It would be important to have the lessons learned from this component written up and distributed for wider use.

P. 10+. Paragraph 23 and onward. These "outputs" are clear and well stated. But, I see them not as outputs, but as "outcomes" in the way they are presented. They are not mere reports on the shelf, but processes that are ongoing. I realize this is a question of proforma, but I'd advocate changing them to outcomes. Far more dynamic and interesting.

P. 11. Paragraph 26. "sub watershed boundaries" are ideal units for bioregional planning. They are typically also socio-cultural units for local people.

P. 12. Paragraph 29. Social assessment studies are absolutely critical for the utility and success of the program. As noted elsewhere here, this is one of the weaknesses in the current MBC program. The biology is the key underlayment for the potential to achieve sustainability, but unless we know for whom we are working, who are the owners, and who should be the planners, there is no head, heart and soul to the project.

P. 12. Paragraph 33. Land use zoning has generally failed throughout the world, except for Europe. Why will it work in Mexico?

P. 15. Paragraph 38c, and elsewhere. What institution will take the initiative to develop and test new land use technologies and/or practices? Local universities, agricultural and forestry research stations? While indeed there is bound to be considerable local initiatives and entrepreneurial activity, there may also need to be more formal experimentation in the demonstration areas, to get the economic, carbon, nutrients, etc., data for analysis.

P. 16. Paragraph 41. On protected areas, it would be useful to go beyond the protective functions of rangers, vehicles and fences, and discuss the other functions of protected area management. See IUCN/WCPA documentation on the roles and functions of the various categories of protected areas. Especially note the array of benefits, especially environmental services.

P. 17. Paragraph 46. I think you mean Article 8.

P. 17. Paragraph 47. This GEF Programmatic Framework, especially the second sentence onward makes GEF efforts the most advanced in the field. Many conservation organizations could learn from GEF in this regard. I would encourage GEF to offer information and examples about this work at the forthcoming World Conservation Congress (October 2000) and the World Parks Congress (2002). Even more important is to develop a mechanism by which the lessons learned from this work in Mexico and elsewhere can be shared.

P. 19. Paragraph 53. The second sentence is very important. Again this is the current failure of the MBC and many other projects. "Connectivity" has two fundamental meanings now: connecting social, economic and ecological systems," and "connecting patches of wildland through corridor development."

P. 19. Paragraph 54. Line 4, do you mean "recover" or "uncover"?

P. 20. Paragraph 57. Please note and cite the work of Dr. Marc Hockings:

Hockings, Marc, Sue Stolton and Nigel Dudley. 2000. *Evaluating Effectiveness: A framework for Assessing Management of Protected Areas*. IUCN/WCPA, WWF, GTZ, World Bank and the University of Queensland. Draft for Discussion.

Page A – 3. First full paragraph. The fact that this project pulls together the work of the Rockefeller Foundation, Kellogg Foundation and MacArthur Foundation is noteworthy.

Page A – 3. Paragraph 4.1. The first two sentences comprise the backbone of the project, and encapsulate the full sense of the "ecosystem approach" and bioregional management.

Page A – 4. Last paragraph. This justification for protected areas is universal. On the contrary, to NOT establish protected core wildland areas as components of the patchwork quilt of landscape regions, is like "sailing a ship out into the Atlantic during hurricane season without life boats!"

Kenton Miller, STAP Reviewer
World Resources Institute,
19 June, 2000

IA RESPONSE TO STAP COMMENTS

The paragraph numbers below refer to those discussed in the text of the review.

Comment	Response
Information sharing between this project and the Meso American Corridor initiative is actively encouraged.	This is intended. Reference to this coordination has been added in para. 57.
p. 6 Par. 12	Mexico's conservation program has focused locally on protected areas. This is now clarified in para. 12; while there has been an attempt to decentralize operational responsibility for conservation in protected areas, conservation-planning functions are still performed at the central level, and the scope of field interventions and integration with development remains inadequate.
p. 8 Par 18	p. 8. Par. 18. Enhancement in this context implies providing locally appropriate, cost-effective alternatives to existing farming and resource use systems. Two examples of such systems are now provided (see para. 18).
p. 9 Par. 20.	Compensation is being provided in different forms. In Los Tuxtlas, land is being purchased in lieu of compensation. The federal government and the State government are purchasing land to create the nucleus zones of the Los Tuxtlas Biosphere Reserve and have allocated US\$ 4.2 million for the purpose. Elsewhere (i.e. in Chiapas), the Government has provided access to new, titled lands in exchange for restricting access to reserves. The Government is currently designing a strategy for Mariposa Monarca, in which a private foundation will provide conservation easements to local communities as an alternative to logging. While the PRODERS project will review the feasibility of creating such easements in PAs under Output 3 (financed through user fees), benefits will accrue mainly through the redistribution of development services.
P. 9 Par 21.	One of the principle objectives of the PRODERS project is to establish a viable model for conservation at bioregional levels, that can be replicated elsewhere. As the STAP reviewer points out, the lessons learned under the PRODERS project should be incorporated into the Mesoamerican Biol. Corridor and other projects. These will be very appropriate vehicles for replication, to be enhanced through adaptive management. Evaluation documents prepared for PRODERS will be routinely shared with these initiatives (see Para. 57).
P. 12 Par 33.	Land use zoning by decree, using instruments of 'command and control' has not worked in Mexico, as is the case elsewhere in the region. But with recent modifications in environmental legislation, land-use management programs are being adapted to satisfy requirements for social participation. Where performed with the agreement and participation of communities, land use zoning has proven to be an effective management tool. This project will pioneer new approaches to engendering effective participation. Participatory approaches to land use zoning have been successfully tested in several communities in Chinantla (Trinidad, Santiago Xiacui, Calcupulalpan and Santiago Comaltepec) and La Montaña (San Nicolás Zoyotlán and

Comment	Response
	Tlaquetzalapa). There has also been extensive experience with land use zoning with active local participation in Chimalapas Oaxaca (in San Francisco la Paz, San Isidro La Gringa and San Antonio Nuevo Paraíso).
P. 15, Par 38C	A number of organizations will be engaged in this effort. Experienced local NGOs (see Annex F) will support interventions at the field level, while several experienced local/ national organizations will take the lead in developing the land use technologies: At the state level, the Technological Institute of Livestock and Agriculture (ITAO) will be involved in Oaxaca , whereas in Tuxtlos the Veracruz University and The National Autonomous University of Mexico, UNAM, will be involed (the latter through its field research station). In Montaña the NGO, PAIR has considerable experience with this type of work and will be a crucial partner at the regional level together with the University of Guerrero. In addition CIDIR, Center for Interdisciplinary Research for Regional Development, part of the National Polytechnic Institute (IPN), will provide technical advice and backstopping for implementation through its local research centres, one of them in Oaxaca.
P. 16. Par 41	While this particular paragraph focuses on enforcement, this is clearly not the sole focus of the project, nor even the protected area component. Other PA functions, including community outreach, interpretation, and sustainable use management will also receive attention (see footnote). The conservation strategy is based on the well-founded premise that enforcement is an important complement to other protected area functions (see Brandon, K. 97).
P. 17 Par. 46.	This has been corrected in the text.
	The text has been amended to read “recover”.
P. 20 Par 57.	The reference has been noted and added to the reference list.

**NOTE ON SYNERGIES BETWEEN UNDP/GEF
AND WORLD BANK/GEF PROJECTS:**

Project/ Program	Objectives	Synergies	Geographic Location	Ecosystem Approach	GEF Allocation (in US millions)	GOM and others Allocation (in US millions)
Mexico: Consolidation of Protected Areas (FANP II)	Strengthening of the endowment fund for protected areas, to include an additional number of globally significant, federally decreed protected areas. Activities include further capitalization of the trust fund, and overall strengthening of GOM's <i>in-situ</i> conservation capacity, one of the 5 overall conservation priorities identified in the NBS. GOM's recently created National Commission on Protected Areas will be the principal executing agency for mainstreaming activities, while GOM's NGO partner the Mexican Fund for Nature Conservation will be charged with managing the financial capital in the trust fund.	Lessons learned on financial management -including the creation of local trust funds and other financial mechanisms- will be progressively applied in other projects, including PRODERS. While the PRODERS project will also seek to create new Protected Areas as refugia for fauna and flora, it will employ different management strategies and institutional arrangements. While FANP II focuses on Protected Areas in IUCN Categories I/ II, PRODERS focuses on Category V.	10-12 Protected Areas Tehuacán-Cuicatlán, (Puebla, Oaxaca); Alto Golfo, (Baja California-Sonora); Cuatro Ciénegas, (Coahuila); Corredor Chichinautzin-Zempoala,(Morelos-México); Sierra de Álamos, (Sonora); Sierra de Huautla, (Morelos); La Encrucijada, (Chiapas) Pantanos de Centla, (Tabasco); Banco Chinchorro, (Quintana Roo); La Sepultura, (Chiapas).	Coastal, Marine and Freshwater Ecosystems; Forest Ecosystems; and Mountain Ecosystems (OP 2, OP3, OP4) There is no overlap in the geographical coverage of FANP II and PRODERS	To be determined	To be determined

