UNITED NATIONS ENVIRONMENT PROGRAMME

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Программа Организации Объединенных Наций по окружающей среде | برنامج الأمم المتحدة للبيئة

联合国环境规划署

UNEP

PROJECT DOCUMENT

SECTION 1: PROJECT IDENTIFICATION

1.1. Project title: Mainstreaming the conservation of ecosystem services and biodiversity at the sub-watershed scale in Chiapas, Mexico

1.2. **Project number:** GFL/
PMS:

1.3. **Project type:** FSP

1.4. **Trust Fund:** GEF

1.5. **Strategic objectives:**

GEF strategic long-term objective: BD 2 To mainstream biodiversity in production landscapes/seascapes and sectors

Strategic programme for GEF IV: SP 4 SP 5

1.6. **UNEP priority:** Ecosystem management

1.7. **Geographical scope:** National

1.8. **Mode of execution:** External

1.9. **Project executing organizations:** Conservation International Mexico, COFOSECH, CONANP, IHN, CONAGUA

1.10. **Duration of project:** 36 months
Commencing: August 2010
Completion: July 2013

1.11. **Cost of project**	US$	%
Cost to the GEF Trust Fund	**1.484.044**	**20.1**
Co-financing		
Cash		
CI	1.741.299	23.6
CONANP	1,564,812	21.2
COFOSECH	256,644	3.5
IHN	15.000	0.2
Sub-total	**3,577,755**	**48.4**
In-kind		
CI	0	0
CONANP	885,000	12.0
COFOSECH	1,304,520	17.7
IHN	135,000	1.8
Sub-total	**2,324,520**	**31.5**
Total	**7,386,319**	**100**

1.12. Project summary

The objective of the project is to mainstream biodiversity conservation into natural resource management at the sub-watershed level through integrating ecosystem service considerations in the decision-making in the Sierra-Costa region of Chiapas, Mexico. The project objective will contribute to the conservation of ecosystem services (ES) and biodiversity (BD) with global significance, and it will be attained by (i) developing the knowledge base for ES appraisal and their interaction with land use among key stakeholders at the sub-watershed level; (ii) integrating ES and biodiversity considerations into land use policies, planning and promotion activities by watershed committees, and communicating them to municipal, state and federal agencies improving policy coordination and facilitating replication; (iii) increasing access by land users to public and private ES payment (PES) mechanisms (carbon, watershed services, biodiversity) to provide funding and incentive instruments for the implementation of land use practices and strategies that conserve ES and BD values and improve local livelihoods.

In order to achieve these results, the project will develop methods, tools and protocols for assessment and monitoring of ES, BD, and land use data, for use by watershed committees, other key government agencies, NGO partners and universities. On the basis of these instruments, the project will support local monitoring and research on status, dynamics and benefits of ecosystem services and interrelationships between land use, ES, BD and livelihoods across ten target sub-watersheds, including the identification of factors influencing individual and collective land use decisions by land owners and *ejidatarios*[1] Lessons will be learned about the impact of hurricanes Mitch (1998) and Stan (2005) on land use and water balances in the project region. Furthermore, the project will implement training programmes for watershed committee members, other policy-makers and land users to enable them to mainstream ecosystem services and biodiversity considerations into natural resources management policies and plans coordinated by key stakeholders at the sub-watershed level. Based on such coordinated sub-watershed development planning, sustainable production practices in agriculture, livestock farming and forestry that conserve ES and BD, as well as local restoration and soil conservation projects, are introduced or strengthened in the target sub-watersheds. Recommendations will be developed, communicated and monitored to incorporate ES and BD into sectoral development and restoration policies and regulations of key government, non-government and public-private agencies, and to improve coordination among these agencies with regard to the promotion of sustainable land uses at the sub-watershed level. The formation and strengthening of committees will be assisted in sub-watersheds of the Sierra Madre of Chiapas with BD and ES conservation priority where they still not exist or are inactive. The project will also provide training and technical assistance on preparing projects that qualify for government-funded PES programs and will contribute to strengthen CONAFOR's PES program by focusing on the development of market-based schemes, an incentive-based mechanism for technicians' certification and an integrated approach to watershed management at the community level. Last but not least, the project will give strong support to increase marketing capacities for different market-based PES mechanisms and sustainable products among land users and their organizations, as well as among actors supporting such initiatives (NGOs, sub-watershed and other government extensionists, technical advisors).

[1] Possessors (tenants) of community land called *ejido*

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ACRONYMS AND ABBREVIATIONS

BD	Biodiversity
CABS	Center for Applied Biodiversity Science (CI)
CABSA	Captura de Carbono, Protección a la Biodiversidad y Servicios Agroforestales
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza
CBD	Convention on Biological Diversity
CC	Climate Change
CEO	Chief Executive Officer
CFE	Comisión Federal de Electricidad
CI	Conservation International
CMDRS	Consejo Municipal del Desarrollo Rural Sustentable
COFOSECH	Comisión Forestal Sustentable del Estado de Chiapas
COMCAFÉ	Comisión Para el Desarrollo y Fomento del Café de Chiapas
CONABIO	Comisión Nacional para el Conocimiento y Uso de la Biodiversidad
CONAFOR	Comisión Nacional Forestal
CONAGUA	Comisión Nacional del Agua
CONANP	Comisión Nacional de Áreas Naturales Protegidas
COP	Conference of the Parties (to the CBD)
COPLADEM	Comité de Planeación para el Desarrollo Municipal
DAC	Development Assistance Committee (OECD)
DEPI	Division of Environmental Policy Implementation (of UNEP)
DGEF	Division of the Global Environment Facility
ECOSUR	El Colegio de la Frontera Sur
ES	Ecosystem Service(s)
ESV	Ecosystem Value
EOU	Evaluation and Oversight Unit (of UNEP)
FIRCO	Fideicomiso de Riesgo Compartido
FONCET	Fondo de Conservacion El Triunfo, A.C.
FSP	Full Size Project
GEF	Global Environment Facility
GESE	Grupo Estatal de Servicios Ecosistémicos
GHG	Greenhouse Gas
GIS	Geographic Information System

HCFC	Hydrochlorofluorocarbon
IDESMAC	Instituto para el Desarrollo Sustentable en Mesoamérica A. C.
IHN	Instituto de Historia Natural
IISD	International Institute for Sustainable Development
INE	Instituto Nacional de Ecología
INESA	Instituto Estatal del Agua
INIFAP	Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias
IPCC	Intergovernmental Panel on Climate Change
IW	International Waters
LD	Land Degradation
LFM	Logical Framework Matrix
MA	Millennium Ecosystem Assessment (2003)
MAPS	Manejo del Agua y Preservación de Suelos
MDG	Millennium Development Goal(s)
MDL	Mecanismo para un Desarrollo Limpio
MEA	Millennium Ecosystem Assessment (2003)
MIC	Manejo Integral de Cuencas
MSP	Medium Size Project
NGO	Non-Governmental Organization
NIP	National Implementation Plan
NPA	Natural Protected Area
NRM	Natural Resource Management
ODS	Ozone-depleting substances
OECD	Organisation for Economic Co-operation and Development
PA	Protected Area
PDF - B	Project Development Facility – Block B
PECSE	Programa Estatal para la Compensación por Servicios Ecosistémicos
PES	Payment for Ecosystem Services
PFNM	Productos Forestales No Maderables
PIF	Project Identification Form
PSAH	Pago por Servicios Ambientales Hidrológicos (Payment for Hydrological Environmental Services Program)
POP	Persistent Organic Pollutants
PROCOREF	Programa de Conservación y Restauración de Ecosistemas Forestales
PSP	Prestador(es) de Servicios Profesionales

RAF	Resource Allocation Framework
RBM	Results Based Management
SAG	Strategy Advisory Group (OECD)
SAGARPA	Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales
SFM	Sustainable Forest Management
SINAP	Sistema Nacional de Áreas Naturales Protegidas
SO	Strategic Objective (GEF)
SP	Strategic Program (GEF)
STAP	Scientific and Technical Advisory Panel
TAG	Technical Advisory Group
TEEB	The Economics of Ecosystems and Biodiversity
TNC	The Nature Conservancy
UNACH	Universidad Autónoma de Chiapas
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WRI	World Resources Institute

SECTION 2: BACKGROUND AND SITUATION ANALYSIS (BASELINE COURSE OF ACTION)

2.1. Background and context

1. The sub-watersheds where the project activities will take place are located in the Sierra-Costa region of Chiapas; most of them are on the slope facing the Pacific, while some others are on the side of the Grijalva-Usumacinta basin which drains into the Gulf of Mexico, i.e., into the Atlantic (see Appendix 16: Maps of sub-watersheds, municipalities and protected areas in the Sierra-Costa region of Chiapas). The Costa and the Grijalva-Usumacinta watersheds are separated by the Continental Divide, formed in this part of Mexico by the Sierra Madre of Chiapas, a mountain range extending 280 km from the Guatemalan border in the southeast to the Isthmus of Tehuantepec in the northwest. With an average altitude of some 1,500 meters above sea level, the Sierra Madre looses height from the Volcán Tacaná (4,092 m) on the border with Guatemala towards its north-western extreme. The Costa region includes a narrow alluvial plain, a piedmont region and a mountainous volcanic belt. The slope on the coastal side of the Sierra Madre is rather pronounced, with more than 20% incline for most of its slopes. On the Grijalva side, the flanks of the Sierra descend more slowly towards the Central Valley or Central Depression. The Sierra-Costa region of Chiapas has a tropical climate with a rainy season that spans from May to November. Average annual temperatures vary from about 18°C along the higher mountain areas, to 24-27°C in the foothills and around 30°C on the coast. Total annual precipitation is roughly 2500 to 3000 mm on average, but with marked differences within three areas: 1) from the Soconusco region in the southeast with over 4000 mm and 180 days of rainfall per year to the Tehuantepec Isthmus, which is rather arid; 2) from the lower regions (coastal plains and Central Depression) with 1500-2500 mm of rainfall to the higher slopes of the Sierra with up to 3500-4000 mm; and 3) from the Costa to the Central Valley (Grijalva River), where rainfalls are lower (1500 mm on average).

2. The Sierra-Costa region of Chiapas shares many of its characteristics as an integrated highland-lowland system with the other parts of the so-called Chiapas-Fonseca freshwater ecoregion that stretches from the Gulf of Tehuantepec in Oaxaca to the Choluteca basin at the Gulf of Fonseca in southern Honduras. Many creeks and small rivers descend from the Sierra Madre to the coastal plains, forming the 24 sub-watersheds of the Costa of Chiapas. On the north-eastern side of the Sierra, 18 sub-watersheds drain into the Grijalva River, feeding the Grijalva River hydroelectric complex, the largest in Mexico with six hydroelectric plants, among them La Angostura, Chicoasén and Malpaso. Nearly 25% of all of Mexico´s electricity is generated in Chiapas. Due to the steep slope of the mountains on the Pacific side, waters descend rapidly, carrying a lot of sediments with them that are deposited in the lowlands and the coastal lagoons. Floods are frequent during the rainy season, especially from August to November, affecting human settlements, means of communication (roads and bridges) and agricultural areas. Along the coastline run sandbars or dunes that impede rivers from discharging their waters directly into the sea, forming extensive systems of lagoons and marshes.

3. The original vegetation in the flat coastal plains and foothills is now replaced in most parts by agricultural land. Agricultural systems are little diversified, with a predominance of extensive cattle breeding, both on the Pacific and Atlantic side. Traditional maize cultivation, often associated with bean, pumpkin and other vegetables mainly for self-consumption, has lost terrain to other land uses, especially cattle farming. Coffee farms, to a large extent run by smallholders, are common in the moist forest areas of the south-eastern parts on both sides of the Sierra Madre, generally not replacing the forest cover entirely, as endemic species are used as shade trees. In mid-elevation (600–1,400 m) areas, coffee farms can account locally for up to 98% of the land cover[2]. Intensive fruit production (banana, mango, citrus) is concentrated in some coastal areas. African oil palm plantations have been established in some parts of the coastal plains, fostered by governmental policies. Cacao is grown on the south-eastern slopes where the rainfall is heaviest. Legal timber extraction, mainly from pine forests, is very limited, whereas illegal logging is still occurring. Non-timber products, like xate palms and orchids, are exploited from cloud forests, and are also cultivated on a limited scale. Fisheries are an important source of income for several communities along the coast, where shrimp and tilapia are cultivated in the lagoons.

[2] Götz Schroth et. al., *Towards a climate change adaptation strategy for coffee communities and ecosystems in the Sierra Madre de Chiapas, Mexico*. Mitigation and Adaptation Strategies for Global Change (2009) 14: 605-625

4. The Sierra Madre de Chiapas and its coastal lowlands were sparsely populated until the second half of the 19th century when two frontiers began to move towards its interior. From the extreme northwest and the Central Valley, cattle ranchers colonized new areas whereas in the southeast, foreign investors penetrated the mountain forests introducing coffee cultivation[3]. Agrarian reform laws decreed after the Mexican Revolution (1910-1917) granted land titles to communities (*ejidos*). These reforms were heavily resisted in Chiapas by large landowners, and the formation of new smallholder farms in the Sierra Madre was limited to marginal uphill areas. A similar process occurred after the Zapatista rebellion in 1994 when the government bought and distributed land claimed by landless farmers and their organizations; several of the new *ejidos* formed during those years in the Sierra Madre were situated in upper woodlands and even in core zones of protected areas[4]. But from a long-term perspective, the impact of land use change was greatest between the 1950s and the 1980s. Under the official motto of "the conquest of the tropics", public policies encouraged the colonization of jungle areas in the south-eastern states of Mexico, including Chiapas; during that period, new areas were opened in the Sierra Madre and its lowlands, mainly for cattle ranching. Due to high demographic pressure, especially from the densely populated indigenous highlands of Chiapas (*Tsotsiles* and *Tseltales* from *Los Altos*) and from Guatemala (*Mam* group), the frontier of settlement advanced into steeper parts of the Sierra.

5. Since the 1990s, certain restraints on further land use change were created by the formation of several protected areas, especially in the moist and pine-oak forest zones of the Sierra Madre and the lagoon-mangrove areas on the coast. There are now four Biosphere Reserves in the zone: La Sepultura, El Triunfo, La Encrucijada y Volcán Tacaná; the Area for the Protection of Natural Resources (APRN) La Frailescana; and three state-managed reserves: El Gancho-Murillo, El Cabildo-Amatal y Pico El Loro-Paxtal. Altogether, 690,959 ha or nearly 40% of the whole Sierra-Costa region, is now under some form of protection. The core zones of the national protected areas (NPAs) must be devoted to biodiversity conservation, and only activities such as research and environmental education are allowed. In buffer zones, agriculture and other traditional land uses are allowed but forest conversion is not. However, many of the buffer zone areas of these reserves are used for agriculture and grazing and are thus part of the production landscape. Although specific environmentally-friendly production practices should be used in these buffer zones in accordance with their management plans, the actual practices there do often not differ much from those in the surrounding areas.

6. The Biosphere Reserves El Triunfo (119,177 ha, with five core zones totalling 21.6% of its surface) and La Sepultura (167,309 ha, 8.2% corresponding to five core zones) are located in the southeastern and northwestern parts of the Sierra Madre and were designated natural protected areas by federal law in 1990 and 1995, respectively. The 37 km long corridor between the two Reserves is covered by the Area for the Protection of Natural Resources La Frailescana (181,350 ha), designated as such in 2007; upgrading of La Frailescana to the status of a UNESCO Biosphere Reserve is underway[5]. Adjacent to El Triunfo, on the southeast, extends the State Reserve Pico El Loro-Paxtal, covering a surface of 60,982 ha. These four protected areas stretch over more than 80% of the whole length of the Sierra Madre mountain range and cover most of its higher parts (see map 2 in Appendix 16). Volcán Tacaná Biosphere Reserve (6,378 ha) on the border with Guatemala was designated in 2006. In the coast, La Encrucijada Biosphere Reserve (144,868 ha) is a still well-conserved (although threatened) ecosystem of mangrove estuaries, semi-deciduous tropical forest and seasonally flooded forests. Also located in the coastal planes of the Pacific, near the town of Tapachula, are the El Gancho-Murillo (7, 284 ha) and El Cabildo-Amatal (3,611 ha) state reserves, both declared as Ramsar sites.

7. In January 2000, CONAGUA (the National Water Commission) installed the Watershed Council of the Coast of Chiapas; in August 2000 followed the Watershed Council of the Rivers Grijalva and Usumacinta. In the coastal basin, four watershed committees for sub-watersheds (subcuencas) were created between 2002 and 2005: the

[3] Héctor Plascencia Vargas and Héctor Sergio Cortina Villar, *Procesos de poblamiento y deforestación en las áreas naturales protegidas de La Sepultura, El Triunfo y La Frailescana, Chiapas*, Conservation International Mexico, A. C. and El Colegio de la Frontera Sur, June 2009, p.4 s.

[4] Plascencia & Cortina, 2009: 19

[5] *Estudio Previo Justificativo para la modificación de la declaratoria del Área de Protección de Recursos Naturales La Frailescana, como Reserva de la Biosfera*. March 2009. Internal CONANP document.

watershed committees of the rivers Zanatenco (municipality of Tonalá), Lagartero (Arriaga), Coapa (Pijijiapan) and Coatán (Cacahoatán, Motozintla, Tapachula y Mazatán). On the Grijalva side, in 2003 the watershed committee of the higher parts of the Cuxtepeques River sub-watershed (municipality of La Concordia) was installed. Additionally, the creation of three more watershed committees is being prepared in the sub-watersheds of the Cahoacán, Huehuetán and Huixtla Rivers, all of them flowing into the most densely populated southeastern coastal plains of the region. The watershed committees are considered auxiliary institutions of the Watershed Councils and are composed of representatives of federal, state and municipal institutions, communities, water users (producer's organizations), NGOs and universities. The mayor of the respective municipality is its coordinator. The function of the watershed committees is to improve the general conditions of the sub-watershed area within their jurisdiction, specifically water supply and quality, and also to mitigate effects of natural phenomena. The committees dispose (some of them only very recently) of an office, a manager and a small technical team. One of their first tasks is to elaborate a general management plan for their sub-watersheds.