Project/ Program	Objectives	Synergies	Geographic Location	Ecosystem Approach	GEF Allocation (in US millions)	GOM and others Allocation (in US millions)
Indigenous and Community Conservation (COINBIO)	<p>Recognition of the traditional authorities and institutions that regulate the access of indigenous peoples to communally-owned natural resources. Strengthening and creating community conservation regimes will protect globally important biodiversity, and provide new regimes of <i>in situ</i> conservation outside of federally decreed PAs.</p> <p>The geographic location of project areas has been carefully coordinated to avoid overlapping with the PRODERS initiative.</p>	<p>Significant synergies exist between COINBIO and PRODERS. Emphasis will be placed on applying the lessons learned in advancing conservation on communal lands. The broader productive focus of the PRODERS project should be incorporated, when appropriate, in CONINBIO activities. Awareness raising will benefit from the exchange of experiences and strategies.</p>	<p>Oaxaca, Guerrero, Michoacán</p>	<p>Forest Ecosystems, Montane Ecosystems (OP3, OP4)</p> <p>While the COINBIO project will work in Oaxaca and Guerrero States, it focuses on different eco-regions to PRODERS. While PRODERS focuses on tropical moist forests and cloud forest, COINBIO focuses on temperate forests (pine-oak and mesophilous communities).</p>	<p>US\$ 7.5</p>	<p>US\$ 11.2</p>
Biodiversity Conservation in the Sierra Gorda Biosphere Reserve	<p>The project will promote recovery and conservation of biodiversity in two globally important eco-regions represented in the Sierra Gorda Biosphere Reserve. Immediate threats and their determinants would be mitigated through the implementation of an alternative management model in the Reserve, involving a local NGO and the federal protected area program (SINAP). The purpose is to formalize working relationships and demonstrate its advantages within the Biosphere reserve context, to provide participatory models for conservation and sustainable use that are cost efficient and equitable.</p>	<p>Lessons learned in the development of successful public-private conservation management approaches should be melded into the management paradigm for PRODERS, as it is replicated.</p>	<p>Querétaro and three bordering states (Guanajuato, Hidalgo, San Luis Potosí)</p>	<p>Forest Ecosystems, Montane Ecosystems (OP3, OP4)</p> <p>There is no overlap in the geographical coverage of the Sierra Gorda Project and PRODERS</p>	<p>To be determined</p>	<p>To be determined</p>

Project/ Program	Objectives	Synergies	Geographic Location	Ecosystem Approach	GEF Allocation (in US millions)	GOM and others Allocation (in US millions)
Mexico: Mesoamerican Biological Corridor	The project will create five biological corridors that will link existing protected areas across the productive landscape in four states in southern Mexico. Protected areas and corridors will thus form an integrated system for conservation and sustainable use of natural resources within four distinct eco-regions., and serve as the Mexican connection towards the rest of the Meso-american corridor. The bulk of project demonstrations will take place within 16 focal areas of the five corridor.	Information on lessons learned will be shared as the two projects advance during implementation, with special emphasis placed on application of the social mobilization/ empowerment approaches and institutional models developed under PRODERS at several levels.	Campeche, Chiapas, Quintana Roo, Yucatán	Forest Ecosystems, Montane Ecosystems (OP3, OP4) There is no overlap in the geographical coverage of the Mesoamerican Biological Corridor Project and PRODERS	US\$15	US\$78

THREATS, ROOT CAUSES AND ECOSYSTEM MANAGEMENT ISSUES:

Threat 1: Deforestation and Habitat Loss: Forest destruction and resultant habitat loss is the most serious and pervasive environmental threat facing the project sites. Deforestation occurs as a result of clearing to expand farms or rangelands, but also because of fuelwood extraction and occasional wildfires.

Root Causes	Proposed Actions/Alternatives
<ul style="list-style-type: none"> ▪ Rural communities within the project’s focal regions have not been effectively engaged in conservation management programs. They have few resources and knowledge to effect conservation. The upshot is that they have little incentive to protect forests and biological diversity. 	<ul style="list-style-type: none"> - Integrate multiple-use natural resource management objectives into the regional development framework, actively involving rural communities in planning and decision-making and gearing development support towards addressing land management needs and environmental challenges [Immediate Objective];
<ul style="list-style-type: none"> ▪ There is a general lack of integration between conservation and development objectives, both within the Government, and within municipalities and local communities. There is inadequate capacity to plan for and perform this integration. A framework for monitoring and evaluating the environmental impacts of land use is lacking making it difficult to operationalize adaptive and flexible environmental management models. 	<ul style="list-style-type: none"> - Develop the institutional, policy and regulatory framework needed to integrate ecosystem management and regional and local development [Outputs 1 & 3 in conjunction with other Activities] - Develop the baseline information needed to prioritize and plan integrated ecosystem management measures. Carry out on-going monitoring and evaluation of ecological processes and conservation outcomes as part of an adaptive management approach [Output 2]
<ul style="list-style-type: none"> • Rural poverty and “marginalization” (i.e. inadequate access to basic social services - health, education, communications, water, energy-and infrastructure) serve as an impediment to conservation. A framework for “mainstreaming” social services with conservation is lacking. 	<ul style="list-style-type: none"> - Develop and promote mainstreaming mechanisms, and reformed policy frameworks, at the regional and federal levels to integrate conservation and development objectives [Output 3] and create the institutional apparatus at the regional and local levels to operationalize the mechanisms [Output 1] - Promote business opportunities based on environmental management (Los Tuxtlas: tree nurseries aquaculture, bio-energy and timber plantations; Montana: tree plantations, nurseries; Chinantla: <i>Ixtle</i>, palm) [co-financing Outputs 3 & 4] - Promote access to and widespread use of information on conservation-compatible development options that abet integrated ecosystem management [Outputs 2/4]
<ul style="list-style-type: none"> ▪ The know-how to integrate management of forests and agricultural landscapes within the agro-ecological conditions of the project sites is limited. 	<ul style="list-style-type: none"> - Establish demonstrations within the focal sites and eventually their surrounding landscapes/regions to demonstrate and promote integrated resource management (all) [Outputs 4/ 5] - Strengthen inter-institutional mechanisms for planning and collaboration (all) [Output 1/ 3]

Root Causes	Proposed Actions/Alternatives
<ul style="list-style-type: none"> ▪ There is a basic lack of understanding within local communities of the connection between ecological systems and village and farm economies, including the potential adverse socio-economic feedbacks from forest and watershed degradation. At the regional level, there is little recognition of the environmental services afforded by wildlands, and of the need to compensate local populations for conservation actions that protect these values. 	<ul style="list-style-type: none"> - Support a mass and sustained institutional strengthening, training and awareness raising drive to impart conservation values to decision-makers and other important stakeholders [Output 1];
<ul style="list-style-type: none"> ▪ Inadequate regulation and enforcement of existing laws designed to protect and sustainably manage forests allows deforestation and other forms of habitat degradation to continue unchecked 	<ul style="list-style-type: none"> - Strengthened enforcement at the community level through empowerment, training, cooperative agreements and targeted strengthening of enforcement mechanisms (all) [Output 1/5] - Assess policy and legal gaps and correct deficiencies (all) [Output 3] - Decentralize management functions from the federal and state to the local level (all) [Output 3]
<ul style="list-style-type: none"> ▪ Insufficient or non-existent instruments, capacity and infrastructure for forest reserves and other types of protected areas ▪ Although a Biosphere Reserve has been recently created in Los Tuxtlas, conservation areas do not exist in Montana and Chinantla. Basic conservation functions such as boundary demarcation and advocacy are absent and policing and enforcement functions need strengthening; there is a lack of infrastructure, equipment and staffing for conservation management; 3 small core zones in Los Tuxtlas have been established as part of the PA, but these may be too small to maintain vital ecological processes and need to be joined through corridors to ensure impact 	<ul style="list-style-type: none"> - Establish new conservation set-asides in Montana and Chinantla, and consolidate the existing reserve in Tuxtlas, with core areas encompassing important habitats, sustainable use areas and buffers zoned for multiple, conservation-enabling resource uses. Explore and support the establishment of private and community conservation easements [Output 5]; - Strengthen PA infrastructure (equipment, boundary demarcation, etc.) [Output 5] - Create local resource management/protection capacity (all) [Outputs 1 & 5]
<ul style="list-style-type: none"> ▪ Traditional slash-and-burn agricultural practices exacerbate wildfires 	<ul style="list-style-type: none"> - Promote sustainable agricultural practices (all) [Output 4] - Discourage and manage the use of fire in agriculture (all) [Outputs 1 & 5] - Develop and support community fire prevention squads (all) [Outputs 1 & 5]

Threat 2: Species Loss/Extinction: Species loss is a second serious threat to the long-term integrity of the regions' ecosystems. Habitat and species loss is frequently a direct consequence of deforestation as well as inappropriate resource extraction by local inhabitants living at the forest edge.

Root Causes	Proposed Actions/Alternatives
<ul style="list-style-type: none"> • There is inadequate enforcement of existing laws against illegal hunting and resource extraction. Gaps in the legal and policy framework hinder enforcement • There is insufficient local capacity and infrastructure for the establishment and management of conservation/protection areas 	<ul style="list-style-type: none"> - Strengthened enforcement at the community level through cooperative agreements and targeted strengthening of enforcement capacity [Output 5] - Designate forests and wildlife as being threatened; declare conservation/protection areas (all) [Output 5] - Strengthen infrastructure (equipment, boundary demarcation, etc.) (all) [Output 5]
<ul style="list-style-type: none"> ▪ There is an inadequate level of proactive management ▪ There is little knowledge of how to minimize negative impacts from alternative income generating activities (e.g., subsistence farming, silvo-pastoral systems and NTFP extraction) 	<ul style="list-style-type: none"> - Establish a proactive and adaptive management regime; assess the existing situation and work to improve ambient ecological conditions (all) - Develop baseline information on ecosystem functions, threatened/ endangered species (i.e., health, distribution, and species composition) etc. [Output 2]. - Establish systematic monitoring programs (all) [Output 2] to define impacts, and adapt management
<ul style="list-style-type: none"> ▪ Conservation set-aside options have not been sufficiently developed and discussed with communities, contributing to encroachment ▪ Community support/involvement in management activities is inadequate 	<ul style="list-style-type: none"> - Establish new protected areas in collaboration with <i>ejidos</i> and <i>comunidades</i>; demarcate boundaries; make reserve management operational by developing a participatory planning framework (all) [Output 2] - Train local people how to plan and manage their own resources (all) [Outputs 1 & 5]
<ul style="list-style-type: none"> • There is no basic regional, integrated planning framework, linked to local needs • A lack of alternative livelihood options, leads to unsustainable resource-use practices 	<ul style="list-style-type: none"> - Establish a regional, integrated planning framework to better guide regional development (all) [Output 2] - Provide alternative, sustainable livelihoods to remove destructive pressure from habitats [Outputs 1,3 & 5]
<ul style="list-style-type: none"> • There is a lack of awareness re. the importance of and opportunities offered by reserves/conservation set-asides 	<ul style="list-style-type: none"> - Raise the level of awareness and provide training in protected areas and wildlife management (all) [Output 1/5]

Threat 3: Soil and Water Deterioration from Unsustainable Annual Cropping and Extensive Grazing: Subsistence agriculture and the unsustainable practices associated with it (shifting cultivation, annual burning, extensive grazing, etc.) lead to accelerated soil erosion, watershed deterioration, and downstream impacts in all three PRODERS regions. Degraded lands occupy approximately 2 % of the Tuxtla, 12.8 % of the Montana, and 0.5 % of the Chinantla focal sites.

Root Causes	Proposed Actions/Alternatives
<ul style="list-style-type: none"> • There is inadequate institutional and human capacity within the GoM 's agricultural agencies to regulate slash-and-burn farming; limited enforcement means that there is little disincentive for farmers to open up new forest areas for cultivation 	<ul style="list-style-type: none"> - Strengthen participatory planning/management skills, including monitoring, negotiation, policing and enforcement skills [Outputs 1,2, & 4]; - Test quid pro quo stewardship compacts that link access to development services to compliance with environmental statutes [Outputs 1, 2 & 3]; Strengthen enforcement capacity of key institutions through training programs and formulation of new, collaborative efforts; cross-authorize staff from agencies for enforcement work (forest officers, wildlife officers); adequately train and equip staff;
<ul style="list-style-type: none"> • Inadequate and/or inappropriate technology/ farming / rangeland management methods are used. Traditional farming systems are characterized by an absence of soil conservation methods such as ditching, mulching, and soil stabilization through tree planting; farming productivity is low, and soil impoverishment results in short cropping cycles; • Farming services have inadequate outreach to communities providing them with limited recourse to technical assistance and other inputs that would enable them to intensify and diversify production; There is a general unfamiliarity amongst extension workers with more sustainable harvest techniques 	<ul style="list-style-type: none"> - Develop locally appropriate agro-silvopastoral systems, geared to local agro-ecological conditions and tested and adapted by contact farmers; evaluate the costs and benefits of improved methods from the perspective of the farmer, taking cultural and social feasibility into account, and accounting for risks. [Montana: silvo-pastoral and animal husbandry, fruit trees (mamey, coffee, maguey and prickly pear cultivation: organic coffee, nurseries, small-animal production' Los Tuxtlas, animal husbandry, adaptation of silvicultural systems, soil conservation) - Strengthen baseline agricultural support programs to ensure that 1) farming support services reach rural/forest-edge communities; 2) skills building focuses on improving soil conservation practices through locally appropriate methods; and 3) they provide inputs to catalyze sustainable farming system intensification [Outputs 1,3 & 4]; - Strengthen community management capacity through requiring more community input; strengthening existing community institutions (NGOs, coops) and developing partnerships for sustainable management of resources (user rights agreements, credit and financing mechanisms) (all) [Outputs 1, 2 & 3]
<ul style="list-style-type: none"> • There is a lack of stakeholder understanding about impending environmental and related losses • There is unfamiliarity with options and little or no access to technical information 	<ul style="list-style-type: none"> - Enable people, through demonstration programs and training, to choose alternatives

PROJECT CO-ORDINATION AND IMPLEMENTATION ARRANGEMENTS

1. **Execution and Implementation Arrangements:** The Project will be executed by the Government of Mexico, with overall responsibilities for execution vested with the Sustainable Regional Development Program unit (PRODERS) within the Secretariat of Environment, Natural Resources and Fisheries (SEMARNAP). PRODERS will implement the project in partnership with other key Secretariats, NGOs, State governments, municipalities and communities, through institutional coordination frameworks set at the local, regional and federal level. A small General Coordinating Unit will be established, led by a Project Coordinator, backstopped by a finance officer and administrative assistant. Technical expertise, including a sociologist and resource economist will be inducted into the Unit during Phase 1. UNDP will administer project funds, guarantee tight accountability for financial and personnel management and, in partnership with SEMARNAP, will monitor the appropriation of counterpart funding for the project. The Project Coordinator and his/her staff will serve as the permanent link between Regional Coordinators, assigned to the regions, and UNDP. He/she will backstop and provide assistance to all staff and promote/support project activities at the national level.
2. Three Site Coordination Units (UCS), will be created in Los Tuxtlas, Chinantla and Montaña, each staffed by a Regional Coordinator, administrative staff and technical specialists, as locally required. The role of these technical groups is to implement project actions, provide follow-up, and to carry out promotion. Finally, the Technical Teams would be complemented by teams of contact farmers, comprising local landowners engaged in implementing the proposed technical demonstrations.
3. In order to ensure a joint programming of GEF interventions with parallel initiatives in Mexico, formal and informal inter-implementing agency linkages will be maintained. Adaptive management approaches will be operationalized to ensure the cost-effectiveness and appropriateness of project programming.
4. **Steering Committee:** A Project Steering Committee, established under the preparatory phase, will meet twice annually with the role of overseeing project planning and performance, making policy recommendations, and supervising, supporting and promoting the initiatives of the project coordinators. Members will include SEMARNAP, UNDP, Federal Secretariats, the Chair of the 3 Regional PRODERS Boards, State Governments, and a representative of the NGO community (national NGO).
5. **Public Participation in Site Management:** The project will promote the establishment of two institutional frameworks at the site and local level, which will secure institutional continuity upon project termination. At the site level (regional) multisectoral committees for integrated ecosystem management and biodiversity protection (COBIDES) will be established, with representatives from SEMARNAP, SAGAR, SEDESOL, the States, Municipalities, NGOs and farming and livestock associations. The COBIDES will be constructed around the existing Technical Committees in La Chinantla and La Montaña, and the Management Committee for the Biosphere Reserve in Los Tuxtlas. Their mandate will be to advise and assist COPLADES and the Federal and State government implementing agencies to incorporate global environmental objectives into services extended to the productive sectors, as well as to promote, coordinate and monitor implementation of Land Use Plans.
6. The Regional Framework will be complemented by Local Management Committees (LMC's), each representing a number of *ejidos* and *comunidades* and private landholders and tasked with coordinating land use planning, management and monitoring within them¹⁴. The geographical focus of each Committee will be determined on the basis of social criteria and sub-watershed boundaries, and flexibility in their focus and composition will be exercised to ensure that the coordination arrangements are socially feasible. Procedures for participatory monitoring and evaluation will be established, where

¹⁴ These Committees are necessary to coordinate planning and management from the bottom up, and ensure that local-residents, and particularly indigenous groups, are fully engaged in kindling ecosystem management activities.

community members, peasant organizations and NGOs will provide an organic process for informing strategies. Training will be provided to Local Committee Members in strategic planning, negotiation and monitoring and evaluation methods, whereas the community motivators will receive training in social motivation and conflict resolution methods.