8. Currently, some 27,000 inhabitants, distributed in about 760 human settlements, live in the polygons of the four reserves in the higher parts of the Sierra Madre[6]. Population is highly dispersed, especially in the interior of the Sierra, pushing the agricultural frontier to remote and often vulnerable sites. An extreme case is La Sepultura where more than 75% of the settlements have less than 20 inhabitants (i.e., 3 or 4 families); only 22 of its 224 communities have more than one hundred inhabitants (2005 data). Less acute but equally remarkable is the demographic dispersion in El Triunfo where in 2005, the average population size of settlements was 70 inhabitants. Demographic growth, although high in the past and still above the national average of 0.8%/year, is declining; in some areas like La Sepultura, where the number of settlements apparently shrunk between 2000 and 2005, it could be even negative. There seems to be a trend towards a certain concentration of population in bigger communities and small towns in the lowlands, due in part to intergenerational migration. While population is highly concentrated in these lowland communities and towns, demographic pressure in the upper and/or protected zones of the basins is nonetheless higher than it seems in term of numbers of inhabitants living there, because many landowners and *ejidatarios*, while residing outside, cultivate land within those areas.

9. The livelihoods of the communities in the Sierra-Costa region depend largely on cattle grazing, maize cultivation in slash-and-burn systems, shade coffee production, timber and non-timber harvesting and fishing. Poverty levels are high in comparison with other parts of the country. Most of those who will benefit from improved access to PES schemes under the project will be ejidatarios with use rights on only 5-10 ha of relatively poor land, often in mountainous zones; these ejidatarios are land users, not owners, and most are poor or extremely poor. Since the mid-1990s, Mexico has defined poverty under three basic categories. According to the National Council of Evaluation of Social Development Policy (CONEVAL), the average "food poverty" (inability to afford a basic minimum diet), "capacity poverty" (inability to afford education and health expenses) and "patrimonial, or cash, poverty" (insufficient resources for housing, energy, clothing and transportation) estimates for the approximately 20 municipalities comprising the Sierra Madre are 51.2%, 61.0% and 81.2%, respectively (in comparison with the national averages of 18.2%, 24.7% and 47.0%)[7]. Inequality indices are even higher if broken down by gender. From August to November, before the coffee and maize harvest begins, many rural families depend on usurer's credits[8]. Access to healthcare is irregular. The larger communities of the Sierra Madre have health clinics, but they are substandard and lack well-trained personnel and availability of appropriate medicine and equipment.

2.2. Global significance

[6] INEGI, 2000; cit. in: Yatziri Zepeda, Goetz Schroth and Ricardo Hernandez (Conservation International), *Complementary environmental service reward programs in the Sierra Madre de Chiapas, Mexico*, 2009: 1
[7] Zepeda et.al., 2009: 2 (elaboration from CONEVAL data)
[8] Phyllis Robinson, *Ecological Farmers from the Sierra Madre of Chiapas – Part I*, 2008 http://smallfarmersbigchange.coop/2008/11/17/692/

10. The Sierra Madre de Chiapas, its watersheds and lowlands are of global importance for biodiversity conservation. The region falls into the Mesoamerican biodiversity hotspot, which holds between 7 and 10 % of all known life forms[9]; the Mesoamerican forests, considered as the third largest among the world's hotspots[10], are critical for the preservation of biodiversity in the Western Hemisphere. The region is also part of the Mesoamerican Biological Corridor intended, in its Mexican segment, for the conservation and development of sustainable uses of globally significant biodiversity within five biological corridors in southeast Mexico; one of them stretches along the Sierra Madre de Chiapas. The entire region is considered a Nationally Important Bird Area, with nearly four hundred species of avifauna found here. The region is also considered a centre of endemism for salamanders, as well as a centre of endemism for butterflies in Mexico.

11. The topographic and climatic variety of the Sierra-Costa region of Chiapas is reflected in an extraordinary diversity of vegetation, ecosystems, habitats and species. Generally, four different habitat types are described for the region[11]: 1) coastal wetlands and mangroves; 2) dry broadleaf forests (tropical deciduous and semi-deciduous forests; in altitudes from about 0 to 1,000 m); 3) tropical mountain cloud or rain forests; and 4) pine-oak forests (from 600 m to over 2,000 m).

12. The coastal wetlands, of which La Encrucijada Biosphere Reserve and the El Gancho-Murillo and El Cabildo-Amatal State Reserves are representative, include several lagoon systems, like the complex of Mar Muerto-La Joya-Buenavista in the northwestern part of the region, the Carretas-Pereyra and the Chantuto-Panzacola lagoons in the protected area of La Encrucijada, a Ramsar site. This valuable bioregion comprises coastal mangrove forests, dry forest, and swamp areas which sustain a high diversity of animal and plant species. The Chantuto-Panzacola lagoon system hosts the largest and densest mangrove forest in Mexico and one of the largest in Mesoamerica; mangrove trees there are up to 35 meters high. Mangroves and extensive reed areas help filter polluted waters pouring in from the Sierra and the coastal plains, thus helping to maintain levels of water quality tolerable for the rich aquatic fauna of the lagoon and for the provision of ecosystem services and goods, like fish, shrimp and other marine species, to its inhabitants. La Encrucijada serves as a habitat for abundant wildlife, including 73 mammal, 11 amphibian, 34 reptile, and 294 bird species. Endangered and threatened species such as jaguar, ocelot, jaguarundi, spider monkey, Mexican anteater, river crocodile, boa constrictor, olive ridley and leatherback turtle seek refuge in the reserve. It provides important nesting grounds for threatened bird species such as the roseate spoonbill, American wood stork, chestnut-bellied heron, and the giant wren - which is found only in Chiapas - as well as 94 species of migratory shore and songbirds[12]. It is part of the North American Waterfowl Management Plan, a US-Canada-Mexico cooperative effort to restore waterfowl populations through habitat protection and restoration.

13. The dry (deciduous and semi-deciduous) tropical forests range between 0 and 1,000 m altitude, approximately. In the Sierra-Costa region most of the forests belong to this habitat type, although great extensions of the original dry tropical forests have been transformed into pasture and agricultural land. This ecosystem is characterized by an upper story dominated by species of the Leguminosae superfamily, and a lower story that usually includes a larger quantity of evergreen species and members of the Rubiaceae family. Dry tropical forests constitute ecosystems with a large percentage of endemic flora and fauna, especially reptiles and mammals of which Mexico is considered as megadiverse[13].

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[9] IUCN, *Global transboundary protected areas network*: http://www.tbpa.net/case_10.htm

[10] Conservation International, *Biodiversity Hotspots:* http://www.biodiversityhotspots.org/xp/hotspots/mesoamerica/Pages/default.aspx

[11] For example: the collaborative project Freshwater Ecoregions of the World (FEOW); http://www.feow.org/ecoregion_details.php?eco=201 . However, each one of these four categories presents variations in itself.

[12] INE, *Programa de Manejo de la Reserva de la Biosfera La Encrucijada* (Management Program of La Encrucijada Biosphere Reserve), 1999

[13] Mexico is the world's most diverse country in reptiles, and second in diversity of mammals, most of these species living in dry tropical forests which are widespread in Mexico.

14. Tropical montane rain and cloud forests are located in the Sierra Madre of Chiapas in altitudes from 1,000 to 2,400 m. In the past, they have suffered severely from deforestation, and in many parts of Mexico and Central America they are still highly threatened. The remaining areas of cloud forests are now concentrated in the core zones of the Biosphere Reserves of El Triunfo and La Sepultura, and in Volcán Tacaná. This ecosystem has extraordinary biodiversity and contains 2,500 to 3,000 species of plants, some 10 to 12 per cent of all plant species in Mexico. El Triunfo's cloud forest hosts one of the most diverse arrays of tree species in North and Central America, including giant tree ferns, and is covered by an enormous diversity of epiphytes. In the dense vegetation of these forests live 392 different bird species, nearly 40% of all bird species in Mexico. El Triunfo is known for having the largest concentration of horned guan, an endangered cracid found only in the upper elevation cloud forests of Chiapas and adjacent Guatemala. The quetzal also finds refuge in these forests, along with the emerald toucanet, azure-rumped tanager, ocellated quail, pink-headed warbler and green-throated mountain gem. Some 55 species of reptiles and 82 of mammals have been recorded throughout the biosphere reserve.

15. The Sierra Madre also provides important ecosystem services. It is a water catchment area for urban centers, surrounding towns and agricultural plains; it captures and channels a considerable amount of water to the Grijalva River which feeds the most important complex of hydroelectric power plants in the country; it has an important potential for carbon sequestration and storage; and its scenic beauty has a vast potential for tourism. Unless the still conserved (agro) forest cover can be preserved, the biodiversity of the Sierra Madre and the environmental services it provides will be at risk.

2.3. Threats, root causes and barrier analysis

16. Land use change due to deforestation, and the subsequent destruction, degradation and fragmentation of habitats, has been in the past the principal cause of biodiversity loss and decline of ecosystem services in the Sierra-Costa region of Chiapas. While it is still a major problem, the principal threats to biodiversity and ecosystem conservation in the Sierra Madre of Chiapas now are: detrimental land use practices; unsustainable logging and wood harvesting for domestic use; hunting and collecting of animals and plants, especially of endangered species; introduction of exotic species; urbanization and infrastructure works (roads, dams); household sewage and urban waste water; energy production, mining and quarrying; forest fires and storms accompanied by excessive rainfall (hurricanes), which cause landslides and floods.

17. In the Sierra-Costa region the impact of most of these threats is not limited to their local area of origin, but is transmitted to other areas by surface and groundwater flows. There is a close relationship between conditions in the higher and lower zones of the numerous sub-watersheds of the region. This is why the basin approach to analyzing and managing threats to biodiversity and ecosystem services is both a necessity and an opportunity for biodiversity conservation in this context.

18. Land use change, as a major threat to biodiversity, has taken basically two forms in the Sierra: (a) deforestation with the purpose of agricultural land use (advance of the agricultural frontier); and, (b) conversion of certain agricultural land uses to others which are less biodiversity friendly.

19. (a) Deforestation was in the past the principal means of colonizing the region, introducing maize cultivation, cattle-farming and coffee production in formerly forested areas. Currently, opening land for pasture is the most expansive form of land use change. Nevertheless, forest cover monitoring indicates that deforestation, while still ongoing, has diminished notably in recent years. The comparison between protected and non-protected areas shows that continuous and well-implemented conservation policies can contribute effectively to slowing down deforestation rates. Between 1970 and 2000 in the areas of La Sepultura and El Triunfo, deforestation rates were around 0.5% and 1.7% annually[14], whereas between 2003 and 2007 (after the constitution of the biosphere reserves) the entire forest/agroforest cover loss in these two areas summed up to 0.62% and 0.71%, respectively.

[14] Plascencia & Cortina, 2008: 27+38

Over the same four-year period, forest loss has been relatively low also in other federally managed reserves, like Volcán Tacaná (0.32%) and La Frailescana (0.4%), but higher in Pico El Loro-Paxtal (2.76%), due to rather limited human and material resources for implementing conservation actions and enforcing land usage restrictions by this state reserve. There is also evidence that deforestation rates are significantly higher in the zones immediately surrounding the reserves, than in their buffer and core zones, suggesting that the protected areas management has little spill-over beyond the reserve boundaries[15].

20. (b) Increasingly important threats to biodiversity and ecosystems are the different forms of productive conversion from more to less biodiversity friendly agricultural land uses. Perhaps the most imminent threat, as a consequence of climate change and market conditions, is the abandonment of shade coffee and cocoa cultivation in favor of other land uses with apparently higher profitability, but less biodiversity value, like cattle grazing or more intensive coffee production[16]. Conversion from the traditional *milpa* system –maize production in combination with other food crops and grazing– to pasture land is another potential threat. In the coastal plains, the expansion of oil palm plantations, which are known to support very low numbers of species[17], is a potential threat, but information about the future prospects of this crop in the project region is contradictory.

21. The main threats to biodiversity and ecosystem services stemming from land use practices are: crop cultivation and grazing on steep slopes (up to 60º) without implementing measures for soil retention, causing erosion and depositing sediments in the plains and lagoons; cattle grazing near rivers and creeks without protective riparian forests to avoid or reduce pollution; cattle, sheep and goat grazing in forests, impeding natural regeneration and understory growth; water contamination by direct discharge of the residues of coffee processing into natural water courses; ill-calibrated and inadequate use of agrochemicals, especially pesticides and fertilizers, in crop production, polluting soil and waters; and uncontrolled fire as a management tool in agriculture (slash and burn practices) and range management, causing wildfires.

22. Unsustainable logging, both for timber and charcoal production, is a particular threat to pine-oak forests. Wood harvesting for domestic use, mainly for construction and fuel, can be a threat locally for pine-oak and cloud forests in the Sierra.

23. Hunting and collecting animals and plants, especially endangered species, has a direct impact on biodiversity if these activities are not managed in a sustainable way[18], as is often the case in the Sierra-Costa region. This refers, for example, to collecting birds with a high market-value, like some parrot species or quetzals, spider monkeys, or collecting orchids and palms in the mountain and cloud forests of the Sierra. Hunting of jaguar, tapir, deer, iguanas and other animals is still a threat. On the other hand, exotic species, like casuarina and eucalyptus trees, which were introduced in reforestation projects, have displaced native species of pines in some places.

24. Other critical threats come from urbanization and infrastructure projects that do not take into account biodiversity and ecosystem service considerations, such as the expansion of urban areas without ecological territorial plans, and water management projects (e.g., dams, diversions, inter-basin water transfers), which alter inland water systems.

25. Threats from hurricanes and some wildfires, although not caused by human activity, are sometimes aggravated by human actions. The year 1998 was catastrophic in both respects: Hurricanes Javier and Mitch produced landslides and floods mainly in the southeastern parts of the Sierra Madre and the adjacent coastal areas, as did hurricane Stan in 2005, causing serious damage to some forest areas in higher grounds and inundations of

[15] Plascencia & Cortina, 2008: 38+39
[16] Schroth et. al., 2009
[17] Edgar C. Turner, Jake L. Snaddon, Tom M. Fayle, William A. Foster, *Oil Palm Research in Context: Identifying the Need for Biodiversity Assessment*, University Museum of Zoology, Cambridge, United Kingdom; February 2008; http://www.plosone.org/article/info:doi/10.1371/journal.pone.0001572
[18] Mexican environmental law allows for the establishment of so-called Environmental Management Units (Unidad de Manejo Ambiental – UMA) for exhibition and conservation *ex-situ* of wildlife species.

human settlements and productive areas. Forest loss in some areas of the State Reserve Pico El Loro-Paxtal might have been due to landslides, including those caused by hurricane Stan in 2005, which may have been influenced by land use[19]. Wildfires in 1998 destroyed thousands of hectares of forest in the Sierra, as in other parts of Mexico and the entire Central American region, as this year was extremely dry. Even rain and cloud forests, usually too humid to burn, had become vulnerable to fire. The drought aggravated the effects of agricultural fire use in forest and grassland areas, leaving thousands of fires burning out of control. Since then, the threat of wildfires caused by these practices to the Sierra's biodiversity has diminished somewhat, as fire management programs implemented by government agencies and NGOs, especially in natural protected areas, seem to have obtained positive results.

Root causes

26. The main threat to conservation of biodiversity (BD) and ecosystem services (ES) is land use change. Root causes for this are complex and relate to factors affecting decision-making on land use. In the Sierra Madre de Chiapas, like in Mexico in general, these decisions are taken in the majority of cases by private landowners or possessors (tenants) of community land, called *ejidatarios*[20] or *comuneros* (in the following, both owners and tenants are referred to as "land users"). Their land use decisions or choices are determined principally by: (1) Economic incentives for ES and BD- friendly land use decisions, and knowledge about them; (2) community rules for the use and management of natural resources, especially forests; (3) governmental plans, norms and regulations on land use, including enforcement mechanisms; (4) awareness (knowledge) by land users, watershed committees and policy-makers of the impacts of land use decisions on individual and collective benefits from ecosystem services and biodiversity.

27. The availability, amount and perception of economic incentives for biodiversity friendly land use decisions depend on market conditions for the goods and services produced on the land, stimuli given by development programs of governmental and non-governmental agencies, and organizational and technical support from local organizations, government agencies and NGOs for sustainable economic projects. Furthermore, the land users' appraisal of economic incentives for biodiversity friendly land use is determined by the opportunity costs of dismissing less biodiversity friendly alternative land uses. Taking this into account, public policies and programs designed to stimulate biodiversity friendly land use decisions in the region are often weak in demonstrating the (long-term) economic advantages of such choices for land users. An example is the Payment for Environmental Services (PSA) programme of the National Forest Commission (CONAFOR), which stops payments after five years. When the payments end, land users are often unaware of and/or unable to switch to other incentives systems and therefore there is a risk that they revert to unsustainable practise. Access by land users to the PSA program is significantly lower than it could be for several reasons. There is insufficient dissemination of information to land users about the program or criteria for accessing it. In addition, both land users and technical assistance providers who assist them need training in preparing well-designed projects that can successfully qualify for the program. CONAFOR also does not have a mechanism to target incentive payments under the program to areas of high priority in terms of ecosystem services and biodiversity.

28. Like in other parts of Mexico, community dynamics and rules concerning the use of natural resources strongly affect individual land use decisions. Many communities have established formal and informal enforcement mechanisms to avoid clearing of forest areas by some of their members. Cortina & Plascencia (2009) report several cases of community disapproval after land users cleared an area of their landholdings, with the effect that others then desisted from similar action[21]. But there are also cases where communities took decisions contrary to forest conservation.