7. Extensive consultations were undertaken during the formulation of this project with Mexico’s NGO community. NGO’s will be represented on the project Steering Committee, as well as on the Multisectoral committees for integrated ecosystem management and biodiversity protection (COBIDES). They will also take responsibility for the implementation of many outsourced project activities. NGO staff will also benefit from training, serving to enhance their institutional capacities for conservation.

8. **Institutional Profiles:** The following table provides a brief description of the functions of the different institutions functioning within the conservation arena at the 3 project sites. The role of the various entities as regards the execution and implementation of the project, is also briefly summarized:

Institution	Role in Project
Government Agencies:	
<p>The Secretariat of Environment, Natural Resources and Fisheries (SEMARNAP): Established in 1994 in a bid to integrate environmental and natural resources management under one institutional umbrella, SEMARNAP consists of 3 Under Ministries (Planning, Natural Resources and Fisheries), and 5 semi-autonomous agencies, (the National Water Commission (CNA), the National Institute of Fisheries (INP), the Mexican Institute for Water Technology (IMTA), the National Ecology Institute (INE), and PROFEPA— the Attorney General’s Office for Environmental Protection).</p> <ul style="list-style-type: none"> • DGPR: General Directorate for Regional Projects for Sustainable Development (PRODERS) • INE • CNA • PROFEPA 	<p>The Secretariat will serve as the National Executing Agency, accountable to UNDP for delivery of agreed outputs.</p> <p>SEMARNAP manages a number of programs compatible with the principles of the NBS, and relevant to this project. These include management of Protected Areas (PA); sustainable forestry management (PRODEFOR), reforestation (PRONARE), commercial plantation programs (PRODEPLAN); and sustainable use systems (UMA).</p> <p>DGPR will be the office within SEMARNAP responsible for overseeing the implementation of the project.</p> <p>INE will provide expertise and follow-up for the management of protected areas.</p> <p>CNA is responsible for water and catchment management. The project will collaborate with CNA for the purposes of managing sub-watersheds, and introducing water use fees to recover management costs.</p> <p>PROFEPA is the enforcement arm of SEMARNAP, and will be responsible for enforcing environmental regulations and auditing development activities to ensure compliance with environmental laws.</p> <p>The Natural Resources Under-secretariat is responsible for forestry including the prevention and control of wildfires. It will assume responsibilities for forest management activities, including fire control.</p>

Institution	Role in Project
<ul style="list-style-type: none"> • Under-secretariat of Natural Resources • General Directorate for soil conservation and restoration (DGRCS) • CECADESU: Center for Training on Sustainable Development, a partially decentralized educational office of SEMARNAP's Under-Ministry for Planning. 	<p>DGCRS will provide technical assistance for land use management and soil conservation.</p> <p>CECADESU will provide technical assistance for environmental education and co-ordinating public involvement</p>
<p>The Ministry of Agriculture, Livestock and Rural Development executes government policies in the agriculture and livestock sectors. Its functions --as modified in April, 1996-- are broadly defined. In terms of its organizational structure, SAGAR operates through 3 Sub-secretariats: Agriculture and Livestock, Rural Development, and Planning. SAGAR coordinates research in the livestock and agriculture field, and supports higher education programs in agronomy, animal husbandry and related fields.</p> <ul style="list-style-type: none"> • The Under-secretariat for Agriculture and Livestock: Established in 1996, the under-secretariat is responsible for the administration of agricultural sector policies, and operates through three general directorates: Agriculture, Livestock, and Agro- Development. • Under-secretariat for Rural Development (SDR): Established in 1996. It develops and implements policies and strategies relating to the rural productive sectors. There are two divisions, namely, Rural Development and Regional Programs. 	<p>SAGAR will fund agriculture research, agricultural inputs and rural outreach efforts. Much of the mainstreaming expected under the project would result from re-orientation of this line ministry's baseline activities.</p> <p>While all three Under-secretariats manage a number of baseline interventions that have bearing on conservation, the Under-secretariats for Agriculture and Rural Development will be directly involved in project planning efforts.</p> <p>SDR will support project goals through programs and activities that are geared to reducing livestock pressure on rangelands and forest resources in the pilot areas. Project coordination will be handled through the Regional Programs' General Directorate.</p>
<p>Secretariat of Social Development (SEDESOL): SEDESOL is the government agency charged with designing, coordinating and implementing the government's social policy.</p>	<p>SEDESOL will provide assistance and funding for rural and social development through the extension of micro-credits, and support for micro-enterprise development. Decentralized SEDESOL resources constitute one of the main targets for mainstreaming (development with environment) under this</p>

Institution	Role in Project
<p>In addition to its coordinating role, SEDESOL also leads the federal government's poverty relief initiatives through its Under-secretariat for Regional Development. Programs include the National Fund for Social Enterprises (FONAES), National Fund for Handicrafts Promotion (FONART) and Regional Indigenous Funds, as well as the Program for Education, Health and Food (PROGRESA)</p> <p>Decentralized agencies associated with SEDESOL include the National Social Development Institute (INDESOL), which has a strong focus on community development and supports training of NGO's and local governments; The National Indigenous Affairs Institute (INI), charged with promoting economically and socially equitable development of the nation's indigenous groups; and various programs that provide subsidies to low income communities.</p>	<p>project.</p> <p>The General Directorate for Social Programs will coordinate SEDESOL's input to the project.</p> <p>INI infrastructure and methodologies will be used to translate training/ extension materials into local languages.</p>
<p>Secretariat of Communications and Transport (SCT).</p> <p>This sector is comprised of Under-secretariats for Transport, Communications and Infrastructure. As the institutional mandate of this Ministry includes the approving, planning and constructing all major highways, secondary routes and rural roads and byways, its investment program can have substantial ecological impacts. Likewise, impacts on rural development and market access can be substantial.</p>	<p>The Ministry will work with PRODERS to strengthen environmental assessment procedures in sensitive sites.</p>
<p>Secretariat of Health (SSA): SSA is comprised of three Under-secretariats, one of which has direct links with the environmental sector (Under-secretariat for inter-sector coordination). Many of the aspects of environmental quality relate directly to health issues (air and water quality, among others).</p>	<p>This Secretariat will assist with the provision of basic health and family planning services in the pilot areas.</p>
<p>Secretariat of Public Education (SEP): SEP is the most highly decentralized agency of the Mexican Federal Government, with a presence in many of the country's most isolated towns and hamlets. The Secretariat is currently promoting the incorporation of environmental education into primary and secondary schooling</p>	<p>SEP will help strengthen educational systems and will serve as an implementation mechanism for the awareness campaign. Rural satellite broadcast infrastructure (<i>telesecundarias</i>) will be used for training.</p>

Institution	Role in Project
curricula.	
Secretariat of Commerce and Industrial Development (SECOFI): SECOFI works through two principle policy devices, the Industrial Policy and Foreign Commerce Program and the Internal Commerce, Supply and Consumer Protection Program, both of which have direct impacts on natural resource management and commercialization.	SECOFI will provide support for small business development. Overall impacts of certain sectoral policies will be studied in depth over the course of project implementation, vis-a-vis their impact on sustainable development and ecosystem management.
8. The Agrarian Reform Sector is comprised of four agencies, the Agrarian Reform Secretariat (SRA), the Attorney General's Office for Agrarian Affairs, the National Agrarian Register and the National Fund for <i>Ejido</i> Development (FIFONAFE). One of the most important policy instruments operated by SRA is the Ejido Rights and Property Deeds Program (PROCEDE).	This Ministry will be in charge of resolving agrarian/land tenure conflicts, as well as contributing towards the creation of an enabling environment for effective conservation through PROCEDE and other instruments.
State Governments	State governments will collaborate in the project, by reorienting State-level rural development programs to address integrated ecosystem management fundamentals, in accordance with relevant plans. Also, State governments would incorporate community and ejido inputs in State-level land-use planning activities, providing a solid legal framework.
Municipal Governments	Local municipal governments will be targeted for zoning and resource management reform. Most of the watershed and protected area management work will be coordinated through local municipal governments.
Non-Governmental Institutions: Many different non-governmental agencies will participate in the project, both in development of pilot projects, as well as in the design and implementation of training modules and dissemination. These include extension groups, community-level organizations, conservation groups and academic institutes, some with purely local constituencies and others with a regional or even national presence. The specific responsibilities of NGOs in project implementation will be determined once final approvals have been obtained, following due processes established for nationally executed projects.	The NGO/social actors are divided into: federal and state governments, municipal governments, organized communities, NGOs and farming organizations.

Institution	Role in Project
<p>LA CHINANTLA</p>	
<p>ERA, A.C.</p>	<p>ERA works mostly with forest-edge communities in the Chinantla Alta region, sponsoring technical training programs that focus on the preparation of forest management programs. These programs, which have been internationally recognized, allow for the rational and equitable use of both timber and non-timber resources.</p>
<p>Methodus Consultora, A.C.</p>	<p>This group works in the Chinantla Baja region, and supports smallholder participation in the productive sectors by preparing market studies and providing training opportunities. Its recent interventions have focused on increasing returns from production, by improving bargaining power, eliminating marketing intermediaries, improving product quality and value added.</p>
<p>Grupo Mesófilo, A.C.</p>	<p>A national-level NGO that is dedicated to the protection of cloud forests. The group focuses on social, productive and ecological issues in order to identify sustainable alternatives to destructive land uses.</p>
<p>PAIR, A.C.- Oaxaca</p>	<p>This organization works in both the Chinantla Alta and Chinantla Baja regions in collaboration with <i>Grupo Mesófilo, A.C</i> to promote ecologically sustainable livelihoods.. In particular, this group has promoted the use of a highly valued, natural fiber called Pita, that is used to decorate saddles, belts and other leather products.</p>
<p>ITAO (Instituto tecnologico agropecuario de Oaxaca)</p>	<p>Focus on teaching and investigation on traditional and alternative farming methods both in the forestry and agricultural sector</p>
<p>CIDIR (Centro de investigacion interdisciplinaria para el desarrollo regional)</p>	<p>This center forms part of the National Polytechnic Institute (IPN), and it has reseacrh centers all over the country. Theri center in Oaxaca is one of these and it practices applied investigations within the social and environmental sciences in various regions of the state</p>
<p>LA MONTAÑA</p>	
<p>PAIR, A.C. Montaña</p>	<p>PAIR has worked in the Montaña region for over 17 years, carrying out social and ecological diagnostic studies to help identify alternative livelihoods. The group has been widely recognized for their efforts to gain the participation of communities in their projects. PAIR has made a significant contribution to silvicultural research.</p>
	<p>Their investigation and teaching cover a variety of areas, among them the socio-economic, environmental and productive topics, and their interrelationship. Several of their</p>

Institution	Role in Project
<p>University of Guerrero</p> <p>LOS TUXTLAS Proyecto Sierra de Santa Marta</p>	<p>investigators have been collaborating with personnel of PAIR-Montaña</p> <p>The <i>Sierra de Santa Marta Project</i> is an NGO that has been working for nearly a decade in the Santa Marta region in Los Tuxtlas, Veracruz. Its work is molded by an integrated vision that incorporates social, ecological and productive elements in order to protect and repair the natural environment, and to expand the menu of economic opportunities in the region. This organization is well-known and accepted by local communities.</p>
<p>DECOTUX, A.C.</p>	<p>This NGO was founded in 1995, and focuses on improving the productivity of smallholder agriculture. The NGO has promoted the use of ‘green’ fertilizers, development of organic agriculture and alternative technologies. DECOTUX works through community motivators in order to create networks of <i>campesinos</i>.</p> <p>The Institute is dedicated exclusively to biological research, and has contributed to increasing knowledge of the biodiversity of the Los Tuxtlas region.</p>
<p>Instituto de Ecología, A.C.</p>	<p>This consultant group has worked throughout Mexico, and specializes in the preparation of land-use management studies.</p>
<p>PLADEYRAS</p>	<p>Researchers from this university have worked extensively in the Ls Tuxtlas region, and they are currently responsible for design and partial implementation of the management plan for the Bisosphere Reserve, in close collaboration with the NGO Sierra Santa Martha.</p>
<p>University of Veracruz</p>	<p>Focuses on biological aspects in the region, and maintain close relations with several relevant institutions</p>
<p>UNAM- Center for Investigation in Los Tuxtlas</p>	

ENVIRONMENTAL OVERVIEW AND MAPS

BIODIVERSITY

1. The three project sites represent a wide variety of ecosystems in both dry and humid tropical biomes, which host a range of forest types from temperate pine and oak-pine forests, to tropical rain forest. The sites harbor an impressive sample of Mexico's remarkable biological heritage, and are outstanding for their alpha and beta diversity. The ecosystems of the sites also are also characterized by their great diversity of organisms of different taxa. [It is important to note that while some taxa has been relatively well studied in Mexico, faunal and floral inventories are not complete.] Further assessment is needed to fill in knowledge gaps. The key attributes of the sites are summarized below.

Ecosystem Diversity

2. Despite the fact that all of the project sites are located south of the Tropic of Capricorn, the ecosystems that occur within them are not all tropical. Ecosystems facing the Pacific coast show a rain shadow -effect and are generally much dryer than those facing the Gulf of Mexico. Among ecosystems with the same aspect, there are huge differences in biota, caused primarily by altitudinal and humidity variations¹⁵. The La Montaña site, within the State of Guerrero, forms part of a watershed draining to the Pacific Ocean and contains two ecosystems of global significance. The first is the Balsas Dry Forest which is endangered, regionally outstanding, and classed as a high conservation priority at a regional scale (Dinersten et al, 1995). The second is the Sierra Madre del Sur Pine-Oak Forest, classified as critical, globally outstanding, and also of high regional priority (ibid). These ecoregions harbor a large number of animal and plant communities, within vegetative types including pine forest, pine-oak forest, montane moist forest, and tropical moist and dry forests. The Balsas dry forest is of global importance as the center of radiation and speciation of important tropical plant families such as Burseraceae. Species diversity for several other plant families is high.

3. Los Tuxtlas represents the Tehuantepec Moist Forest Ecoregion, which is endangered, bioregionally outstanding, and of high regional priority (ibid). Los Tuxtlas is a volcanic region composed of low mountains, which abuts the Gulf of Mexico, and constitutes the northernmost extension of tropical rainforest in Mexico. Because of its location and recent geologic origins, Los Tuxtlas is unique, both in terms of biodiversity and the structure of its biological communities. There are few regions in the tropics with a shrub layer as dense as that of Los Tuxtlas, which is due to the dominance and abundance of the palm *Astrocarium mexicanum*. Mangroves are also found on the southern coastal fringe of Los Tuxtlas, with the endangered tree, *Rhizophora mangle*, dominating.

5. The La Chinantla site also contains part of the Tehuantepec Moist Forest Ecoregion. It has an impressive altitudinal gradient, which drops from nearly 3000 m.a.s.l. to almost sea level in a relatively short distance. The mountains in the Chinantlas form an orographic barrier to the humid

¹⁵ Mexico has one of the greatest beta and gamma biological diversities in the world, and therefore, even similar vegetation types within the country have different biota.

clouds coming off the Gulf of Mexico, resulting in abundant precipitation. The humidity and altitudinal gradients that are formed give rise to many different plant communities within numerous forest types, including pine forest, pine-oak forest, montane moist forest (the largest stand in the country), and tropical rain forest. The site is within the transition zone between the Neotropic and Neoarctic biogeographical regions. Some studies suggest that this region is also a Pleistocene refuge. These characteristics combine to make La Chinantla a globally important and very unique bioregion.

Plant Diversity

6. 184 plant families have been reported in the Chinantla region, with a total of 1899 species, 39 of which have protection status under Mexican law. The most important vegetation type of the region from a conservation perspective is the montane moist forest (*bosque mesofilo*). Montane moist forests are estimated to represent 10-12% of Mexico's biodiversity, which in turn may account for approximately 10% of global biodiversity. 151 plant families and 925 species have been reported in La Montaña. Among the most important genus are *Pinus*, with more than 19 species and varieties recorded, *Quercus* with 21 species and *Bursera*, with at least 22 different species. Los Tuxtlas harbors 75 plant families and 233 species. Mexican law protects 40 of these, and 6 or more are endemic to the country or region. *Ceratozamia mexicana*, *Zamia loddigessi*, *Rhizophora mangle*, *Chamedorea ernesti-angusti* and *Ch. metalica* are among the most threatened species at the site.