[19] Zepeda et.al., 2009: 2

[20] At the national level, only about 17.5% of *ejidatarios* are women; in Chiapas this percentage is even less. See Alejandra Valenzuela and Héctor M. Robles Berlanga, *Presencia de la mujer en el campo mexicano*. http://www.pa.gob.mx/publica/pa070504.htm

[21] Héctor Sergio Cortina Villar and Héctor Plascencia Vargas, *Estudio del proceso de deforestación en las áreas naturales protegidas de La Sepultura, La Frailescana y El Triunfo, Chiapas*, Conservation International Mexico, A.C. and El Colegio de la Frontera Sur, June 2009, p.5-18

29. Governmental plans, norms and regulations on land use take on different forms and are implemented by different institutions at the federal, state and municipal levels. The most relevant forms of land use regulations in the Sierra Madre are the territorial zoning plans of municipalities, land use restrictions established by watershed committees and the National Water Commission (CONAGUA) and the zoning of reserves by the National Commission for Natural Protected Areas (CONANP), defining areas for different land use. However, these regulations have proven to be not very effective as long as they are not coherently accompanied by other measures, principally strong enforcement mechanisms, economic incentives and awareness-raising.

30. Awareness and knowledge about the impacts of land use decisions on individual and collective benefits from ecosystem services and biodiversity are important, if insufficient, conditions for biodiversity friendly land use decisions both by land users and policy decision-makers, particularly in the watershed committees. There are still many knowledge gaps on links between land use (decisions) and biodiversity/ecosystem services regarding the specific conditions of the Sierra-Costa region.

31. A common root cause for some of the above mentioned threats is widespread poverty and marginality that gives inhabitants, particularly of rural and mountainous areas of the Sierra Madre, little other choice than to exploit natural resources in an unsustainable way, for example through maize production on unsuitable upland sites, including steep and erosion-prone slopes, or hunting and gathering endangered species. The probability that they will adopt sustainable land uses and agricultural practices in the region is low if these do not contribute palpably to improving their livelihoods.

32. Demographic growth has diminished considerably in recent years, but is still an important root cause for threats to biodiversity conservation. Young families in search of better livelihoods often have no other alternatives than to clear wooded areas or to migrate. This is one of the main reasons for the dispersion of small settlements in the area. On the other hand, a growing trend of rural exodus to towns, mainly of younger and better educated people, is leading to an aging of rural populations, reducing the viability of introducing technical innovations for more complex sustainable agricultural practices. Together with a growing scarcity of labour due to emigration, in some areas this has already produced a tendency toward land use change from more intensive to extensive agricultural production practices, principally extensive cattle ranching.

33. Climate change is predicted to lead to an increase in adverse natural phenomena, especially hurricanes with their devastating consequences for forests, natural habitats, human settlements and productive areas. The effects of hurricanes Javier, Mitch and Stan were likely aggravated by extensive deforestation in some areas of the Sierra. Other effects of climate change and higher temperatures are predicted to be an increased risk of wildfires and the abandonment of shade coffee in favour of other land uses of less biodiversity value (especially pasture), as a hotter climate with more irregular rainfall will be less favourable to the production of quality coffee[22].

Barriers

34. According to the identified root causes, the principal barriers to biodiversity and ecosystem conservation in the Sierra Madre of Chiapas are related to: knowledge gaps on biodiversity and ecosystem services, as well as their links with land use systems; lack of tools that watershed committees and other decision-makers can use to integrate such knowledge into land use decisions; absence or weakness of economic incentives for BD friendly land use decisions and agricultural practices, as a result of market conditions and deficient public development and conservation policies; community dynamics not favourable to BD and ES conservation; weak or missing government regulations on land use; and effects of climate change (hurricanes, land use change, wildfires). The project will focus on addressing the knowledge gaps and the lack of economic incentives as the principal barriers to overcome, but will take into account the other root causes and barriers in its assumptions and risk management measures. Barriers in particular related to knowledge gaps and to insufficient economic incentives are:

35. Knowledge base on biodiversity and ecosystem services is insufficient: There is a lack of basic knowledge regarding appraisal of biodiversity and ecosystem services, and their interaction with land uses, among

[22] Schroth et.al., 2009, op. cit.

local decision-makers and land users. Documentation about links between land use and ES/BD, about ES benefits provided by different land use systems and about factors influencing individual and collective land use decisions by land users in the project area is not comprehensive or well-integrated. Benefits from ES in the pilot sub-watersheds are not systematically identified and documented. There are only sporadic and unsystematic research projects demonstrating links between land use, ES/BD and livelihoods in the project region. Explanations defining factors for land use decisions are casuistic, incomplete and give insufficient orientation for sustainable land use policies. A broad compilation and systematic analysis of lessons learned about the direct and indirect impacts of hurricanes Javier and Mitch (1998) and Stan (2005) on land use and water balances is still not available.

36. Knowledge on BD and ES is insufficiently communicated to land users and policy decision-makers and is often disconnected from decision-making processes: The information needs of key stakeholders on the status and dynamics of important ES and BD components in the project area are only partially fulfilled, due in part to a lack of documented research results (see 35.). Most information and training materials do not address adequately the needs and demands of stakeholders engaged in sub-watershed policy-making and management. Research results demonstrating links between land use, ES/BD and livelihoods in project region are scarce and often not accessible to land users and policy decision-makers. Backstopping of watershed committees by local research institutions and NGOs has contributed to addressing some of these gaps, but such support is not provided in a systematic manner. Frequently, knowledge on BD and ES is not transmitted in a way that enables watershed committees, other policy-makers and land users to integrate it into land use policies, planning and promotion activities, nor is it communicated to municipal, state and federal agencies improving policy coordination and facilitating replication.

37. Development and land use policies are not coordinated, particularly at the sub-watershed level: National and state development plans in Mexico generally postulate that environmental considerations should be transversal elements of all sector public policies, but many government agencies, especially those in the economic sector, do not integrate them into the actual implementation of their programs and projects. Certain programs even promote and finance activities contrary to BD and ES concerns, like extensive cattle ranching or infrastructure projects affecting protected areas. Communication and exchange of information between government agencies is seen as necessary, but is slow and bureaucratic. Thus coordination of policies on the basis of mainstreaming ES and BD considerations is still a challenge.

38. Limited capacities of watershed committees to design and coordinate conservation and sustainable development plans and projects: Watershed committees are mandated to elaborate and coordinate conservation and sustainable development plans and projects at the sub-watershed level. For different reasons, watershed committees in the Sierra-Costa region have not yet developed sufficient capacities to assume these functions. One reason is that watershed committees are rather young institutions, those existing in the project region being established between 2002 and 2005, and coverage is still limited. Management and technical staff depend primarily on municipal authorities who change every three years, so there is little continuity in their personnel, and investments in capacity building are lost. Other limiting factors are low participation of land users and community representatives, insufficiently trained personnel for community work, and lack of legal status, which means that watershed committees cannot raise funds independently[23].

39. Insufficient availability of technical assistance to land users for introducing or strengthening sustainable production and restoration practices: Since the 1990s, several programs and projects promoting sustainable production and restoration practices have been implemented in the Sierra Madre and its sub-watersheds, both by government agencies, like CONANP, the Institute of Natural History (IHN), CONAFOR etc., and NGOs/academic institutions, like ProNatura, Ambio, Conservation International (CI), The Nature Conservancy (TNC), the Instituto para el Desarrollo Sustentable en Mesoamérica A. C. (IDESMAC), El Colegio de la Frontera

[23] See consultancies realized during the PPG phase: Elena Santillán and Beatriz Pineda, *Identification of Opportunities for Strengthening Training Programs in Natural Resource Management and Payment for Environmental Services in la Sierra Madre de Chiapas, Mexico*, August 2009, p.35-36 (Appendix 20); Hugo Guillén, *Sub-watershed Policy and Governance in la Sierra Madre de Chiapas, Mexico*, August 2009, p.15 (Appendix 18)

Sur (ECOSUR), Universidad Autónoma de Chiapas (UNACH) and others[24]. However, these projects generally are locally limited in their coverage, often lack continuity due to government and policy changes and have few resources. A weakness of many of these projects relates to their focus on technological aspects, while organizational and market requirements often do not receive due attention.

40. Limited access of land users in sub-watersheds to ES payments by government-funded and market-based programs: In 2009, out of a total of 327 PES applications to CONAFOR´s PSA program for hydrological services in Chiapas, only 182 (55.6%) met all the requirements for approval. Of all the successful applications, only 36 were approved (11% of all the applications submitted), and the others were rejected due to insufficient funding[25]. This means that insufficient capacities of land users and of project developers (providers of technical assistance) to prepare projects that qualify for government PES programs are an important reason for limited access to ES payments. There is lack of accountability on the part of the project developers as their accreditation and payment do not depend on performance. On the other hand, market-based schemes for PES are still weakly developed. The Scolel'Te project of Ambio, for example, has been successful at selling thousands of carbon credits over the course of its nearly ten year history, but it still faces a challenge of identifying buyers, and could possibly garner a higher price per credit if it were to target buyers who particularly value the multiple benefits of Plan Vivo[26] certificates (climate change mitigation, poverty alleviation, and biodiversity conservation). These difficulties are partly linked to the lack of a strategic marketing plan and of funds to implement it[27].

41. Insufficient marketing capacity of land users and their organizations for different market-based PES mechanisms and sustainable products: This lack of capacity refers to land users, but also to actors supporting them (NGOs, watershed committees and other government technical advisors). There is an unmet demand for marketing plans and technical support to implement them for market-based PES mechanisms, as well as for market feasibility studies, cost-benefit analyses and marketing plans for sustainable products, for example xate palms, beef or dairy products produced under sustainable criteria, sustainable timber products[28], and others.

2.4. Institutional, sectoral and policy context

42. The project is situated within a broad institutional context, with relevant government institutions at national, state and municipal levels. In addition, there are a number of important civil society groups, such as NGOs and private and civic producer organizations. Public-private bodies, among them the watershed committees in the region, are also involved in planning and implementing sustainable development policies and form a key part of the institutional landscape in which the project will operate. The presence of the academic community is notable, not only in view of the research and monitoring projects it carries out in the region, but also due to its participation in policy planning processes and the transfer of scientific knowledge and innovative technologies to decision makers and land users (see for more detail section 2.5 Stakeholder mapping and analysis).

43. This institutional plurality and complexity of the region provides not only an opportunity but also a challenge as development policies and programs are often insufficiently coordinated between actors. Policy contradictions exist between the environmental and the economic, infrastructure and social sectors of government,

[24] See consultancy realized during the PPG phase: Brian Gurr, *Review of Markets for Ecosystem Services and Sustainable Agricultural and Forestry Products: Opportunities for Market Expansion in the Sierra Madre of Chiapas, Mexico*, August 2009 (Appendix 19)
[25] Zepeda et.al., 2009: 3
[26] The Plan Vivo system is a set of standards, processes and tools used to develop and register payments for ecosystem services (PES) projects in developing countries. Project activities include reforestation and agroforestry, forest conservation, restoration and avoided deforestation, implemented by smallholders or communities on their own land, or land where they have user rights. The Plan Vivo System is managed by BioClimate Research and Development (BR&D) which is a non-for-profit organization.
http://www.planvivo.org/fx.planvivo/scheme/default.aspx
[27] Gurr, 2009: 13; Zepeda et.al., 2009: 4
[28] Gurr, 2009

presenting obstacles to mainstreaming BD and ES conservation policies. There are new approaches to territorial development in Chiapas, like that of the Social and Sustainable Development Program (PRODESIS) in the Sierra region, dependent upon the State Ministry of Social Development. PRODESIS promotes subordination of sector policies to overarching visions and goals of sustainable regional development. A similar line of reasoning will be promoted by the proposed project since, in the limited space of sub-watersheds, different sectoral agencies are confronted with common threats and challenges and the need of finding articulated inter-institutional solutions.

44. Policies and legislation of relevance to the project include the following:

45. The National Biodiversity Strategy of Mexico and its Action Plan coordinated by the National Commission for the Knowledge and Use of Biodiversity (CONABIO) and prepared in 2000 with financial support from UNDP/GEF, in cooperation with state governments and civil society. Mexico had signed the Convention on Biological Diversity (CBD) on 13 June 1992 and ratified on 11 March 1993. In 2006 the south-southeastern states of the country: Chiapas, Oaxaca, Yucatán, Campeche and Quintana Roo signed the "Merida Declaration", where they agreed to prepare State Biodiversity Strategies (SBS) for this region which is the most biodiverse of the country. One of Mexico's priorities in biodiversity conservation policy expressed at recent Conferences of the Parties to the CBD is sustainable use and conservation of key ecosystems such as the Sierra Madre and the coastal wetlands.

46. CONANP, as the federal institution in charge of four protected natural areas in the Sierra-Costa region, is applying a Strategy of Conservation for Development, under the hypothesis that protection of ecosystems and biodiversity in reserves can and must be combined with the improvement of the quality of life of its inhabitants. The main instrument for implementing this strategy is the Conservation for Sustainable Development Program (PROCODES), complemented by the Temporary Employment Program (PET).

47. Highly relevant is CONAGUA's policy of establishing watershed councils (on the watershed level) and watershed committees (on the sub-watershed level) as management entities for natural resources development and conservation throughout the country, based on the federal Law of National Waters (Ley de Aguas Nacionales - 2004), but also on other federal legislation: General Law of Ecology Equilibrium and Environmental Protection (Ley General de Equilibrio Ecológico y Protección al Ambiente - 1989); Law of Sustainable Rural Development (Ley de Desarrollo Rural Sustentable (2002); and General Law of Sustainable Forest Development (Ley General de Desarrollo Forestal Sustentable - 2004). The former National Program of Micro Watersheds (NPMW) managed by the Shared Risk Trust Fund FIRCO in cooperation with municipalities, was abolished in 2007, but left behind an experience of watershed management in some municipal administrations.

48. Since 2003, the National Forest Commission CONAFOR has designed and implemented a number of pioneering programmes of payments for ecosystem services, merged in 2006 into a single governmental policy known as Program of Payments for Environmental Services (PSA). This program includes payments for hydrological services, biodiversity conservation, agro-forestry practices and development of projects for carbon fixation by forests. The goal of PSA is to provide economic incentives to forest owners to avoid deforestation as well as to build capacities to develop environmental services markets in Mexico. PSA is one of the 45 programs included in the federal policy for sustainable forest management and reduction of poverty known as ProArbol. Another program with particular relevance for the present project is the Forest Conservation and Restoration Program (PROCOREF).

49. The State Development Plan of Chiapas 2007-2013 defines Environmental Management and Sustainable Development as one of its four main components. Central objectives of this plan are: application of a forest development policy based on the integrated management of the hydrological watersheds of the state; participation of users and society in water management[29]. Ecosystem restoration policies of the government of Chiapas are implemented by the Forestry Commission of the State of Chiapas *(*COFOSECH*)*.

[29] Plan de Desarrollo Chiapas Solidario 2007-2012. http://www.chiapas.gob.mx/plan/

2.5. Stakeholder mapping and analysis

50. Key project stakeholders at the national level, but with direct presence in the region, are CONANP, CONAGUA and CONAFOR. Other important federal actors – some of whom have participated in the project preparation – are CONABIO, the Federal Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA), the National Institute for Forestry, Agriculture and Fisheries Research (INIFAP) and the Federal Commission for Electricity (CFE). Most of the involved federal institutions (CONANP, CONAGUA, CONAFOR and in part CONABIO) are decentralized entities falling under the general authority of the Ministry of Environment and Natural Resources (SEMARNAT).

51. The project has been developed under the guidance and with the active participation of CONANP (both at Chiapas and federal levels). CONANP is permanently present in the region with technical personnel and disposes of planning capacities, reserve management plans, monitoring programs, institutionalized connections with universities and years of experience with sustainable development projects[30]. The institution will play a key role in ensuring full integration of the project activities into the management of the Sierra Madre biosphere reserves (El Triunfo, La Frailescana and La Sepultura) and the Coast (La Encrucijada). CONANP will also contribute to creating synergies between local watershed committees and the advisory councils (CA) of the reserves, where civic and governmental stakeholders are represented. Conservation and sustainable development activities supported by PROCODES and PET funds from CONANP will contribute considerably to achieving project results, especially in component 2 by introducing or strengthening production practices and implementing restoration and soil conservation activities that conserve ES and BD in buffer zones of the reserves.

52. Close cooperation of the project with CONAGUA is crucial and has already begun during the project preparation phase. CONAGUA has an ambitious strategy to expand coverage and strengthen capacities of watershed committees for conserving ecosystem service in the Sierra-Costa region, so there is a high degree of complementarity with project objectives. CONAGUA will be an important partner in the project efforts to get municipalities more involved in local strategies of ES and BD monitoring and natural resources management via watershed committees.

53. CONAFOR is an important project stakeholder mainly for two reasons: First, its PSA program is one of the principal existing opportunities for land users to obtain economic incentives for taking ES and BD friendly land use decisions. The project will improve access by land users to CONAFOR's PSA and prepare targeted analyses and proposals to strengthen the program to the benefit of both the PSA program and the project objectives. Secondly, three out of 225 nationwide priority areas under PROCOREF lie in the Sierra-Costa region. Priority areas of this program are selected applying criteria of soil and ecosystem degradation, threats to water provision and other environmental services, and significance of forest ecosystems. Opportunities for cooperation with this program lie in the areas of reforestation and soil conservation. PROCOREF provides financial incentives for sustainable and more profitable alternatives to smallholder maize agriculture on erosion prone lands, such as tree crop agroforestry, as well as the reforestation of pastureland and other degraded areas. The GEF project will add an ecosystem function and biodiversity component to this program, which otherwise would focus mostly on land degradation aspects without considering biodiversity values.

54. One of five biological corridors of the Mesoamerican Biological Corridor program (MBC) implemented by CONABIO is located in the Sierra Madre of Chiapas. The MBC project "Participatory monitoring in the coffee zone of Chiapas" will provide ecosystem indicators that will be relevant for the upper parts of the sub-watersheds on which the present project focuses. It is also promoting a Chiapas-wide PES strategy which will help create a favorable policy environment for the sub-watershed level actions that the present project will promote. Common interests of both projects lie also in restoration of degraded ecosystems and promotion of sustainable use of natural resources.