Reptilian Diversity:

7. For Chinantla 16 orders, 25 families and 200 species of reptiles have been reported. 114 of those species are classified as globally important, being endemic either to the region, or to the country. Six are listed in CITES, including *Crocodylus acutus*, *Clelia clelia* and *Dermatemys mawi*. In Montaña, a total of 112 species have been identified, representing 16 families and 2 orders. 63 of these species are listed as endangered, rare, subject to special protection, or threatened under the Mexican Official Norm. Despite the high number of reptilian species found in the region, only one, *Crotalus durissus durissus*, is included in CITES. Los Tuxtlas is an area rich in herpetofauna: at least 112 species have been recorded there, representing 3 orders and 24 families. Of these species, at least 10 are endemic to Los Tuxtlas, and 52 are included in the Mexican Official Norm. Some of these species are very endangered, including *Dermochelys coriacea*, *Dermatemys mawii*, *Crocodylus moreletii*, *Boa constrictor* and *Bothrops asper*, which are among the 8 species listed in CITES. The presence of *C. moreletii* underscores the importance of preserving the site's aquatic ecosystems.

Bird Diversity

8. For la Chinantla, 16 orders, 59 families and 529 bird species have been reported. Of those, 169 are protected under Mexican law, 26 are of global importance because they are endemic, and 10 are listed in CITES. *Anas clypeata*, *Burhinus bistriatus*, *Falco peregrinus*, and *Colinus virginianus* are among those listed. 187 bird species have been reported in La Montaña, representing 37 families and 2 orders. These include cosmopolitan, tropical and temperate

families, again a reflection of convergence of tropical and temperate ecosystems. More information is required to assess the population dynamics of these birds. Since birds are one of the groups most sensitive to environmental change, they can be used as key species for monitoring ecosystem status and project performance. Only two species are included in CITES: *Falco peregrinus* and *Ortalis vetula*. A total of 37 species are endemic either to the country or to the region, thus qualifying as species of global importance. The Tuxtlas is a region with one of the richest avifauna distributions in Mexico. 561 different species of birds have been reported, 230 of which are neararctic-neotropical migrants. One species (*Camphylopterus excellens*), and six of the subspecies reported (*Geotrygon lawrencii carrekeri*, *Empidonax flavescens imperturbatus*, *Myioborus miniatus molochinus*, *Euphonia gouldi loetscheri*, *Atlapetes brunneinucha apertus* and *Chlorospingus ophthalmicus wetmorei*) are endemics to Los Tuxtlas, and 20 others are endemic to a larger area. 55 of the species reported are endangered, and 30 are in danger of extinction. Los Tuxtlas also has the distinction of being in the flight path of the "River of Raptors" - one of the most spectacular migratory bird phenomena in all of the Western Hemisphere.

Mammal Diversity

9. For Chinantla, 10 orders, 30 families and 260 species of mammals have been reported. Of these, 40 species are endemic and considered of global importance. 17 species are listed in CITES, among them *Ateles geoffroyi*, *Panthera onca*, and *Puma concolor*. The mastofauna occurring in Chinantla is representative of both Neotropical and Neartic faunas, another reason to consider la Chinantla as transitional between these two biogeographic realms. In Montaña, a least 63 species of mammals are found, ranging from big cats and deer, to small rodents and bats. These species represent 18 families and 7 orders, with 7 of them endemic and 6 included in CITES. In Los Tuxtlas, 12 orders, 31 families and 98 species of mammals have been reported. Of these species, 25 are protected by the Mexican Law on account of their rarity, 21 are included in CITES and 1 is endemic.

CLIMATE CHANGE MITIGATION BENEFITS

10. The PRODERS project offers important global climate change (GCC) mitigation benefits, both in terms of carbon sequestration in forests and soils, and in terms of emissions avoidance from slash and burn agriculture. As demonstrated in Mexico's country studies and action planning work¹⁶, One of the highest priority areas of opportunity for GHG mitigation in Mexico is in the forest management sub-sector (i.e. through maintaining carbon sinks in densely forested areas). According to Masera, *et.al* (1995b)¹⁷, "under an appropriate policy framework, the forestry sector (of Mexico) has the capacity of reducing the growth of CO2 emissions in the energy sector, which makes it one of the most important mitigation options in the short to medium term." This area of mitigation is strategic and especially attractive because, if done properly, it generates additional benefits in terms of biodiversity conservation, watershed protection and sustainable rural development. This mitigation action, in addition to maintaining carbon sinks in forests and soils, also avoids the emission of greenhouse gasses resulting from land conversion by shifting

¹⁶ According to Mexico's Climate Action Plan, 1999

¹⁷ Masera, O., 1995. *Deforestación y Degradación Forestal en México*. Documento de Trabajo 19. Grupo Interdisciplinario de Trabajo Rural Apropiaada, A.C. Pátzcuaro, Michoacan, México. 50 pp.

agriculture.

11. An initial analysis focusing exclusively on the eight pilot areas proposed under the project (Attachment A), indicate that significant potential exists for carbon emissions avoidance when comparing “with project” and “without project” scenarios. Assuming a continuance of current deforestation/degradation rates over a timeframe of 20 years, forest conservation in itself will avoid in the order of 10.23 to 16.89 million metric tons of carbon emissions. In addition, assuming that the project will lead to the establishment of 5,200 Ha. of fuelwood and 1,500 Ha. of timber plantations, 5,000 Ha. of natural forest management, and 2,500 Ha. of agroforestry systems in the buffer zones of these pilot areas, an additional 1.81 to 2.177 million tons of carbon could be sequestered. These estimates are based on general and very preliminary figures of carbon contents for different land uses and forest types in Mexico. In depth, site-specific assessments of carbon cycling in each of the pilot areas will be performed as part of the process of ground-truthing baseline indicators, which will allow much more precision in the determination of the project’s carbon sequestration and offset benefits¹⁸.

WATERSHED AND SOIL PROTECTION BENEFITS

12. Mexico is a country with scarce water resources with water being a major constraint to sustainable development throughout the country. Water conservation, along with biodiversity conservation, are two of the country’s greatest and most urgent environmental challenges. The PRODERS sites targeted by the project form part of important watersheds, as described below:

Los Tuxtlas: The mountain massifs that constitute the Los Tuxtlas are important headwaters and catchment areas for the Coatzacoalcos and Papaloapan river basins, both of which are among the highest volume discharge watersheds (per unit surface area) in the country. These watersheds feed the important freshwater lake of Catemaco located to the south, and to the north numerous important coastal lagoons and mangrove systems including Laguna de Sontecomapan and Laguna Costera del Ostión.

La Montaña: The two pilot areas of this site, the Huamuxtitlán-Tehuaxtitlán Canyon to the north, and the Iliatenco-Barranca del Aguila, both form the headwaters of the important Balsas river basin, which has in its lower important agricultural projects that irrigate more than 3,300 Ha.. The forests of the site are significant in that they sustain dry-season runoff for these projects. The Huamuxtitlán-Tehuaxtitlán Canyon also supplies irrigation water for the Huamuxtitlán Valley, which is of regional importance.

La Chinantla: The watersheds of the high and low Chinantla flow into the Papaloapan river basin, and supply the Miguel de la Madrid and Miguel Aleman flood control and hydroelectric dams located in its mid reaches. Both of these dams protect important downstream lowlands of the State of Veracruz and generate power for the national grid.

Land and Soil Degradation:

¹⁸ The afore-mentioned benefits will be magnified through the expansion of ecosystem management at each site.

13. The conservation of soil resources is dependent primarily upon two factors: that soils are used in accordance with their capability, and that soil management practices be appropriate and suitable. During the last forty years Mexico has witnessed drastic changes in terms of population growth, accelerated urbanization and industrialization, and increasing levels of rural poverty. These changes have provoked irreversible changes in terrestrial ecosystems, soil erosion and land degradation. Currently, levels of soil erosion and land degradation are severe throughout Mexico, and giving rise to desertification in many regions. Land degradation of some degree occurs in 95% of the landscape. Wind and water erosion occurs on 85% and 60% of the countryside, respectively. Consequent biological degradation and associated desertification is observed on an estimated 80% of the land.¹⁹The project sites are no exception. Land degradation occurs on an estimated 0.5 % [2,384 Ha.] of the Chinantlas; 12.8 % [88,573 Ha.]of the Montaña; and 2 % [2,448Ha.] of the Los Tuxtlas