[30] See study carried out during PPG phase: María José Martínez-Harms and Sandra Quijas Fonseca, *Synthesis and Review of Existing Efforts and Institutional Capacity for Monitoring Environmental Services and Biodiversity in La Sierra Madre de Chiapas, Mexico*, Centro de Investigación en Ecosistemas, Universidad Nacional Autónoma de México, 2009, p.28-29 (Appendix 17)

55. The project is presently discussing the involvement of the Federal Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) in the ES and BD conservation strategies at sub-watershed level promoted by the project. The SAGARPA Program of Sustainable Use of Natural Resources in Primary Production, with its components of soil and water conservation and productive conversion offers opportunities for collaboration.

56. The Federal Electricity Commission (CFE) is a government-owned company in charge of production and distribution of electric energy in the whole country. The Commission runs the Grijalva River hydroelectric complex with its six plants (see paragraph 3) and therefore has stakes in the management of the Grijalva watershed in general, and of the sub-watersheds of the rivers emanating from the Sierra Madre in particular. In cooperation with FONCET's payments for ecosystem services scheme to finance the protection and restoration of El Triunfo Biosphere Reserve (see paragraph 70), CFE will place a levy upon the electricity charges made to residents of the nearby city of Tuxtla Gutiérrez (capital of Chiapas) for compensating the regulation of water flow provided by the watershed. There is also discussion of CFE making a one-to-one match donation of funds raised through the levy applied to its customers.

57. At the state level, IHN and the Forestry Commission of the State of Chiapas *(*COFOSECH*)* are the most heavily involved project stakeholders. IHN is a decentralized entity falling under the coordination of the Ministry of Environment and Housing (SEMAVI). Similarly, COFOSECH falls under the competence of the State Ministry of Rural Development (SECAM), as well as the Commission for the Development and Promotion of the Coffee of Chiapas (COMCAFÉ). Another relevant state government actor is the State Water Institute (INESA).

58. IHN was a pioneer in the 1980s in establishing protected areas in Chiapas, particularly in the Sierra Madre, which have passed later to federal management under CONANP. The institution has played a key role in conservation and restoration projects in several sub-watersheds of the Sierra. Recently and with support from CI, the IHN has redefined its mission, vision and institutional strategy. One of its strategic activities consists now in offering services of knowledge and technology transfer to land users, organizations, communities and public agencies for conservation and sustainable use of the natural patrimony of Chiapas. This includes monitoring of endangered and conservation dependent species; as well as research and technical assistance for restoration and management of (agro-) ecosystems, including watershed management and climate change mitigation[31]. A central part of IHN's new strategy is a proactive approach to establishing alliances for conservation and sustainable use of natural resources.

59. COFOSECH has important interests in the project as its reforestation and soil conservation policies include an explicit watershed management approach for avoiding further huge landslides, such as those that affected the region in recent years. The project will work with COFOSECH to target these investments so that they effectively contribute to the restoration and maintenance of ecosystem services and biodiversity.

60. SEMAVI is responsible for managing the state reserves of Chiapas. In the region, these are the Zones for Ecological Conservation El Gancho-Murillo, El Cabildo-Amatal and Pico El Loro-Paxtal. However, SEMAVI disposes of very limited human and financial resources for effective conservation and sustainable use management of these areas. The ministry has a leading role in coordinating state environmental policies, including those of IHN, and has expressed and demonstrated its interest in giving follow-up to project activities.

61. COMCAFÉ is engaged in strengthening the profile of the Sierra Madre region for specialty coffee production. INESA gives support to municipalities in drinking and wastewater management and is participating in the management of the Sumidero canyon watershed, i.e. the middle part of the Grijalva watershed; the main objective of this initiative is to reduce solid and liquid pollution coming from upstream towns, communities, sugar refineries and coffee processing. The ES value of controlling pollution of the Sumidero canyon is considerable, given the sight's growing attraction for national and international tourism.

[31] IHN, *Plan Estratégico 2009-2015 del Instituto de Historia Natural (IHN) del Estado de Chiapas, México*, Tuxtla Gutiérrez, April 2009

62. The ten sub-watersheds selected for project implementation are situated in 17 municipalities of the Sierra-Costa region, 14 of them on the Pacific side of the Sierra and 3 on the Grijalva side. Together with CONAGUA, municipalities are formally in charge of financing and managing the watershed committees in their geographic area of administration. The mayor in turn is president of the watershed committee. Having experienced the consequences of floods and landslides, and being responsible for drinking water provision to its inhabitants, municipalities have strong motives to be concerned about what is happening in the upper parts of their sub-watersheds. Thus, municipal administrations count potentially among the most interested project stakeholders. However, their involvement in watershed committee management has up to now been rather uneven from mayor to mayor[32], perhaps the first reason for this being their obligatory short term in office (three years) and their corresponding short-term vision of municipal administration. Political partisanship has often been a reason for discontinuing projects begun by a former municipal administration. It will be part of the project's efforts to raise awareness among municipal administrations about the importance of long-term perspectives in watershed management and to strengthen understanding and capacities for designing and implementing adequate ES and BD protection policies.

63. Apart from watershed committees, there are several other public-private bodies that are relevant for local and regional development policies: the Planning Committee for Municipal Development (COPLADEM), the Municipal Council for Sustainable Rural Development (CMDRS) and the Advisory Councils (CA) of biosphere reserves; in the southeast of the Sierra, Micro Regional Councils (CMR) have a voice in sustainable development programs. These committees and councils have varying compositions of representatives of the governmental and the non-governmental sectors, and their function is principally to serve as a platform for public-private dialogue (PPD), exerting some influence on decision-making about investments in development programs and activities. The present project will promote communication between watershed committees and these participatory public spaces, transmitting ES and BD considerations into their planning and decision-making.

64. Numerous non-governmental organizations are working in the Sierra-Costa region of Chiapas, implementing sustainable development projects mostly on a local or sub-regional scale. Particularly relevant for the proposed project are CI, TNC, Pronatura, Ambio, the Institute for Sustainable Development in Mesoamerica (IDESMAC) and the El Triunfo Conservation Fund (FONCET).

65. CI has been working with coffee producing communities, reserve management bodies and other local partners in the Sierra Madre since 1997, promoting biodiversity friendly land use practices and working to establish market linkages that reward forest and water conservation by communities in the biosphere reserves of the Sierra. This program has been implemented in partnership with local coffee cooperatives, ECOSUR and CONANP. With the increased recognition of climate change and its expected impacts on Mesoamerican mountain ecosystems, the emphasis of the program has shifted towards understanding the vulnerability and increasing the resilience of the communities and their ecosystems to climate change[33]. CI's Center for Applied Biodiversity Science (CABS) has identified the Sierra Madre de Chiapas as the third most important area for biodiversity conservation in northern Mesoamerica. These findings have resulted in a long-term ecological monitoring system for measuring the collective impact on biodiversity of interventions like deforestation mapping and the CI led development of a climate change adaptation strategy being implemented in the region.

66. TNC has been engaged in the region since the 1990s in projects related to restoration of degraded areas, monitoring of endangered species and watershed management, including helping cattle ranchers in the buffer zone of El Triunfo to adopt best practices. Currently TNC, CATIE and UNACH are forming a network of

[32] See the consultancies realized during the PPG phase about weaknesses of municipal participation in sub-watershed committee management: Guillén, 2009: 18-19; Santillán & Pineda, 2009: 35-36; see also Walter López Báez, Jaime López Martínez, Bernardo Villar Sánchez, Jorge Faustino Manco, *Manejo de cuencas hidrográficas en el estado de Chiapas, México. Diagnóstico y propuesta de un modelo alternativo de gestión*, INIFAP, Ocozocuautla (Chiapas) 2008, p.13

[33] Goetz Schroth, J. Haggar, R. Hernandez, T. Castillejos, *Understanding vulnerability and building resilience to climate change in a high biodiversity mountain landscape in Chiapas, Mexico*, IOP Conf. Series: Earth and Environmental Science 6 (2009) 342040 doi:10.1088/1755-1307/6/4/342040

organizations and producers for sustainable cattle production in Chiapas, demonstrating that ranchers can achieve higher yields while enhancing ecosystem services (reduction of GHG emissions and sequestration of carbon) [34]. TNC has paid special attention to strengthening watershed management in the Sierra-Costa region, supporting the participatory assessment of the Coapa sub-watershed, followed by the elaboration of a general management plan for this sub-watershed. TNC is also engaged in developing a scorecard tool for evaluating and comparing performance of sub-watersheds based on an ideal sub-watershed model[35]. This instrument includes interesting elements, e.g. ES indicators that can be seized up for developing the project's standardized methodology for assessment and monitoring of selected BD and ES indicators.

67. ProNatura has been working since 2003 with communities harvesting xate in the buffer zones of La Sepultura and El Triunfo reserves of the Sierra Madre, developing nurseries to grow xate plants from seed to seedling, and then planting them in the surrounding natural areas. ProNatura wants to help producers improve the volume and quality of production. They are in the process of forming a second level organization which will function as an intermediary between producers and wholesalers or retailers. The NGO is also engaged in efforts to diversify and grow the market for sustainably harvested wood, accessing niche markets for interior construction materials and furniture-grade wood[36]. ProNatura is interested in cooperating with the proposed project in strengthening the marketing capacities of land users by carrying out marketing studies and implementing marketing plans for these sustainable products. Another characteristic of ProNatura´s work in Chiapas is the significance it gives to addressing gender issues in conservation strategies.

68. Ambio, in collaboration with the University of Edinburgh and ECOSUR, has designed and implemented the Scolel'Te project, which uses the Plan Vivo system to certify carbon projects with farmers in communities around Chiapas and Oaxaca. Since 1998, Ambio has managed the Fondo BioClimatico (BioClimate Fund), a marketplace for sellers and buyers of carbon credits under the voluntary market. From 1997 to 2006, the fund sold over 77,000 credits.[37] In collaboration with ECOSUR, Ambio is also engaged in piloting methods for reducing greenhouse gas emissions from cattle pastures and test climate change adaptation strategies. Ambio will be an important project partner in expanding access by land users to users-funded and market-based PES mechanisms.

69. The strengths of IDESMAC lie in its experience in providing technical assistance to land users' organizations for organic coffee production and for sustainable management of xate palm, including pertinent marketing strategies and certification. From 1999 to 2002, IDESMAC covered these areas in the GEF-funded Habitat Enhancement in Productive Landscapes project in El Triunfo Biosphere Reserve. Like Pronatura, IDESMAC works with the hypothesis that market opportunities for producers of these crops improve if they are able to deliver a quality product on a consistent basis. IDESMAC also has capacities in applying GIS and land use monitoring tools, as well as in addressing gender issues, that could be of use for the project.

70. Like Ambio and Reforestamos Mexico, FONCET is engaged in marketing of carbon and watershed services credits generated in Chiapas. Currently, the organization is developing a PES scheme in partnership with CFE to finance the protection and restoration of El Triunfo (see paragraph 56). FONCET is also discussing a project with CFE making a one-to-one match donation of funds raised through the levy applied to its customers. The scheme also plans to facilitate the sale of carbon credits created by reforestation, restoration and avoided deforestation in El Triunfo[38].

71. Relevant social organizations include *ejidos* and *comunidades* (two forms of community based land use bodies); unions of *ejidos* (normally on a municipal scale); local and regional associations of cattle farmers; regional associations of forest farmers; cooperatives and similar forms of producers' organizations (for example

[34] Brian Gurr, Addendum to Gurr, 2009, *Supporting the Sustainable Cattle Production and Climate Change Network*, Conservación Internacional – México, 5 Sep 09

[35] The Nature Conservancy, *Tarjeta de Evaluación de cuencas hidrográficas (TECH) y su aplicación piloto a la cuenca del río Coapa, Pijijiapan, Chiapas*, elaborado por Alejandro C. Imbach, Tuxtla Gutiérrez, Junio 2006

[36] Gurr, 2009: 11-12

[37] See also section 40.

[38] Gurr, 2009: 14

the *Organización Regional de Palmeros de la Sierra Madre*, *others*); voluntary groups engaged in nature and environmental protection. Generally, the proposed project will engage with one or more of these organizations when implementing projects and activities with land users.

72. Key project stakeholders in the academic and research sector are ECOSUR, CONABIO, the Autonomous State University of Chiapas (UNACH), INIFAP and IHN with its research departments. To a greater or lesser degree, they all are carrying out monitoring activities on ES and BD in the region, and also research projects on relationships between land use, habitat change and ES and BD loss. For example, ECOSUR's Livestock and Environment Division is studying carbon dioxide and methane emissions from cattle pastures with the purpose of designing silvopastoral systems that contribute to the mitigation of GHG emissions[39]. CONABIO's program of ecosystem monitoring based on remote sensing and the above mentioned MBC project "Participatory monitoring in the coffee zone of Chiapas" are relevant for the upper parts of the sub-watersheds on which this project focuses. INIFAP, through its Centre of Chiapas, has carried out an in-depth analysis of watershed management in Chiapas[40] and, based on its results, proposed an alternative model of watershed management which includes establishing a scientific and research network to give technical support to watershed committees. INIFAP offers also training courses and a diploma in integrated watershed management targeted to public officials and interested citizens. ECOSUR is working in some communities in Chiapas with farmers schools to introduce technical innovations for sustainable production practices, for example in silvopastoral cattle ranching, organic coffee, and use of organic fertilizers. UNACH offers open courses on sustainable agriculture and cattle agroforestry. IHN has a specialized offer in technical assistance for establishing and managing Environmental Management Units (Unidad de Manejo Ambiental – UMA) for exhibition and conservation *ex-situ* of wildlife species.

2.6. Baseline analysis and gaps

73. As described in the previous section on stakeholder mapping and analysis, the baseline situation is characterized by the existence of institutional structures and capacities related to the expected results and planned activities of the project. However, these ongoing institutional actions present shortcomings in different aspects: Coverage of institutional programs is low; they are weakly focused on priority areas for ES and BD conservation; ES and BD considerations are not systematically integrated into instituional planning and implementing mechanisms, one of the reasons of this being the insufficient knowledge base regarding the status and tendencies of ES and BD and their interrelations with land use decisions and policies. Specific stakeholder achievements and limitations regarding the three project components – 1) Monitoring and research on ecosystem services and biodiversity; 2) integration of ES and BD considerations into land use policies and planning on the sub-watershed level; 3) increasing access of land users to incentive programs for ES and BD- friendly land use decisions – are presented in the following:

74. Several government institutions and NGOs are engaged in and have varying levels of capacity to map, monitor and evaluate BD and ES. Their primary focus lies on indicators of biodiversity (mainly trees, birds and butterflies), carbon storage and flow, and coffee and xate palm production[41]. Among the academic institutions, ECOSUR is principally monitoring and mapping BD and forest cover. UNACH has developed capacities in monitoring rainfalls, erosion and effects of conservation practices in sub-watersheds of the Sierra Madre; also in monitoring impacts of payments for hydrological services. IHN has experience in monitoring endangered and conservation dependent species. INIFAP has experience in evaluating the effects of agricultural production systems on biodiversity. Among government agencies, CONANP has been monitoring BD indicator species and water quality in most of the biosphere reserve of the Sierra-Costa region. Weaknesses in existing monitoring efforts are related to the lack of common methodologies to make comparable the monitoring results of different actors; in general, lack of inter-institutional coordination of monitoring efforts; insufficient information transfer

[39] Gurr, 2009: 15
[40] López et. al., 2008, op. cit.
[41] Martínez-Harms & Quijas, 2009, op. cit., p. 12

from monitoring institutions to key actors in land use decision-making; insufficient training of personnel in monitoring BD and ES and shortage of equipment for analyses, mapping, observation in the field and others.

75. In view of these institutional weaknesses, without the proposed project, knowledge regarding appraisal of ES/BD and their interaction with land uses would grow in a slow and fragmented manner. This applies, on the one hand, to the disposable knowledge base as documented through (a) monitoring of key ES and BD indicators and (b) scientific research on (inter-)relationships between land use and ES/BD in the project area, on ES benefits provided by different land use systems and on factors influencing individual and collective land use decisions by land users. On the other hand, it also applies to slow progress in diffusion of knowledge about these variables and their relationships among local decision-makers, particularly watershed committees and land users in the Sierra-Costa region.

76. Regarding the integration of ES and BD considerations into land use policies and planning on the sub-watershed level, the baseline situation shows a great variety of planning methodologies used by the different institutions that have worked with watershed committees in the last years, among them CONANP, SEMARNAT, FIRCO, CONAGUA and INIFAP. Each institution is using its own methodology and has prioritized its "own" sub-watersheds, according to its specific interests. No institution except CONAGUA has taken into account watershed committees in their planning activities. While environmental concerns are generally part of institutional planning at the sub-watershed level, difficulties were found in the implementation of plans, one of the principal obstacles being lack of communication and coordination between institutions. There are also a number of gaps and weaknesses in training programs. For example, they have different and even contradictory approaches and interests, causing confusion among training recipients. Training tools are inadequate; for example, there is a lack of manuals on best practices in sustainable production. The standard course offering does not correspond to the specific demands of watershed committees and communities. Training events are too short, and often they take place in towns distant from the area of intervention of sub-watershed personnel and have no follow-up in the field. Finally, gender issues are rarely taken into account in the contents of, and participants' selection for, training courses.

77. Several government institutions, research centers and NGOs carry out programs and projects in the Sierra-Costa region aimed at inducing land users to implement sustainable production practices. With funds from its PROCODES and PET programs, CONANP is introducing or strengthening production practices and implementing restoration and soil conservation activities that conserve ES and BD in buffer zones of the reserves. CONAFOR's PROCOREF program provides financial incentives for sustainable and more profitable alternatives to smallholder maize agriculture on erosion prone lands, such as tree crop agroforestry, as well as the reforestation of pastureland and other degraded areas. IHN offers services related to knowledge and technology transfer to land users, organizations, communities and public agencies for the conservation and sustainable use of the natural patrimony. COFOSECH is implementing reforestation and soil conservation policies, including wildfire prevention and tree pest control. NGOs like ProNatura, TNC, CI, IDESMAC and others are engaged in local projects for sustainable coffee, xate palm, timber and cattle production. However, as a whole these programs and initiatives reflect a lack of inter-institutional coordination and so are largely locally isolated efforts with little impact on integrated sub-watershed development.

78. As a result of these institutional shortcomings, integration of ES and BD considerations into land use policies, planning and promotion activities at the sub-watershed level would make little, if any, progress in the absence of the project. Few watershed committees in the Sierra-Costa region would implement management plans, projects and activities that systematically and effectively integrate ecosystem service and biodiversity considerations. Projects to introduce or reinforce sustainable production practices, as well as restoration and soil conservation activities, would be scarce and uncoordinated. They would not follow an integrated watershed management approach, nor would they be coordinated to any significant degree with related activities of other institutions, with the consequence that their impacts on ES and BD conservation would remain limited. The current absence of communication and coordination between municipal, state and federal agencies would remain a dominant characteristic of public development policies at sub-watershed scale, and programs contrary to ES and BD conservation would continue to be implemented.

79. Access by land users to ES payments by government-funded mechanisms, principally CONAFOR's PSA program, would remain limited or even decline in the absence of the project. Some deficiencies in the program that contribute to these limitations would persist, such as lack of information and training of land users about accessing the program and low quality of projects developed by PSA technical advisors. Priority areas for application of CONAFOR's PES mechanism in pilot sub-watersheds would remain inadequately defined, resulting in sub-optimal focusing of incentives for the implementation of land use practices and strategies that conserve ecosystem service and biodiversity values.

80. Actors like Ambio, Reforestamos México, FONCET and ECOSUR are engaged in marketing of carbon and watershed services credits generated in Chiapas, but these market-based schemes for PES are still weakly developed, as there is a lack of strategic marketing plans and funds to implement them. So access by land users and their organizations to market-based PES programs and to premium markets for sustainable products would remain at low levels. Land users and supporting actors would not develop the specialized marketing know-how to access markets for ES/BD credits or for organic and eco-friendly products (e.g. coffee and cocoa, timber and non-timber products, meat and dairy products). Continuing gaps in marketing capacities would include: lack of market feasibility studies and marketing plans for market-based PES mechanisms and sustainable products; lack of capacity to negotiate and establish partnerships with buyers; limited access to specialized trade fairs in Mexico and abroad; limited access to funds for financing certification and storage by cooperatives (before selling to wholesalers) of sustainable products.

81. In the absence of the project, the opportunity costs to land users of taking ES and BD- friendly land use decisions would generally remain too high to make them an attractive option. They would continue to face such trade-offs as those between: short-term economic gains from converting forest to pastureland vs. long-term socio-economic and environmental benefits from sustainable management of the forest resource; and short-term gains in profitability from maintaining or introducing unsustainable land use practices vs. medium or long-term benefits from using organic or eco-friendly production methods - for example in coffee production and processing, timber and non-timber harvesting and in livestock production.

82. Hence, the baseline scenario would offer few and weak incentives to land users for taking ES and BD-friendly land use decisions. This would lead to continued loss of forest cover and failure to re-establish forest in critical areas such as riparian buffer zones or the core zones of the reserves. The tendency to convert coffee farms under forest shade into cattle pasture or more intensively managed coffee or other monocultures would not be reversed. Furthermore, agricultural land users would continue to use inappropriate production methods that contaminate water courses with sediment and pesticides and degrade critical habitat for globally threatened species, including in the region's biosphere reserves. Vulnerability to climate change, as well as threats of landslides and forest cover losses due to natural disasters would remain at high levels.

83. Under the "business-as-usual" scenario, continued loss of forest cover and an aggravated tendency towards unsustainable production practices would increase threats to global, national and local environmental benefits, especially hydrological ecosystem services and biodiversity. Business as usual in watershed management would not arrest tendencies to water quality deterioration, nor would it diminish risks of floods and sedimentation of coastal lagoons, with its negative impacts on wildlife and livelihoods for adjacent communities. Loss of forest cover would reduce carbon sequestration services and, particularly in the mountain cloud forests of the Sierra Madre, reduce habitats for threatened species like horned guan, quetzal, jaguar, tapir, spider monkey and others. These species could suffer significant population losses and thereby, on a regional scale, move from endangered to critically endangered status.

2.7. Linkages with other GEF and non-GEF interventions

84. The proposed project will coordinate with other related initiatives at two levels: (1) international and (2) national/regional. At the international level, the proposed Chiapas initiative will be linked to a series of ecosystem services projects undertaken by UNEP in the context of its Ecosystem Management Program and thus benefit

from their cumulative knowledge base and lessons learned. Their focus is the development of analytical work aimed at understanding variations of the different ecosystem services targeted, thus helping policy makers to incorporate trade-offs in development policy. This cluster of initiatives will contribute to a critical mass of knowledge management in support of this program's strategy in different settings. The Ecosystem Management Program will take advantage of opportunities for collaboration and cross fertilization among the initiatives, with programmatic coordination carried out at UNEP's headquarters at a global level. The initiatives include:

- UNEP's GEF-funded Project for Ecosystem Services (ProEcoServ), which will take the lead in developing and applying appropriate ecosystem management tools within sectoral planning frameworks and macroeconomic planning models in close coordination with its Division of Environmental Policy Implementation (DEPI).
- The GEF-funded UNEP-CONANP initiative in preparation in the state of Oaxaca; its objective is "to mainstream biodiversity conservation into natural resource use and development planning in the Mixteca region, integrating ES tools and sustainable livelihood options".
- UNEP and UNDP are developing a GEF project to test PES schemes in Argentina that includes strengthening access to government supported schemes and, to some extent, free market initiatives. Hence it represents an excellent opportunity for exchange of experiences and lessons with the present project.
- UNEP's Uganda PES project, which is experimental in approach, will provide valuable lessons in how a PES scheme can provide social benefits and meet environmental objectives, in particular through empirical evidence generated by the project regarding the effectiveness of the PES schemes. During implementation, cross fertilization will be fostered through contact between task managers and at the steering committee level.

85. For these and other related initiatives UNEP will ensure that this collaboration continues during the implementation phase at the PSC level. The UNEP Task Manager is in a position to promote such interaction mainly with other relevant UNEP and GEF projects in geographic or thematic overlap. These can take place on a virtual level among specific projects or at the corporate/programmatic level as detailed elsewhere. Experience shows that the proactive planning to make exchange-fostering activities coincide may even allow for real time events to take place amongst projects with little or no extra budgetary burden.

86. At the national & regional level, the project will complement and reinforce several other PES programs that are presently being implemented in Chiapas. These include the ProArbol program of CONAFOR, which is partially supported by GEF and provides payments for carbon, watershed services and biodiversity. The goal of ProArbol is to provide economic incentives to forest owners to avoid deforestation as well as to build capacities to develop environmental services markets in Mexico. The current proposed project will strengthen capacities of watershed committees and other local stakeholders to access these payments as a funding mechanism for the implementation of their watershed management strategies. It will also promote research and monitoring to develop the methods, tools and protocols to better target critical ecosystem services through such payments.

87. Since 2006 and until 2011, CONAFOR is implementing the GEF and World Bank-funded Environmental Services Project. The core objectives of this project are to: a) develop efficient and practical models for expanding and sustaining market-based PES programs; and b) improve the existing payment for environmental services program of CONAFOR to better define and focus its support to strategic mountain and forest ecosystems. The project also includes the documentation of links between land use and conservation of biodiversity, carbon and hydrological services. The current proposed project will undertake dialogue with CONAFOR about lessons learned from this experience and will take them into account in its strategy to strengthen access of land users in the Sierra-Costa region to market-based and user-funded PES mechanisms. It will also work with CONAFOR to strengthen its PES program in several ways: by providing data to allow selection of high-risk areas for ES and BD conservation; improving its capacity to link its PES beneficiaries in high-BD & ES value areas with other ES buyers at the end of their participation in the CONAFOR program; and developing a proposal to improve the

integration of CONAFOR's program with other sustainable production and conservation initiatives at the sub-watershed scale.

88. Some existing NGO initiatives are providing land users in the Sierra Madre with access to voluntary carbon markets. The most advanced model is the Solel'Te project. Ambio, in collaboration with the University of Edinburgh and ECOSUR, has designed and implemented this project, which uses the Plan Vivo system (see paragraph 40) to certify carbon projects with farmers in communities in Chiapas and Oaxaca. Since 1998, Ambio has managed the BioClimate Fund, a marketplace for voluntary sellers and buyers of carbon credits. From 1997 to 2006, the fund sold over 77,000 credits, but it still faces the challenge of identifying buyers, and could possibly garner a higher price per credit if it were to target buyers who particularly value the multiple benefits of Plan Vivo certificates (climate change mitigation, poverty alleviation, and biodiversity conservation)[42]. With support from CI, Ambio and Aires de Cambio (another local NGO) expanded the Scolel'Te project into ten communities in the Sierra Madre with a model combining conservation coffee and carbon credits. Ambio has plans to expand the model to 23 additional communities in the Sierra Madre.

89. The development of the above-mentioned GEF-funded UNEP-CONANP initiative in Oaxaca offers opportunities for exchange of experiences and mutual learning, specifically regarding ES monitoring tools and best practices for improving sustainable livelihoods in communities in high priority areas for ES and BD. Collaboration is already ongoing through exchanges between project teams during project preparation activities.

90. TNC and ECOSUR are working on a carbon baseline for possible carbon projects in El Triunfo; this will be a valuable baseline against which the present project can measure its progress in ecosystem restoration at this site. Since 2008, PRONATURA is implementing a GEF-funded project aimed at reducing community pressure upon non-timber forest species, like orchids and palms (especially Chamaedorea quezalteca). The current project will reinforce this project by providing support to its marketing efforts (marketing plan, certification of sustainable products).

91. Currently, CONANP is implementing with GEF funds the fourth tranche of the project "Consolidation of the Protected Area System (SINAP II)" which includes La Sepultura Biosphere Reserve in the Sierra Madre and the nearby El Ocote Biosphere Reserve. This project is focussed on strengthen sustainable financing of natural protected areas and will contribute to higher sustainability of ES and BD conservation measures in the Sepultura Biosphere Reserve.

92. The proposal budget includes funds for a number of activities to support the coordination and interaction described above, including:

- Under Output 2.4 (Activity 2.4.2): Presentation of lessons learned and recommendations for integrating ES and BD considerations into economic development and sector policies to key government, non-government and public-private agencies in the region ($3,877)

- Under Outputs 2.2 and 2.3 (Activities 2.2.3 and 2.3.3): Exchange of experiences between land users, local authorities and local organizations about sustainable agricultural, livestock and forestry practices ($75,923), as well as about reforestation, soil conservation and ecosystem restoration activities, for ES and BD conservation ($12,738)

- Under Output 3.1 (Activity 3.1.2): Workshops applying methods to develop land users' capacity to prepare, implement and monitor CONAFOR PES projects in priority areas ($15,265)

- Under Output 2.1 (Activity 2.1.3): Workshops on mainstreaming ES and BD considerations into natural resources management policies and plans at the watershed level ($22,531)

[42] Gurr, 2009, op.cit.: 13

- Under Output 3.2 (Activity 3.2.1): Workshops with CONAFOR officials at the regional and federal level on how to link CONAFOR´s PES beneficiaries to ES buyers ($8,031)

- Under Output 3.4 (Activity 3.4.2): Workshops on how to transfer knowledge and skills to access market based PES mechanisms and premium markets for sustainable products ($24,231)

- Under Output 3.4 (Activity 3.4.3): Workshops on how to build alliances among land users and between land users and actors supporting them, in initiatives to access market-based PES mechanisms and premium markets ($8,677)

The proposal has included tasks within the project personnel TORs (Appendix 11) to implement such coordination, as outlined in section 4. In addition, the Project Steering Committee will provide a forum for institutional level coordination. The interaction in the PSC of key actors representing the most relevant institutions at this level provides an excellent opportunity for dynamic planning and coordination of activities, exchanges and cooperation/coordination of this project with other existing and emerging initiatives throughout the life of the project. As noted above, the UNEP Task Manager is in a position to promote such interaction with other relevant UNEP and GEF projects in geographic or thematic overlap at a global level. On the other hand, the other institutions participating in the PSC, such as CI, CONANP and CONAFOR who carry out other related GEF initiatives as well within Mexico, will have the opportunity for the systematic promotion of project synergies and exchanges of experience within their portfolios at the institutional level. An indication of this is given in the coordination plan below and will be continuously updated following project dynamics and emerging opportunities.

The following table summarizes the main areas of coordination with relevant partners and indicates at which level (UNEP headquarter or Project Management Unit) the responsibility for coordination lies.

Coordination plan

Area of coordination	Involved coordinating partners	Responsible for coordination
International coordination of efforts to increase the global knowledge base on effectiveness of PES schemes and on the relationship between BD, ES and human well-being; as well as the development of tools for mainstreaming ecosystem services into development and economic decision-making	- Project for Ecosystem Services (ProEcoServ) - UNEP-UNDP project to test PES schemes in Argentina - UNEP's Uganda PES project - UNEP-CONANP initiative in the Mixteca region (state of Oaxaca, Mexico) - other related initiatives	UNEP
Dialogue and exchange of experience about lessons learned on integrating ES and BD	- UNEP-CONANP initiative in the Mixteca	Project PMU

considerations into economic development and sector policies	region	
Workshops applying methods to develop land users' capacity to prepare, implement and monitor CONAFOR PES projects in priority areas	- CONAFOR´s GEF and World Bank-funded Environmental Services Project - ProArbol program of CONAFOR - UNEP-CONANP initiative in the Mixteca region	Project PMU
Better define and focus support of governmental PES programs to critical/strategic mountain and forest ecosystems	- CONAFOR´s GEF and World Bank-funded Environmental Services Project - ProArbol program of CONAFOR	Project PMU
Develop efficient and practical models for expanding and sustaining market-based PES programs; workshops on how to link CONAFOR´s PES beneficiaries to ES buyers	- CONAFOR´s GEF and World Bank-funded Environmental Services Project - ProArbol program of CONAFOR - Ambio´s Scolel'Te project	Project PMU
Dialogue and exchange of experience about lessons learned on sustainable production practices, as well as on conservation and ecosystem restoration activities, for ES and BD conservation	- UNEP-CONANP initiative in the Mixteca region - PRONATURA´s GEF-funded project aimed at reducing community pressure upon non-timber forest species	Project PMU

SECTION 3: INTERVENTION STRATEGY (ALTERNATIVE)

3.1. Project rationale, policy conformity and expected global environmental benefits

93. In the proposed project, land use and habitat change are strategic variables for biodiversity and ecosystem services conservation policies. For geographical and historical reasons – including strong connectivity between mountains and plains and recent colonization – the relationship between land use systems and practices, on the one hand, and BD/ES provision and conservation, on the other is particularly evident in the Sierra-Costa region of Chiapas. Additionally, natural disasters, like hurricanes Javier and Mitch in 1998 and Stan in 2005 with their highly destructive consequences, have contributed to raising awareness among the general population, land users and policy decision-makers about the impact of adverse land use tendencies on important ecological functions of forests and other natural vegetation cover. As a consequence, institutional arrangements were put in place to address the problem, in particular by establishing watershed committees in the most affected areas to coordinate watershed protection efforts among a vast array of stakeholders, from government agencies to civil society organizations, strengthening environmental governance. While effective operation of these watershed committees is still in the early stages, they are being established across the country to promote locally driven, integrated resource management and offer a strategic opportunity for strengthening the policy, regulatory and institutional coordination framework necessary for mainstreaming BD/ES considerations into land use policies and decisions.

94. In order to design and implement adequate land use policies and management, more knowledge about land use-ES/BD linkages under varying conditions, crops and land use practices is needed. The project will increase the knowledge base and understanding of relationships between land uses and environmental service provisioning, specifically for the Sierra-Costa region, and develop and pilot tools, methodologies and protocols with which watershed committees and other governmental and non-governmental actors in the region can integrate this type of information and thinking into their environmental decision-making and land management activities. In line with UNEP's global follow-up strategy for Millennium Ecosystem Assessment (MA), the project will put in place monitoring programs and develop tools and protocols to monitor, analyze and value environmental services, including biodiversity conservation, and to channel the results back into decision-making procedures.

95. By focusing on the ecologically heterogeneous region from the Sierra to the Pacific coast, the project will contribute to the global knowledge base on the relationship between biodiversity, ecosystem services and human well-being, as well as to the development of tools for mainstreaming ecosystem services into development and economic decision-making. In particular, it will promote the systematic application of ecosystem service considerations in public, civil society and private sector decision-making through the watershed management approach. It will also contribute to the formation and functioning of watershed committees and other local level natural resource management frameworks.

96. Root cause analysis shows that the existence of economic incentives, and knowledge about how to get access to them, are crucial factors for ES and BD- friendly land use decisions. The project will therefore pilot strategies to increase the access by land users in the biosphere reserve buffer zones and adjacent areas to environmental service payments from both the government and private sector markets in return for adopting sustainable production practices and making land use decisions that benefit biodiversity and maintain environmental services at an adequate level to ensure sustainable livelihoods and a healthy environment. The project will also promote incorporation of ES and BD considerations in reforestation and restoration activities, particularly in riparian zones and pastures. By piloting, institutionalizing and monitoring these mechanisms under a range of crops, land use intensities and ecological and socioeconomic conditions from the Sierra Madre to the Pacific coast, the project will increase our understanding of the relationships between land uses and ecosystem service provisioning and provide a basis for replication of these mechanisms across landscapes in Mexico and globally.