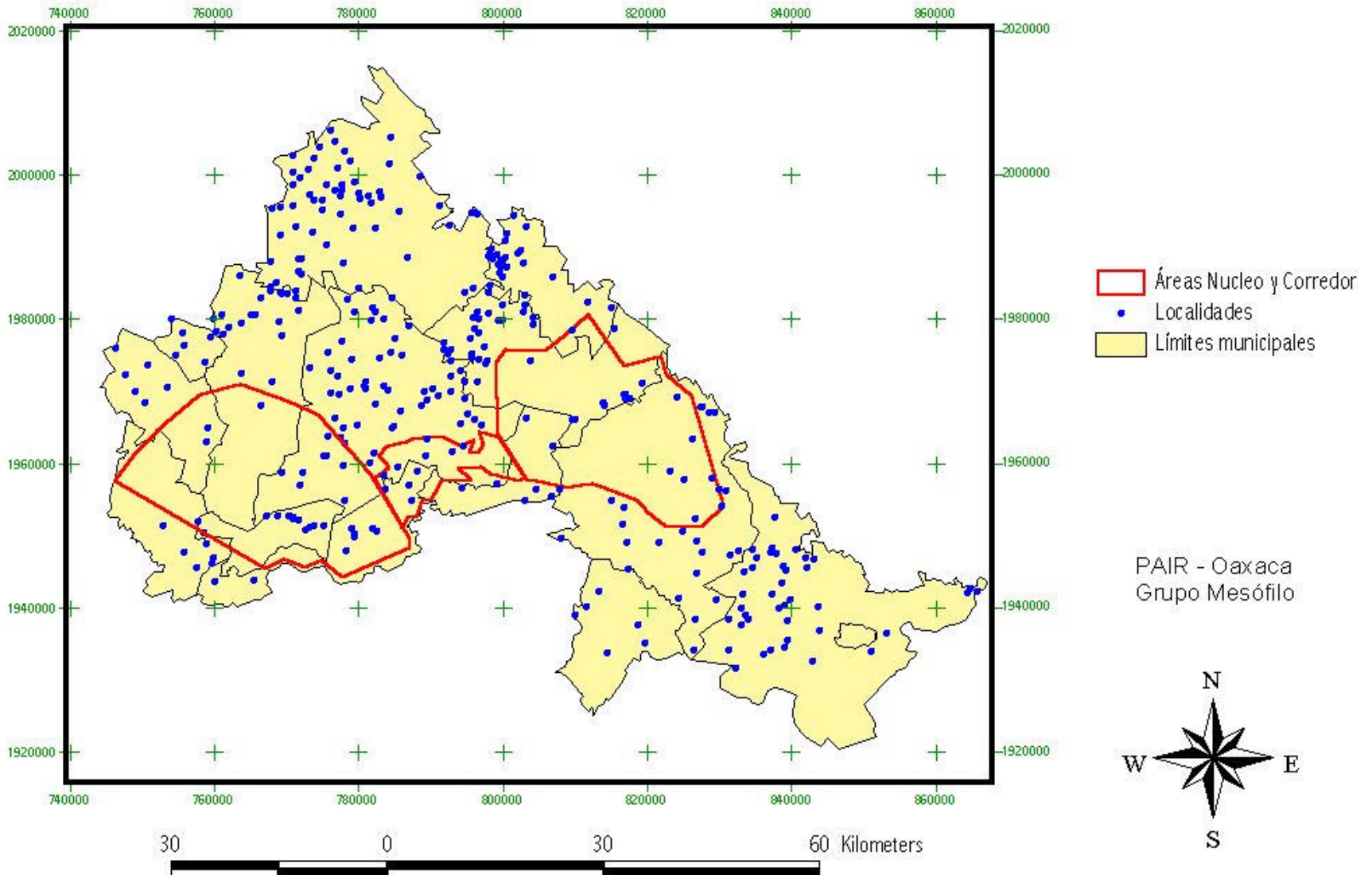
Attached: Site Maps

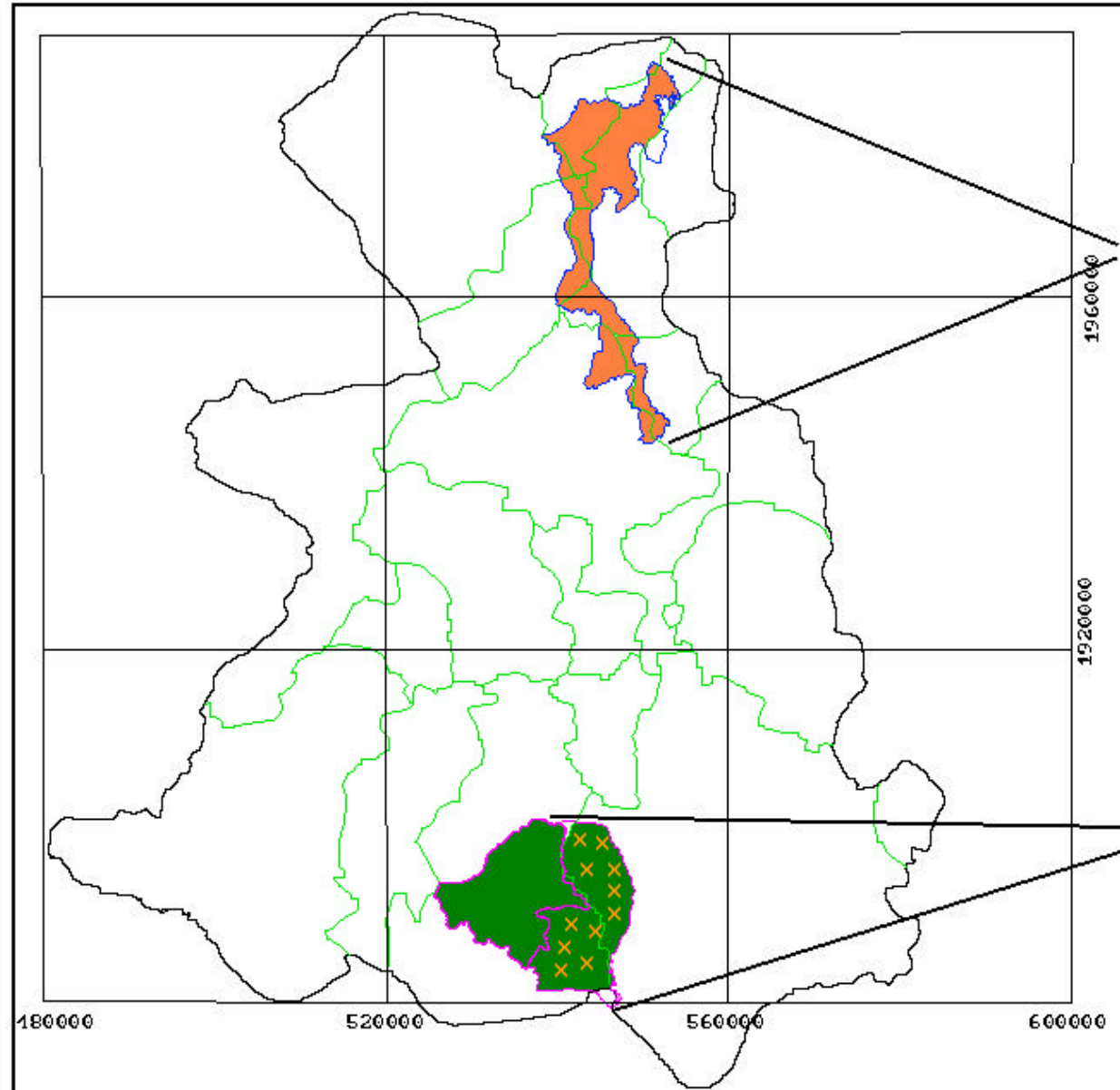
¹⁹ CONABIO, 1998. *La Diversidad Biológica de Mexico: Estudio de País*. 341 pp.

Proyecto SEMARNAP-GEF: "Conservación de la Biodiversidad y Desarrollo Sustentable
en Regiones Prioritarias"
Localización de las Regiones



Localidades, Areas para la Conservación y Corredor Región de la Chiantla, Oaxaca





CAÑADA

Superficie nucleo verificada
21,652 ha.

Vegetación predominante
Selva Baja Caducifolia

Climas: Aw0 y Aw1

No. de comunidades subyacentes
16 más 7 anexos de Cualac

ILIATENCO-BARRANCA DEL AGUILA

Superficie nucleo verificada
14,894 Ha.

XXX Superficie nucleo por verificar
15,093 Ha.