97. The project is consistent with Strategic Programs 4 and 5 of Strategic Objective 2 (SO2) of the Biodiversity Focal Area. One of the primary goals of the Biodiversity Focal Area is the maintenance of ecosystem goods and services that biodiversity provides to society. The focus of SO2 is "to support country efforts to

integrate biodiversity considerations into sectors that fall outside the environment sector". As such, the proposed project will increase understanding of the relationships between important land uses and environmental service provisioning in order to better integrate biodiversity and ecosystem service conservation principles into the coffee, cocoa, livestock, timber and non-timber and other relevant production sectors in the area.

98. Strategic Program 4 notes that providing information on the value of biodiversity and its contribution to national development or to businesses that depend on biodiversity, particularly at national and local levels where policy and production decisions are made, is paramount. Hence through monitoring and assessment programs and demonstration activities, the project will build the knowledge base on the value of biodiversity and ecosystem services as related to production and livelihoods in the Sierra-Costa region. It will develop methodologies, tools and protocols for policymakers and planners in watershed committees and municipal governments, universities and extension services, land users and others to monitor and assess the status of key biodiversity and ecosystem service indicators in relation to production practices; it will also build capacities to integrate the results into land management activities[43].

99. With regard to Strategic Program 5 ("Fostering markets for biodiversity goods and services"), the project will pilot and demonstrate cost-effective market-based instruments that reward the protection of ecosystem services under different land uses, thus providing socio-economic benefits to local producers. It will support and strengthen initiatives for opening access to voluntary carbon, water and biodiversity markets, like Scolel'Te (Ambio), Reforestamos México and FONCET. It will also develop and expand access to specialty markets and certification systems for a range of commodities[44], such as timber and non-timber products, sustainable beef and dairy products, organic coffee and cocoa, and others. It will promote and support alliances among land users to sell their products, like the Sustainable Cattle and Climate Change Network in Chiapas recently launched by TNC, along with CATIE, CONANP and UNACH; and it will actively partner with private und public sector actors on the demand side, such as Starbucks and CFE (the Federal Electricity Commission). It will also develop and/or improve conservation best practice guidelines for a number of land uses to support voluntary certification mechanisms, consistent with GEF objectives for supply chain initiatives under Strategic Program 5.

100. Expected global environmental benefits: By integrating biodiversity and ecosystem service considerations into land use planning in the Sierra-Costa region, the project will help to conserve many species of global concern and preserve or restore essential ecosystem functions in critical habitat areas. The region of intervention comprises two important biodiversity areas: the Sierra Madre, including four contiguous biosphere reserves; and the Coastal Wetlands, including La Encrucijada Biosphere Reserve. The entire area falls within the Mesoamerican hotspot and includes such globally threatened species as the horned guan, golden-cheeked warbler, and azure-rumped tanager in the highlands, and American crocodile, olive ridley, and leatherback turtle in the coastal wetlands. La Encrucijada hosts the largest mangrove forest in Mexico and one of the largest in Mesoamerica; it is important as nesting site for migratory and resident birds and for a number of endemic and threatened marine fish species. The coastal area is also a priority for disaster prevention due to its exposure to hurricanes. By integrating the restoration and conservation of watershed functions and riparian corridors in key sub-watershed areas, such as the slopes of the Sierra Madre, the project will help increase the resilience of these landscapes to changing rainfall and water flow levels and thereby help buffer them against climate change impacts. The project will also enhance ecosystem connectivity across this landscape, which includes major elevation and rainfall gradients, and thereby safeguard potential migration corridors to allow species to adjust their ranges under a changing climate. The

[43] The study on institutional capacities for monitoring ES and BD services in the Sierra Madre of Chiapas, carried out during the PPG phase, developed methodological recommendations for introducing SE considerations into decision-making of sub-watershed committees. See María José Martínez-Harms and Sandra Quijas Fonseca, *Identification of Opportunities for Strengthening Training Programs in Natural Resource Management and Payment for Environmental Services in the Sierra Madre of Chiapas, Mexico*, Centro de Investigación en Ecosistemas, Universidad Nacional Autónoma de México, August 2009. The study on capacity-building of sub-watershed committees, as well, formulated proposals for training on ES and BD. See Santillán & Pineda, 2009, op.cit.

[44] See study on market opportunities of sustainable agricultural and forestry products, realized during PPG phase: Gurr, 2009, op.cit.

project is also expected to have positive impacts on marine ecosystems; for example, the coastal area of Chiapas is an important migratory route for dolphins and whale sharks.

101. Other global benefits of the project include an increased global knowledge base on the links between biodiversity, ecosystem services and human well-being, as well as the development of tools for mainstreaming ecosystem services into development and economic decision-making which can be replicated in Mexico and globally (see paragraphs 43-45).

3.2. Project goal and objective

102. The goal or strategic objective to which the project will contribute is the conservation of biodiversity (BD) and ecosystem services (ES) in Mexico.

103. The project objective is: "Mainstreaming biodiversity conservation into natural resource management at the sub-watershed level through integrating ecosystem service considerations in the decision-making in the Sierra-Costa region of Chiapas, Mexico".

3.3. Project components, expected results and activities

104. The project has three technical components: 1. Development of the knowledge base for appraisal of ES and their interactions with land uses among key stakeholders at the sub-watershed level. 2. Mainstreaming ES and BD into land use policies, planning and promotion by watershed committees and policy coordination with other key government agencies. 3. Increasing access by land users to public and private PES mechanisms (carbon, watershed services, biodiversity) to provide funding and incentives for the implementation of land use practices and strategies that conserve ES and BD and improve local livelihoods (targeting land users and non-government stakeholders).

Component 1: Development of the knowledge base for appraisal of ES and BD

105. The expected outcome of component 1 is an increased understanding of the relationships between land uses and BD/ES among monitoring institutions, watershed committees and land users as a result of sub-watershed scale assessment and monitoring of the following:

a) The status of important ES and BD components and their indicators in the project area;

b) The interdependence of land use patterns/policies and ES/BD status;

c) ES benefits provided by different land use systems under varying levels of intensity;

d) Factors influencing land use decisions by land users.

The achievement of the outcome will be measured by the coverage of information needs about the status and dynamics of key ES and BD indicators as described in paragraph 112. The information will also include representative studies for the project area about: links between local land use patterns and ES/BD; ES benefits provided by different land use systems under varying levels of intensity; and factors influencing individual and collective land use decisions by land users, including their understanding of the interaction between land use and ES.

106. Several outputs relevant to increasing the knowledge base for appraisal of ES and their interaction with land uses will be developed: methods, tools and protocols for assessment and monitoring of ES, BD, and land use data and policies (output 1.1); baseline information (data base, maps) on key indicators (output 1.2); increased local research projects and publications on status, dynamics and benefits of ecosystem services and interrelationships between land use, ES (especially water quality), biodiversity and livelihoods, including gender aspects, across sub-watersheds (documentation of results from pilot monitoring activities in 8-9 sub-watersheds) (output 1.3); identification of factors influencing individual and collective land use decisions by land owners,

ejidatarios and *comuneros* (output 1.4); lessons learned about the impact of hurricanes Javier, Mitch and Stan on land use and water balances (output 1.5).

Activities to achieve outputs of component 1:

107. To develop methods, tools and protocols for assessment and monitoring of ES, BD, and land use data and policies, as well as their interdependence with land use patterns and activities, a standardized monitoring and assessment methodology across the project region will be designed, focusing on water quality, biodiversity and carbon. This will involve adaptation of existing tools and protocols for monitoring water quality, biodiversity and other key indicators, both from existing pilot programs in the project region and from monitoring efforts in Mexico and other countries, to specific needs and conditions of sub-watersheds in the project region.

108. The PPG survey of current and past monitoring and mapping efforts (see Appendix 17) found that a number of federal, regional and local institutions and NGOs are engaged in and have varying levels of capacity to map, monitor and evaluate BD and ES, with their primary focus being on indicators of biodiversity (mainly trees, birds and butterflies), carbon storage and flow, and coffee and xate palm production[45]. Research and monitoring of different coffee production patterns is highly concentrated in the Soconusco region. Among the academic institutions, ECOSUR is principally monitoring and mapping biodiversity and forest cover. UNACH has developed capacities in monitoring rainfall, erosion and the effects of conservation practices in sub-watersheds of the Sierra Madre, and also in monitoring the impacts of payments for hydrological services. IHN has experience in monitoring endangered and conservation-dependent species, such as jaguar, tapir, pecarí, and puma, as well as crocodiles, amphibians and gastropods. INIFAP disposes of an experimental station in Ocozocuautla (centre of Chiapas) and has capacities in evaluating the effects of agricultural production systems on biodiversity. Among government agencies, CONANP has been monitoring (mostly by subcontracting specialized academic institutions or NGOs) biodiversity indicator species such as jaguars, crocodiles, spider monkeys and different bird species. CONANP is also monitoring water quality in most of the biosphere reserves of the Sierra-Costa region; the La Encrucijada reserve has its own laboratory for bacteriological and physical and chemical water analysis.

109. The survey also found that the main weaknesses in existing monitoring efforts are related to: the lack of common methodologies to make comparable the monitoring results of different actors; a lack of inter-institutional coordination of monitoring efforts; insufficient information transfer from monitoring institutions to key actors in land use decision-making; insufficient training of personnel in monitoring BD and ES and shortages of equipment for analysis, mapping, observation in the field and other activities.

110. Based on the results of this PPG study, the project will work with the above-mentioned institutions and watershed committees to expand monitoring activities in pilot sub-watersheds. The project will involve communities in certain aspects of the monitoring processes, such as field data gathering for some indicators, in order to reduce costs and make monitoring more sustainable. The project will further define the specific roles of these actors in monitoring processes and propose a mechanism to ensure regular coordination among them. For example, supporting institutions will be responsible for elaborating the common methodology, tools and protocols, as well as data analysis, whereas watershed committees and land users will be responsible for application of protocols, selection of sites and data gathering. Actors involved in the monitoring process will be trained in using tools and protocols for assessment and monitoring of selected BD and ES indicators and their inter-relationships with land use patterns and decisions at the sub-watershed level, including implementation of follow-up courses.

111. Training will focus on improving the ability of watershed committees and supporting institutions to monitor the following in a coordinated manner: forest cover and land use patterns; key ecosystem service indicators, mainly water quality and various characteristics of carbon storage; and priority BD components. Following the recommendations of the PPG study, further details will be developed during the first part of the

[45] Martínez-Harms & Quijas, 2009, op. cit., p. 12

project regarding the possible inclusion of other ES indicators, such as erosion and soil fertility, through selection of important ecosystem services provided to the communities in the sub-watersheds[46].

112. The project will develop baseline information on key indicators by sub-watershed across the project region, including a system of biological indicators of water quality, biodiversity and biological integrity, and land use patterns. The project will select and monitor several types of indicators, including: a) species of global conservation concern listed on the IUCN Red List and on regional threatened species lists, and (b) species that are well-known indicators of ecosystem health. Water quality indicators will include the diversity and abundance of freshwater fish, amphibian and macro-invertebrate species; population size and viability for these species; and other indicators of healthy aquatic ecosystems. Terrestrial biodiversity indicators will include the presence of conservation-dependent species (including mammals, birds, and pollinators), forest vegetation complexity and diversity, and other possible indicators of ecosystem and habitat health such as visible soil erosion and soil fertility. Adoption of environmentally friendly coffee, livestock and other production practices as a result of expanded access to PES mechanisms is expected to result in such changes as reduced soil erosion and stream siltation, a more diverse and complex forest/vegetation cover, lower pollutant and higher oxygen levels in freshwater bodies, and other factors that create healthy ecosystems that support stable populations of key biodiversity species. The project will also produce maps representing the baseline status and dynamics of these key indicators to allow future monitoring at little cost and through a network of existing institutions, including some participatory monitoring by non-specialists. The project will complete the baseline information for key indicators in each category within the first 9 months, and will edit and publish the results.

113. The project will then monitor the above-noted indicators to demonstrate the improved status and conservation of species of global concern and ecosystem health as a result of the project interventions. Over the course of the project, documentation (database and maps) on the status, dynamics and benefits of ecosystem services and on interrelationships between land uses, ecosystem services, biodiversity and livelihoods will be updated to reflect the impacts on biodiversity and ecosystem services of improved land use management resulting from expanded access to PES mechanisms and improved production practices promoted by the project. Benefits from ES in the pilot sub-watersheds (using the categories of the Millennium Ecosystem Assessment 2003: regulation, provision, cultural values, support) and changes in the status of key biodiversity indicator species will be identified and documented. Target levels for improvement in the status of ES and BD indicators and ecosystems will be determined by comparing the data collected to that known for populations in healthy ecosystems and to target levels of known indices (such as the Index of Biotic Integrity, for example). Improvements in the status of globally significant species will be assessed by measured improvements in their population sizes and habitat quality, which will be used to update the IUCN Red List of Threatened Species and regional threatened species assessments. In addition, the evaluation and classification of interrelationships between specific land uses and the status of important ecosystem service and biodiversity indicators will be an important project contribution with relevance to land use policy and planning; some examples of such "strategic links" are:

- The impacts of land use systems (type and density of vegetation, diversity and complexity of forest cover, pastures and industrial systems) on water quantity and quality;

- The impacts of coffee and livestock production systems of varying gradients and intensities (conventional vs. organic production practices) on carbon, water and BD indicators, and on profitability;

- The impacts of water quality conditions on key biodiversity indicators;

- Interaction between land uses, ES/BD and livelihoods (including gender aspects).

114. The findings gathered under these analyses will be edited and printed in a format useful for watershed committee managers, community extensionists, technical advisors and land users; they will be presented to these stakeholders, other donor projects such as Mixteca, and the media.

[46] Martínez-Harms & Quijas Fonseca, 2009, op. cit., p. 31

115. The knowledge base about benefits from ES in (pilot) Sierra Madre watersheds, as well as about factors influencing land use decisions, will be expanded by systematizing existing research and through some additional investigation. Based on its analyses of factors influencing land use decisions, the project will develop recommendations for the land use policies, planning, training and promotion programs of sub-watershed committees and other government agencies. It will publish and present these recommendations to project stakeholders, other relevant donor projects such as ProEcoServ and Mixteca, and the media.

116. The project will synthesize lessons learned about the impacts of hurricanes Mitch (and subsequent hurricanes around September 1998) and Stan (2005) on land uses and water balances by compiling and summarizing the results of existing studies about the direct and indirect impacts of these hurricanes, relating the impacts to land use patterns and previous land use changes (deforestation and others). The project will publish and present these findings to the media and key target audiences.

Component 2: Mainstreaming ES and BD into land use policies at the sub-watershed level

117. The expected outcome of component 2 is: Ecosystem services and biodiversity considerations are mainstreamed into land use policies, planning and promotion by watershed committees (WSC) and policies are coordinated with other key government agencies, resulting in improved status of key BD & ES indicators in target sub-watersheds (as measured under output 1.3).

118. The achievement of this outcome will be measured by: 1. Number of target WSC that have systematically integrated ES and BD considerations into their land use policies and planning. 2. Number of other key institutions that have adopted project recommendations for integrating ES and BD considerations into their policies. 3. Number of WSC implementing coordinated plans with other institutions to introduce or reinforce sustainable production practices (SPP) and restoration & soil conservation activities (RSCA). 4. Improved status of key BD/ES indicators in these watersheds (as monitored by output 1.3).

119. Outputs to achieve the outcome of component 2 are: key WSC members, other policy-makers, extension agents and land users participate in training programmes on mainstreaming ES and BD considerations into natural resources management policies and plans at the sub-watershed level (output 2.1); sustainable production practices (SPP) in agriculture, livestock farming and forestry that conserve ES and BD are introduced and/or strengthened in at least seven sub-watersheds, improving the status of key BD and ES indicators (as measured under output 1.3) (output 2.2); restoration and soil conservation pilot activities (RSCA) demonstrating approaches that conserve ES and BD are implemented in at least eight sub-watersheds, improving the status of key biodiversity and ecosystem service indicators (as measured under output 1.3) (output 2.3); recommendations are developed, communicated and monitored to (a) incorporate ES and BD into sectoral development and restoration policies and regulations of key government, non-government and public-private agencies, and (b) to improve coordination among these agencies with regard to the promotion of sustainable land uses at the sub-watershed level (output 2.4); the coverage of actively working watershed committees in the Sierra-Costa region is increased (output 2.5); there is improved coordination of capacity building activities for WSC and land users among the institutions that provide training (output 2.6).

120. During the project preparation phase, 10 sub-watersheds were selected where the project will intervene, including seven sub-watersheds on the slopes facing the Pacific coast, and three sub-watersheds on the slopes facing the Grijalva-Usumacinta basin (see Appendix 16: Maps).

The ten sub-watersheds where the project will intervene

Sub-Watersheds	Municipalities	Date of creation of watershed committee	Area in hectares
Costa of Chiapas (with a total of 20 municipalities and 24 sub-watersheds)			
Sanatenco	Tonalá	July 2002	28,239.2
La Punta (Lagartero)	Arriaga	September 2003	23,060.3
Margaritas-Coapa	Pijijiapan and Mapastepec	October 2003	87,006.2
Coatán	México: Cacahoatán, Motozintla, Tapachula and Mazatán Guatemala: Huhuetenango and San Marcos	August 2005	36,751.7
Cahoacán	Cacahoatán, Tuxtla Chico, Tapachula, Frontera Hidalgo, Suchiate	In promotion	27,737.2
Huehuetán	Huehuetan, Mazatan, Tapachula	In promotion	83,171.5
Huixtla	Huixtla, Motozintla, Tuzantán	In promotion	82,011.1
Sub-total of 7 sub-watersheds in the Costa of Chiapas watershed			**367,977.2**
Grijalva			
Presa La Concordia, higher parts of Cuxtepeques river	La Concordia	May 2003	60,743.3
Suchiapa (El Tablón)	Villaflores and Villa Corzo	In promotion	203,376.7
Santo Domingo	Villa Corzo	In promotion	205,318.9
Sub-total of 3 sub-watersheds in the Grijalva watershed			**469,438.9**

The first criterion for selection is the existence of a watershed committee or its promotion and probable creation in the near future. Other criteria include overlap with one of the protected areas and high flooding risks and vulnerability.

121. The survey of watershed committees and their capacity-building needs carried out during the PPG phase found a great variety of planning methodologies in use by the different institutions that have worked with watershed committees in recent years, among them CONANP, SEMARNAT, FIRCO, CONAGUA and INIFAP.[47] The study concluded that each institution has used its own methodology and has prioritized its "own" sub-watersheds, according to its specific interests. No institution except CONAGUA has taken into account watershed committees in their planning activities. While environmental concerns are generally part of institutional planning at the sub-watershed level, such planning does not systematically include monitoring or research on strategically important ES and BD indicators or use of monitoring results for land use decision-making. The greatest

[47] Guillén, 2009, op.cit., p. 24-25

difficulties were found in the implementation of plans, with one of the principal obstacles being lack of communication and coordination among institutions.[48]

Activities to achieve outputs of component 2:

122. To implement training programs for key stakeholders to enable them to integrate ES and BD considerations into natural resources management policies and plans, the project will first help adapt and improve the existing training offering relative to the capacity building needs of WSC members and other key stakeholders. This existing offering includes a wide array of subjects, from integrated management of sub-watersheds, production conversion, PES, BD conservation, participatory strategic planning, pollution, climate change and natural disasters, land-use planning, water retention, soil conservation, GIS and fundraising. However, there are a number of gaps and weaknesses in these training programs. For example, they have different and even contradictory approaches and objectives, which can cause some confusion among training recipients. In addition, training materials and tools are inadequate; for example, there is a lack of manuals on best practices for sustainable production. The standard course offering also does not correspond to the specific demands of watershed committees and communities, and training events are too short; they often take place in towns distant from the area of intervention of watershed personnel and have no follow-up in the field.[49] The project will address these gaps by designing and implementing a training program that is based on the specific demand and needs of watershed committees and related actors regarding knowledge about ES and BD values and their interactions with land uses, as well as the need for relevant methods and planning tools. The project will also develop special training modules, materials and decision-making tools (including participatory methods to engage land users in sub-watershed planning) and provide training and on-the-job back-stopping for WSC members, extensionists, land users and officials from other key government agencies. The project will present and publicize these materials, along with the overall program, to project stakeholders such as WSC members and extension agents, land users, policy-makers and officials from other key government agencies, and to representatives of other related projects and the media.

123. Watershed committees and other governmental and non-governmental agencies, including CONANP, CONAFOR, COFOSECH, SAGARPA, SECAM, COMCAFÉ, Ambio, ProNatura, CI and IDESMAC, will introduce and strengthen sustainable production practices in agriculture, livestock farming and forestry by designing and implementing coordinated inter-agency plans to promote and strengthen the financing of such practices in at least seven sub-watersheds with a total of up to 12,000 hectares. Competent institutions, in particular CONANP, INIFAP, ECOSUR, UNACH, Ambio, ProNatura and IDESMAC, will provide training to staff of the WSC extension services and other cooperating governmental and non-governmental agencies, to enable them to promote and provide technical assistance for ES and BD friendly production practices in agriculture (coffee, cocoa), livestock farming (cattle) and forestry (xate palm, timber). Extension staff that has received this training will provide technical assistance to land users (men and women) in adopting such practices; this will be coordinated with technical assistance to build the marketing capacity of land users and supporting actors for market-based PES mechanisms and sustainable products in component 3. The project will organize events to allow for exchange of experiences among land users regarding sustainable agricultural, livestock and forestry practices, and will invite representatives of relevant GEF/donor projects (such as Mixteca) and the media to relevant sessions.

124. Watershed committees, other governmental agencies (INIFAP, CONAFOR, COFOSECH, CONANP, UNICACH) and non-governmental organizations (Ambio, ProNatura) will implement reforestation, soil conservation and ecosystem restoration projects that specifically integrate BD and ES considerations (including pilot restoration of riparian forests targeting areas that were hit by hurricane Stan) in at least eight sub-watersheds by:

[48] Guillén, 2009, op.cit., p. 29; see also Santillán & Pineda, 2009, op.cit., p. 35
[49] Santillán & Pineda, 2009, op.cit., p. 32-34

- Designing coordinated inter-agency plans for reforestation, soil conservation and ecosystem restoration projects (where they do not exist, as is the case in the majority of sub-watersheds);

- Training the extension services of watershed committees and of other cooperating government and non-government agencies to promote and assist pilot activities for reforestation, soil conservation and ecosystem restoration;

- Promoting pilot reforestation, soil conservation and ecosystem restoration activities that conserve ES and BD on up to 18,000 ha in at least eight sub-watersheds; pilot activities will incorporate ES and BD conservation practices into restoration of riparian forests in areas affected by hurricane Stan, especially in the south-eastern parts of the Sierra Madre.

The project will host events to allow land users, local authorities and other interested organizations and projects to exchange experiences about reforestation, soil conservation and ecosystem restoration activities; media representatives will be invited to attend results presentation sessions.

125. The project will present recommendations for mainstreaming ES and BD considerations into development and restoration policies and for improving institutional coordination and monitoring to key government, non-government and public-private agencies by:

- Systematizing pilot experiences in ES and BD friendly production practices and restoration activities (of project and elsewhere), identifying lessons learned and best practices;

- Developing specific recommendations for integrating ES and BD considerations into mainstream economic development and sector policies and regulations;

- Communicating by different means (workshops, manuals, inter-institutional working groups) lessons learned, best practices and policy recommendations derived from the above-mentioned pilot experiences to key government, non-government and public-private agencies in the region (e.g. CONAFOR, COFOSECH, CONAGUA, SECAM, CMDRS, COPLADEM, among others – see paragraph 64) to incorporate ES and BD considerations into their standard development and restoration policies, programs, plans and regulations;

- Establishing a system to monitor improvements in: a) mainstreaming ES and BD considerations into sector policies and regulations; b) institutional coordination of watershed management policies and planning.

Watershed committees operate under certain constraints, such as limited and fluctuating levels of human and material resources, frequent staff turnover as municipal administrations change, and inconsistent participation by land users and key government agencies[50]. However, CONAGUA is a partner in this project and is committed to strengthening their capacity and reinforcing their role as the pivotal institution for land use planning at sub-watershed scale. To increase the coverage of working watershed committees in the Sierra-Costa region, the project will analyze best practices and benefits from the work of these committees and share the results with stakeholders and the media to promote the establishment of new watershed committees. Based on the results of this analysis, it will assist with the formation and capacity-building of committees in watersheds of the Sierra Madre of Chiapas where they still do not exist or are inactive. The project will also promote improved coordination among the training and capacity-building activities provided by such institutions as CONANP, INIFAP, ECOSUR, UNACH, Ambio, ProNatura and IDESMAC, which are the main providers of training to WSC extension agents and land users in the areas of sustainable production practices.

Component 3: Increased access by land users to public and private PES mechanisms

126. The outcome of component 3 is**:** Land users have increased access to public and private PES mechanisms (carbon, watershed services, biodiversity) to provide funding and incentives to implement land use practices and

[50] See studies conducted during the PPG phase, included in Appendix 17: Martínez-Harms & Quijas, 2009; and Appendix 18: Guillén, 2009

strategies that conserve ES and BD and improve local livelihoods (targeting land users and non-government stakeholders) in the Chiapas region.

127. The achievement of this outcome will be measured by: 1. The increase in area of land with high priority for ES and globally significant BD whose users access ES payments by a) government-funded and b) market-based programs and implement sustainable land use practices that contribute to improvements in the status of key biodiversity indicators of global significance. 2. Improvements in the status of key BD and ES indicators in areas with increased access to public and private PES mechanisms as a result of improved land use practices. 3. Number of additional land users (men and women) in target sub-watersheds with access to government PES programs. 4. Number of additional land users in target sub-watersheds with access to market-based PES programs. 5. Number of land users organizations in target sub-watersheds with access to premium markets for sustainable products.

CONAFOR´s PSA (payment for environmental services, for its acronym in Spanish) program is the principal government-funded program related to ecosystem services in Mexico and in Chiapas. The goal of the program is to provide economic incentives to forest owners to avoid deforestation as well as to build capacity to develop environmental services markets in Mexico. The program includes payments for hydrological services, biodiversity conservation, agroforestry systems and to support the development of projects for carbon fixation by forests (not direct payments for carbon sequestration). Depending on the type of forest, current payments average around USD 33 per hectare/per year over a 5-year period[51]. Similar amounts are paid under the categories of biodiversity conservation and agroforestry systems. The PSA program is designed to specifically target land areas with high deforestation risk, biodiversity and ecosystem service values; therefore, project activities to strengthen the effectiveness and reach of this program will contribute to the conservation of key biodiversity and ecosystem services. Among the factors limiting access to and effectiveness of these programs are: contracts tend to be assigned to better organized and relatively wealthier communities; the five-year duration of the contract and communities' inability to access local markets thereafter makes the long-term benefit for conservation questionable; information on high-risk areas for ES and BD conservation is incomplete and unsystematic; and there is no adequate training for technicians and beneficiaries, so many applications are not approved for technical reasons. In fact, out of a total of 327 PES applications submitted in Chiapas in 2009, only 182 (55.6%) met all the operational requirements.[52] This indicates that insufficient capacity by land users and project developers to prepare projects that qualify for government PES programs is an important limiting factor on wider access to ES payments that incentivize conservation of biodiversity and ecosystem services. Another reason is lack of accountability on the part of the project developers, as their accreditation and reimbursement for services do not depend on performance. On the other hand, market-based schemes for PES are still weakly developed. The Scolel'Te project of Ambio, for example, has successfully sold thousands of carbon credits over the course of its nearly ten year history, but it still faces a challenge in identifying buyers. The difficulties of market-based PES projects such as those of Ambio or Reforestamos Mexico are partly linked to the lack of strategic marketing plans and of funds to implement them[53].

128. To achieve the component 3 outcomes, the project will produce the following outputs: training and technical assistance in preparing projects that qualify for government PES programs that conserve biodiversity (output 3.1); information to reinforce program elements for the selection of high-risk areas in terms of ES and BD conservation; development of market-based schemes, an incentive-based mechanism for technicians' certification and an integrated approach to watershed management at the community level thereby enhancing CONAFOR´s PSA program effectiveness in conserving biodiversity and ecosystem services (output 3.2); market feasibility studies and marketing plans for market-based PES mechanisms and sustainable products (premium markets) that, by definition, conserve BD and ES (output 3.3); increased capacity to implement marketing plans for different market-based PES mechanisms and sustainable products is built among land users (both men and women) and

[51] Exchange rate 1 dollar = 13 mexican pesos
[52] Zepeda et. al., op. cit., p. 3
[53] Gurr, 2009: 13; Zepeda et.al., 2009: 4

their organizations, as well as among actors supporting them (NGOs, extension agents, technical advisors), and the area under certified production increases, with improvements in BD/ES indicator status.

Activities to achieve outputs of component 3:

129. Land users, extensionists, providers of professional services and officials of key stakeholder institutions (CONAGUA, CONANP, COFOSECH, SAGARPA, SECAM etc.) will be trained in preparing projects that qualify for government PES programs by improving their information and understanding of available public PES mechanisms in the Sierra-Costa region and by strengthening their capacity to assist land users in preparing, negotiating, implementing and monitoring qualifying projects in priority areas. The project will organize a series of workshops in target sub-watersheds to explain the importance of ES at local, regional and global scales, as well as the rationale behind PES and CONAFOR operational rules; media representatives will be invited to attend selected sessions to hear presentation of results.

130. The project will contribute to strengthening the CONAFOR PSA program by developing:

- A mechanism to expand CONAFOR's capacity to link communities that are about to complete the 5-year PES period to new ES buyers. As stated before (paragraph 127), the 5-year limit of CONAFOR's PSA program presents a possible risk to the sustainability of the program's benefits; the project will propose measures to strengthen alternative follow-on programs, such as those of Ambio, FONCET and Reforestamos Mexico that sell carbon and watershed services credits generated in Chiapas.

- An incentive-based scheme for the certification of ProArbol technical advisors, where the quality of the projects they develop is reflected in their certification by CONAFOR (this derives from evaluation findings that the performance of project developers is often weak because their accreditation and payment do not depend on results).

- A proposal to strengthen the CONAFOR PSA program through the introduction of a more integrated and coordinated approach to watershed management at the community level by linking PES for land users to other sustainable production, restoration and conservation projects and activities in their communities. The purpose of doing so is to achieve synergistic effects between different initiatives at the local level and enhance the sustainability of the PES interventions at the end of their 5-year period.

CONAFOR officials will share these proposals and mechanisms at regional and federal levels through workshops intended to contribute to development policy dialogue. Media representatives will be invited to relevant presentations.

131. The project will make available to land users and their organizations the market feasibility studies and marketing plans for market-based PES mechanisms and sustainable products described above, applying gender equity criteria. For this purpose it will analyze and systematize existing and, when necessary, carry out new cost-benefit analyses and market studies for such mechanisms and production practices that are currently or potentially viable for land users in the Sierra-Costa region of Chiapas, differentiating between locations at upper, middle and lower sub-watershed levels. The studies will consider new mechanisms, such as the sale of carbon credits for conversion from traditional to sustainable pasture practices or for treatment of wastewater from coffee production that would complement CONAFOR's PES program, the sale of biodiversity credits and other incentive mechanisms. The project will also develop marketing plans for the market-based PES mechanisms (such as the above-mentioned carbon and watershed services credits sold by Ambio and FONCET) and sustainable products identified as most promising for the sub-watersheds in the project region. In particular, these could include: eco-friendly coffee and cocoa; sustainably harvested xate palm leaves and seedlings; sustainable beef and dairy products; sustainably harvested wood for interior construction materials and furniture-grade wood.[54]

[54] See PPG study Gurr, 2009 (Appendix 18)

132. The project will increase capacity among land users and their organizations, as well as among actors supporting them (NGOs, watershed and other government extensionists, and technical advisors) to implement marketing plans for different market-based PES mechanisms and sustainable products by:

- preparing training modules and manuals for capacity building activities to support implementation of marketing plans (market feasibility studies and marketing plans will serve as decision support tools that can be used by extensionists, technical advisors, NGOs, etc. in training land users); the project will present the manuals to a range of stakeholders and to the media for further dissemination (in addition to implementing training as mentioned in the following activity);

- implementing training and technical assistance activities to build the capacity of land users and supporting actors to implement marketing plans for market-based PES mechanisms and sustainable products; the project will coordinate training in accessing premium markets for environmentally friendly products with technical assistance in sustainable production practices under component 2;

- promoting and strengthening alliances among land users, as well as between those land users and actors supporting them (NGOs, government agencies), to facilitate their access to market-based PES mechanisms and premium markets;

- assisting land users to obtain financing for marketing costs of sustainable products;

- providing support for promotional activities.

3.4. Intervention logic and key assumptions

133. The intervention logic of the proposed project is that the adoption of environmentally friendly production practices as a result of expanded access to public and private PES mechanisms that incentivize biodiversity and ecosystem service conservation will bring about improvements in ecosystem health and functioning and in the status of species of global conservation concern. The project will achieve its objective of mainstreaming biodiversity conservation into natural resource management at the sub-watershed level in the Sierra Madre of Chiapas using a combination of three elements: 1) an increased knowledge base for BD/ES assessment and on links between land use practices and the status of globally significant biodiversity and ecosystem services; 2) integration of knowledge on BD/ES and economic incentive mechanisms into natural resources management and land use policies at the sub-watershed level; 3) enhanced access of land users to economic incentives for taking ES/BD-friendly land use decisions.

134. Increased knowledge and information on BD and ES and on links between land use practices and the status of BD/ES indicators will result principally from project activities designed and implemented under component 1. However, some relevant factors are not under project control, as different actors with permanent presence in the region will be involved in the monitoring and knowledge-building process, for reasons of process ownership and sustainability.

135. The assumptions about the performance of the actors involved in the monitoring and knowledge-building process are:

- Key actors (communities, watershed committees, government agencies, universities) are disposed to participate actively in the monitoring process because they will understand the value of the data gathered for effective land use management and have capacity to apply standardized monitoring methodologies.

- Regular coordination of actors involved in the monitoring process can be ensured through a coordination mechanism to be designed during the project.

- Levels of compliance with monitoring protocols by actors involved in the monitoring process are high.

- Continuity of monitoring and assessment of key indicators and BD/ES-land use links by involved actors can be ensured beyond project lifetime as a result of the capacities developed by the project to use standardized

monitoring tools and methodologies, because the project will establish a baseline against which future monitoring activities can continue at low cost, and because watershed committees will increasingly request such information to support land use decision-making.

136. Incentive schemes for ES/BD-friendly land use patterns and practices are basically government-funded or market-based. Therefore, assumptions about increased access to such schemes relate mainly to the ongoing effective performance of government programs and markets with regard to economic incentives they offer to land users and the ability of the latter to prepare qualifying projects and/or produce marketable environmentally friendly products.

137. Key assumptions with respect to enhanced access of land users to economic incentives for taking ES/BD-friendly land use decisions are:

- Government PES programs and funds will be maintained in the long run on at least the same level.

- CONAFOR remains open, as it has expressed, to proposals to strengthen its PES programs by better targeting risk areas; developing market-based schemes; improving performance of technical advisors to land users, among other aspects.

- There is high and stable demand to incentivize improved land use practices, i.e. a broad unexploited potential of buyers on regional, national and international markets for ES (such as voluntary markets for carbon and water services) and sustainable agricultural and forestry products of the Sierra-Costa region.

- Initiatives to access PES programs or premium markets for sustainable products that require organized action of land users can build on minimum levels of social cohesion in target watershed communities.

- Land users and the organizations supporting them will have increased capacity to prepare qualifying projects for government PES programs and/or to supply environmentally-friendly products to targeted markets.

138. Another assumption refers to the international framework related to PES mechanisms, particularly for carbon, that will probably evolve after the UNFCCC Conference in Copenhagen in December 2009. It is assumed that, after Copenhagen, international carbon/ES markets will remain at or above current levels of demand, providing ongoing opportunities for land users in Chiapas.