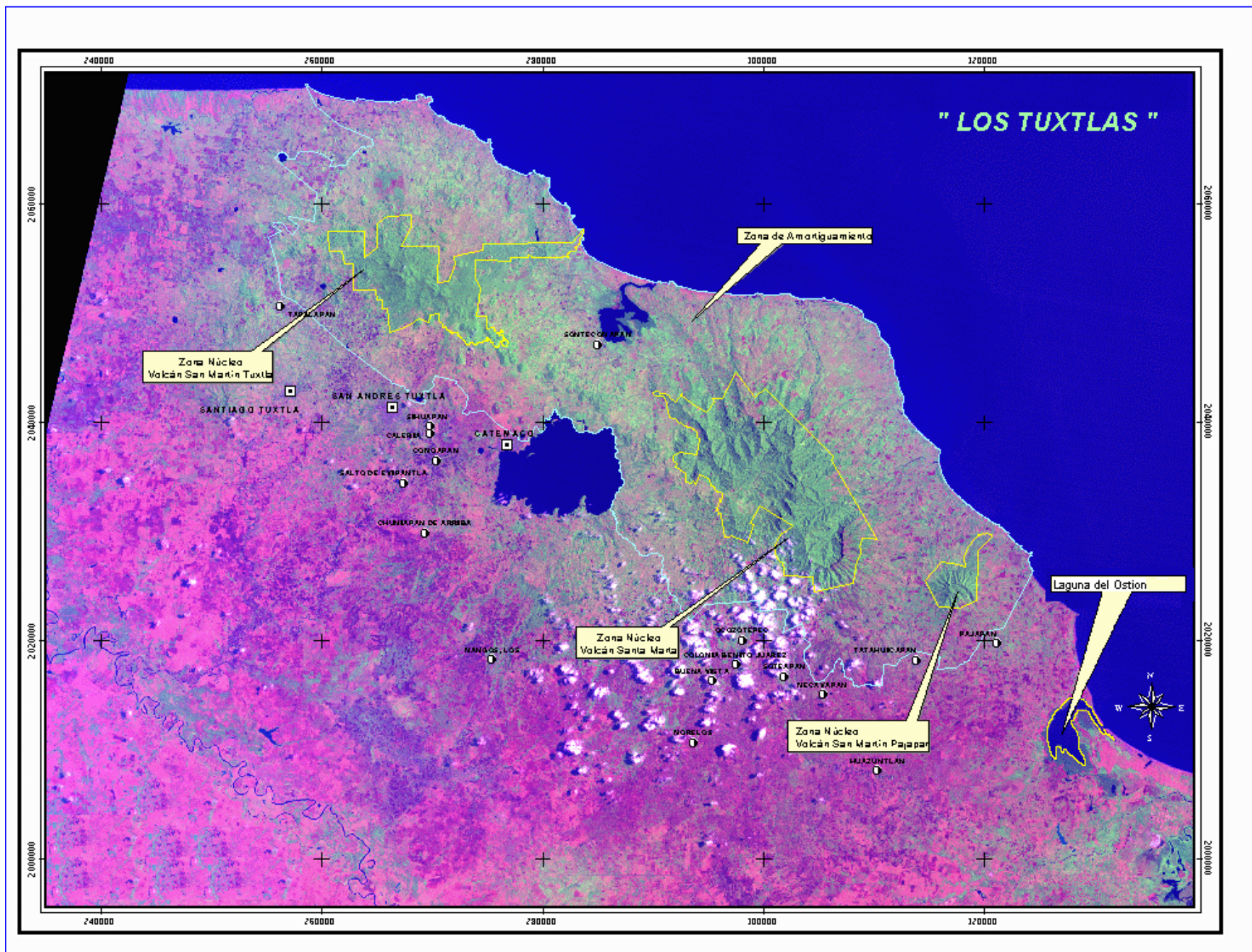
Total a conservar
29,987 Ha.

Vegetación predominante
Bosque templado y mesófilo de montaña

Climas Cw2 y Cm

No. de comunidades subyacentes
4 más 39 anexos de Iliatenco, Paraje Montero
y Mixtecapa.

MAPA DE UBICACION DE LAS
2 ZONAS DE CONSERVACION
PAIR A.C.



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PROJECT CATEGORIZATION TABLE

Focal Area Categories					
Biodiversity		Climate Change		International Waters	Ozone Depletion
Conservation +		Energy conservation (prod./distribution)		Transboundary Analysis	Monitoring:
in situ+	Ex situ	ESCO's	Efficient Designs	Strat. Action Plan Development	ODS phase out (Production)
Sustainable Use+		Solar:		Freshwater Basin✓	ODS Phase Out (Consumption)
Benefit-sharing +		Biomass:		Marine Ecosystem	Other:
Agrobiodiversity		Wind:		Wetland Habitat	
Trust fund		Hydro:		Ship-based	
Ecotourism		Geothermal:		Toxic Contaminants	
Biosafety		Fuel cells:		GPA Demonstration	
Policy & Legislation +		Methane recovery:		Fisheries Protection	
Buffer Zone Dev. +		Other: Carbon Sinks +		Global Support:	
b. Categories of General Interest					
Investment +		Technical Assistance +		Targeted Research	Land Degrad. +
Technology Transf. +		Small Islands		Info/Awareness+	Private Sector

Involvement type	Project design	Implementation	Info/ awareness	Consultation
Chinantla				
<i>NGO's</i>				
Methodus Consultora, A.C.	+	+	+	
ERA, A.C.		+	+	+
SERBO, A.C.				+
Mesófilo, A.C.	+			
PAIR-Oaxaca, A.C.	+			
<i>Community based organisations</i>				
SCL Comercialización de Chile Jalapeño		+	+	+
SC Nicolás Vargas		+	+	+
U de E Fernando Gómez Sandoval		+	+	+
UIZACHI;		+	+	+
AAL Vainilla, Café y Cacao		+	+	+
Productores Unidos para el Desarrollo Sustentable (PUDS S.C.)		+	+	+
Sector Vainillero		+	+	+
Unión de Comunidades Lima Café		+	+	+
Unión de Comunidades Región Usila (UCRU)		+	+	+

Involvement type	Project design	Implementation	Info/ awareness	Consultation
FRS La Esperanza Indígena A.C.		+	+	+
Asociación Agrícola Local de San Felipe Usila		+	+	+
SPR Chinantla Baja		+	+	+
SPR Playa Limón		+	+	+
Asociación de Campesinos Indígenas		+	+	+
Comité de Recursos Naturales de la Sierra Juárez		+	+	+
Montaña:				
<i>NGO's</i>				
Comité Central Menonita				+
Mantis Religiosa				+
PAIR-Montaña, A.C.	+	+	+	
<i>Community based organisations</i>				
SSS Arroceros de San Pedro Aytec		+	+	+
SPR Ahuelican		+	+	+
SSS La Flor de la Bocana		+	+	+
U de E La Luz de la Montaña		+	+	+
SSS Cafetaleros de Iliatenco		+	+	+
SSS El Tlapaneco		+	+	+
Unión Regional Campesina		+	+	+
Tuxtlas:				
<i>NGO's</i>				
Proyecto Sierra Sta. Martha		+	+	+
DECOTUX, A.C.	+	+	+	
PLADEYRAS, A.C.	+			
Instituto de Ecología, A.C.	+			
Centro Regional para la Educación y la Organización, A.C.				+
Anfitrionas y Anfitriones Ecológicos de Los Tuxtlas.				+
Sociedad Coperativa Mok Cinti				+
Comité para la Educación y Desarrollo Integral de la Mujer.				+
<i>Community based organisations</i>				
Grupo de reforestación de San Fernando.		+	+	+
Grupo de Mujeres de San Fernando.		+	+	+
Grupo de Productores de Palma Camedor.		+	+	+
Liga Etnica		+	+	+
Agrícolas y Ganaderos		+	+	+
Frente Cívico Indígena Pajapeño.		+	+	+
Comité Comunitario de Ecología de El Pescador		+	+	+

G.H. 1



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Subdirección de Proyectos Ambientales y de
Desarrollo Urbano

Oficio No.- 305. VI. 4.- 141

3528

México, D.F., a 31 de Mayo de 2000.

LIC. JOSE LUIS SAMANIEGO LEYVA

Coordinador de la Unidad de Asuntos Internacionales
Secretaría de Medio Ambiente, Recursos Naturales y Pesca
Lateral del Periférico Sur 4209, Piso 6,
Colonia Jardines en la Montaña
C i u d a d

Hago referencia a su Oficio UCAI/2715/00, de fecha 25 de mayo de 2000, relativo a la propuesta del Proyecto "**Manejo Integrado de Ecosistemas en Tres Regiones Prioritarias**", que será apoyado con recursos del Fondo para el Medio Ambiente Mundial (GEF).

Sobre el particular, a través del presente me permito comunicar a usted que en virtud de que el proyecto de referencia cuenta con el aval técnico de la Secretaría de Medio ambiente, Recursos Naturales y Pesca (SEMARNAP), esta Secretaría de Hacienda y Crédito Público está de acuerdo en que dicha propuesta se someta a consideración del Secretariado del GEF en Washington, a través del PNUD como Agencia Instrumentadora del GEF en México; lo anterior, en virtud de que su financiamiento contribuirá al cumplimiento de metas sectoriales de desarrollo.

Mucho le agradeceré nos mantenga informados del trámite que guarden estas gestiones, y sin otro particular por el momento, aprovecho la ocasión para reiterar a usted las seguridades de mi más atenta y distinguida consideración.

Atentamente,
SUFRAGIO EFECTIVO. NO REELECCION.
El Director de Organismos Financieros
Internacionales

Ricardo Ochoa