139. The expected outcome of project component 2 is the mainstreaming of ecosystem services and biodiversity into land use policies, planning and promotion by watershed committees and improved policy coordination among government agencies at different levels. This outcome will be achieved by integrating both knowledge on BD/ES and economic incentive mechanisms into natural resources management and land use policies at the sub-watershed level. Underlying assumptions relate mainly to the effective functioning of watershed committees and to the possibilities for effective coordination with other key actors for sustainable development in the Sierra-Costa region.

140. Assumptions concerning the effective operation of watershed committees are:

- CONAGUA and municipalities are willing to strengthen watershed committees, particularly by increasing and stabilizing their supply of human and material resources and ensuring more continuity to WSC management staff beyond the three-year period of municipal administrations.

- Participation of key stakeholders, especially land users´ and key government agencies' representatives, in WSC sessions becomes more regular.

141. Assumptions concerning effective coordination with other key actors for sustainable development in the Sierra-Costa region are:

- Key government agencies (particularly CONAGUA, COFOSECH, SAGARPA, SECAM, COMCAFÉ) in the Sierra-Costa region are interested and able to take measures to integrate ES and BD considerations into their policies.

- Key actors such as CONAGUA, COFOSECH, SAGARPA, SECAM, and COMCAFÉ are disposed to implement and co-finance coordinated projects with WSC to introduce or reinforce sustainable production practices and conservation/restoration activities.

3.5. Risk analysis and risk management measures

142. Different types of risk are identified for each of the project components: (1) Risks related to knowledge building and monitoring of BD/ES key indicators; (2) Risks related to enhancing access of land users to economic incentives for taking ES/BD-friendly land use decisions; (3) Risks concerning effective operation of watershed committees (WSC) and effective coordination with other key actors for sustainable development in the Sierra-Costa region; and (4) climate change risks specific to the project goal of conservation of biodiversity. These risks are presented in the table below.

Risk	**Probability of occurrence**	Mitigation strategy
Scientific knowledge basis is inadequate to justify and rationalize deals between buyers and sellers of ES	M/L	The project will strengthen the knowledge basis by monitoring and analyzing relationships between land use and ES provision (particularly water quality). For carbon payments, the science for measuring and monitoring changes in carbon stocks is relatively straightforward; CI is applying it and communicating it to buyers of voluntary carbon offsets in many projects outside Mexico, so no major difficulties are anticipated. Payments for biodiversity under CONAFOR are based on the presence of endangered species, and CI has significant experience in supporting local stakeholders in developing successful proposals for such payments.
Certain key actors (communities, watershed committees, government agencies, universities) might not be willing to participate actively, and in a coordinated manner, in the process of monitoring BD/ES indicators.	L	While participation and coordination among key stakeholders in the knowledge-building and monitoring process can be influenced only partially by the project, the project will benefit from and take advantage of the long experience and interest in this field of key project partners such as CONANP, IHN, CI, and ECOSUR. With their support, the project will promote regular involvement of other actors in the monitoring process, particularly municipalities and selected communities.
Regular monitoring and assessment of key indicators and BD/ES-land use links in the Sierra-Costa region might not be sustainable and may not be continued after the end of the project because no institution with sufficient technical and financial capacities will have assumed the responsibility to coordinate the monitoring process.	M	The sustainability of monitoring key ES and BD indicators in the Sierra-Costa region will be enhanced through early allocation of coordination responsibilities to actors with permanent presence in the region, particularly IHN and ECOSUR. The State Working Group of Ecosystem Services (GESE) will support the process; this group includes actors from the governmental, non-governmental and academic sectors that will participate in the project (CONANP, COFOSECH, CONAFOR, SEMAVI, ECOSUR, MBC, IHN, Ambio, CI, PRONATURA, FONCET, Chapingo Postgraduate College). Its mandate is to promote and strengthen initiatives for compensating ecosystem services in the state of Chiapas, in particular by ES research and monitoring.

Risk	**Probability of occurrence**	Mitigation strategy
Government-supported PES programs or sub-programs could be suspended	L/M	This risk is considered to be low in the short term, given that Mexico has an established PES system for carbon, watershed services and biodiversity (with pilot payment programs in place in the Sierra Madre de Chiapas) and has also made commitments under other initiatives such as the GEF/WB-funded Environmental Services Project 2007-2010. On the other hand, the risk that funds for governmental PES programs or sub-programs could be reduced in the medium-longer term might be considered as medium level, given the current budget problems of the Mexican government caused by the international economic crisis and severely reduced revenues from oil sales. Consequences could include restrictions in the coverage of the PES program in Chiapas. Although it would be difficult for the project to reduce this risk, it can help to mitigate possible impacts by vigorously promoting access to user-funded and market-based PES programs under component 3.
CONAFOR may have limited willingness to implement innovative proposals to strengthen its PES programs (e.g. better targeting risk areas; developing market-based schemes; and improving performance of technical advisors to land users, among other aspects).	L	In the past, CONAFOR has demonstrated its willingness and capacity to adapt its PES programs for water quality and regulation, biodiversity conservation, and carbon sequestration. Recommendations by earlier evaluations have been integrated into the design of these programs and their operative rules. Recommendations by this project for strengthening CONAFOR's PES programs will build on findings of former evaluations and on current discussions within CONAFOR, so as to offer realistic and well-adapted alternatives.

Risk	**Probability of occurrence**	Mitigation strategy
The demand potential of willing buyers of ES and BD credits in regional, national and international markets might be too limited to incentivize improved land use practices.	L	The main bottleneck for successfully selling carbon, water services and biodiversity credits on voluntary markets relates to the limited marketing capacities of sellers and actors supporting them (for example, the case of Ambio helping land users to sell Scolel'Te carbon credits), and not to the lack of willing buyers. So the project focus on building the marketing capacities of sellers of ES/BD credits will expand their access to markets. No major problems in finding willing buyers are anticipated.
Markets may not be interested in paying environmental premiums for certified products such as coffee, cocoa and cattle.	L/M	This risk is expected to vary from low to medium across the project sites, depending on the products in question. The risk is relatively small for coffee, where environmental premium markets are well established and where CI has 10 years of experience in the Sierra Madre promoting conservation coffee. The risk is also limited for cocoa, given that Soconusco is a "charismatic" cocoa source region and an origin of *criollo* cocoa varieties. However, the risk may be significant for beef from cattle raised in environmentally friendly production systems; the project will therefore invest effort in identifying appropriate markets, such as those promoted by SECAM, which provides marketing support for sustainable beef and dairy products, including the annual organic products fair, ExpoOrganico.[55] It should also be noted that the bundling of environmental market premiums with other forms of PES (e.g., payments for carbon services within silvo-pastoral systems) reduces the risk of not being able to obtain rewards for the ES land users provide.

[55] Gurr, 2009: 9

Risk	**Probability of occurrence**	Mitigation strategy
Community conflicts and low social cohesion could undermine initiatives to access PES programs or premium markets for sustainable products that require organized action by land users, such as producing sustainable and reliable quantities of environmentally friendly coffee or xate palm leaves.	M	This risk should not be underestimated. Frequently, organized activities by land users fail because of low social cohesion in the community and/or lack of organizational capacities. The project will mitigate this risk by carrying out organizational viability assessments before committing its support to organized PES and sustainable production initiatives in selected communities.
Low levels of effectiveness by watershed committees in decision making and management of natural resources might persist due to insufficient human and material resources, lack of continuity of WSC management staff beyond the three-year period of municipal administrations, irregular participation by key stakeholders (especially land users and key government agency representatives) in WSC sessions, and political partisanship.[56]	L	In spite of the fact that watershed committees have only recently been introduced in Chiapas, they have so far been relatively successful as a local institutional framework for natural resource conservation and management in the Sierra Madre, where watershed management has a substantial history. Although watershed committees in the Sierra Madre are not yet fully functional, there is every reason to assume that, with increased support through the project interventions in partnership with CONAGUA, they will become increasingly effective over the lifetime of the project.
Some key actors, especially in the economic and public infrastructure sector (such as SAGARPA, SECAM or the state Ministry of Infrastructure), could show little disposition to implement and co-finance WSC-coordinated projects to introduce or reinforce sustainable production practices and conservation/restoration activities.	M	The project strategy to reduce this risk is to enter into an active dialogue with these actors, based on the environmental and sustainability principles to which all have subscribed in programmatic documents. This dialogue will be led by key project stakeholder institutions, such as CONANP, IHN, COFOSECH, CI, and CONAGUA.

[56] See paragraph 62; findings based on studies prepared during the PPG phase: Santillán & Pineda, 2009 (Appendix 20); Guillén, 2009 (Appendix 18)

Risk	**Probability of occurrence**	Mitigation strategy
Major climate change risks for the region include hurricanes, the impacts of higher temperatures on land use patterns and wildfires.	M	Higher frequencies of hurricanes with prolonged rainfalls lead to landslides, loss of forest cover and increased sedimentation in coastal lagoons, aggravating threats for biodiversity and ecosystem services. Consequently, the project will concentrate its threat mitigation activities in high risk areas of sub-watersheds. A hotter climate with more irregular rainfall will be less favourable to the production of quality coffee in the region, and lower profitability may compel farmers to abandon shade coffee and expand other land uses of less biodiversity value, probably at the expense of forest. To reduce this serious risk, the project will promote BD-friendly coffee growing and processing practices, including: complex shade, which can offer some hurricane protection; payments for forest conservation and restoration from existing government programs and private initiatives; diversification of income sources to mitigate risks associated with unstable environmental conditions and coffee markets; access to markets that reward sustainable land use practices and forest conservation; and strengthening of local capacity, especially of watershed committees, for adaptive resource management. Higher temperatures and more irregular rainfalls increase also the risk of wildfires, especially in the dryer north-western parts of the Sierra Madre. While significant areas of forest are still destroyed every year by wildfire, fire management programs implemented by governmental and non-governmental organizations in the Sierra Madre have contributed to controlling somewhat this risk. The project will not participate directly in these programs but they should help to mitigate this risk.

3.6. Consistency with national priorities or plans

143. Mexico's National Development Plan 2007-2012 defines environmental sustainability as one of its five guiding principles[57]. Environmental sustainability should be a transversal element of all public policies, improving inter-institutional coordination and sector integration. Environmental sustainability criteria must be mainstreamed in policy decision-making, particularly in the productive and in the rural sector[58]. The proposed project is fully consistent with these orientations, as mainstreaming environmental sustainability considerations, particularly biodiversity and ecosystem service conservation, into public development policies at the local and sub-watershed level is at the centre of its objectives. This project is also aligned with priority # 3 of the present UNDAF, in particular outcome 3.1: *"Sustainable development principles mainstreamed in national and regional programmes, including equality and equity in natural resource use as well as the distribution of environmental costs and benefits."*

144. The proposed project is also consistent with state policies. The State Development Plan of Chiapas 2007-2013 includes Environmental Management and Sustainable Development as one of its four main components. One of the objectives of this plan is conservation of priority ecosystems which host the state's biodiversity. Other objectives which coincide with expected results of the present project are: Biological monitoring in priority areas for conservation; integrated management of hydrological watersheds, as well as participation of users and society in water management; strengthening capacities for accessing markets of sustainable products[59].

145. The strategic goal of the present project is "to contribute to the conservation of biodiversity (BD) and ecosystem services (ES) in Mexico". BD conservation became established as a priority in Mexican national policies, since the country signed in June 1992, and ratified in March 1993 the Convention on Biological Diversity (CBD). The intersecretarial Commission for the Knowledge and Use of Biodiversity CONABIO was created in 1992 by presidential decree, with the President of the Republic as its first authority, and the Minister of Environment as its secretary. CONABIO coordinated in 2000 the elaboration of the National Biodiversity Strategy of Mexico (NBSM) and its Action Plan. In 2002, CONABIO began, in collaboration with state governments and different sectors from society, the preparation of two strategic planning documents for each state of the country: a State Study (SS): Diagnosis on the biodiversity of the state and preparation of a document counterpart to the Country Study; and a State Biodiversity Strategy (SBS): Long term public policy planning tool which establishes actions, actors and the necessary resources for the conservation and sustainable use of biodiversity. In March 2006 the south-southeastern states of Chiapas, Oaxaca, Yucatán, Campeche and Quintana Roo signed the "Merida Declaration", where they agreed to prepare State Biodiversity Strategies for this region, placing conservation of biodiversity at high levels of the political agendas of the state governments.

146. Furthermore, the ecosystem focus of the project, emphasizing sustainable use and conservation of key ecosystems such as the Sierra Madre and the coastal wetlands, are fully in line with Mexico's priorities at recent Conferences of the Parties to the CBD. The project will contribute to address the needs identified by the National Capacity Self-Assessment (NCSA, 2005/6) especially by monitoring of natural resources, forest cover and the state of ecosystems in the critically important Sierra-Costa region and by building the capacity of local institutions in biodiversity and ecosystem monitoring.

147. Objectives, expected project outcomes and planned activities fit into the strategies of several key stakeholders for biodiversity and ecosystem conservation in the region:

- CONANP's strategic objective of conserving the country's most representative ecosystems and their biodiversity, with the participation of all social and institutional sectors.

[57] In the Spanish original: "Ejes Rectores". See: Plan Nacional de Desarrollo 2007-2012. http://pnd.calderon.presidencia.gob.mx/

[58] Plan Nacional de Desarrollo 2007-2012. http://pnd.calderon.presidencia.gob.mx/sustentabilidad-ambiental.html

[59] Plan de Desarrollo Chiapas Solidario 2007-2012. Eje 4. Gestión Ambiental y Desarrollo Sustentable. http://www.chiapas.gob.mx/media/plan/EJE4.pdf

- CONAGUA's policy of establishing watershed committees as management entities for natural resources development and conservation.
- CONAFOR's program of Payments for Environmental Services (PSA) that includes payments for hydrological services, biodiversity conservation, agro-forestry practices and development of projects for carbon fixation by forests.
- CONABIO's efforts under the Mesoamerican Biological Corridor, which are also supported by GEF, to restore degraded ecosystems and promote the sustainable use of natural resources, in particular in the Sierra Madre of Chiapas.
- IHN's strategic objective of conservation and sustainable use of the natural patrimony of Chiapas, by monitoring of endangered and conservation dependent species, research and technical assistance for restoration and management of (agro-) ecosystems, including watershed management and climate change mitigation.
- COFOSECH's reforestation and soil conservation policies which include an explicit watershed management approach.

3.7. Incremental cost reasoning

148. In the absence of the project, decision-makers and land users in the Sierra-Costa region of Chiapas will continue to undervalue the environmental services provided by the region's ecosystems, including its biosphere and forest reserves, which also host much of the region's globally significant biodiversity. This undervaluation of ES will be due in part to an insufficient knowledge base on: the status and dynamics of important ES and BD components in the project area; links between land use and ES/BD; and on factors influencing individual and collective land use decisions. It will also derive from limited and unfocused diffusion of existing knowledge to decision-makers and land users.

149. While the watershed management approach would slowly expand under existing federal legislation as a result of CONAGUA's efforts to promote new watershed committees in some sub-watersheds, with priority for flood prevention in highly populated lowlands, the lack of information and tools to encourage and allow local stakeholders to recognize and value ecosystem services will impede them from including BD and ES considerations systematically in land use planning and decision-making processes. This will be true in particular in the context of watershed management, but also at the level of key municipal, state and federal stakeholder institutions with high potential impact on sub-watershed development in the Sierra-Costa region. Policies and programs governing sectoral activities in and outside the environment sector will continue to include few, if any, measures to conserve and sustainably use biodiversity; for example, municipal development plans and projects will continue to prioritize 'end-of-the-pipe' infrastructure works, without considering causes and effects of land use decisions in the higher parts of the Sierra. Institutional obstacles that discourage watershed committees from developing coordinated plans for introducing sustainable production practices and restoration activities will remain high, and initiatives in this area will be few and scattered.

150. Under the business-as-usual scenario, access by land users in sub-watersheds to government-funded, market-based and user-funded PES programs, as well as to premium markets of sustainable products, would continue to have a weak focus on ES and BD priority areas. These programs and markets would also benefit relatively low numbers of land users and generate a lower corresponding value of payments, thus creating insufficient incentives for land users to take ES and BD- friendly land use decisions.

151. The lack of knowledge and information about ES and BD and their links with land use patterns, a low degree of integration of ES and BD considerations into land use policies at the sub-watershed level and low levels of land user access to public and private reward systems for ES and BD conservation would lead to a continued loss of forest cover and related ecosystem services, a failure to re-establish forest in critical areas such as riparian buffer zones, and associated deterioration in the status of globally significant species that depend on such forest

habitats. Furthermore, agricultural land users would continue to use inappropriate production methods that contaminate water courses with sediment and pesticides and degrade critical aquatic habitats for globally threatened species, including in the region's biosphere reserves.

152. The project will provide watershed committees and associated institutions with the knowledge and tools to take ecosystem services, including biodiversity conservation, into account in their decision-making and to improve access to incentives mechanisms by land users who conserve ecosystem services, both through government and private sector funded payment mechanisms and through increased marketing of sustainable products. The project will take an ecosystem-based approach and therefore focus its support on sustainable production, restoration and conservation initiatives located in areas of high biodiversity value, such as protected area buffer zones, corridors, and remnants of native forests, especially riparian forests. The value added of GEF resources lies in supporting the expanded implementation of public and private incentive mechanisms and markets that are now difficult to access or perceived as risky or of unknown benefit by land users, but which have significant potential for growth and, as a result, higher delivery of global environmental benefits as a result of their targeting of areas of global biodiversity importance. The ecosystem conservation reward mechanisms and watershed-scale resources management framework promoted and strengthened by the project will be of general enough applicability to be widely scaled up throughout Mexico and into other countries.

3.8. Sustainability

153. Sustainability, understood as the probability of continued long-term project-derived outcomes and impacts, will be achieved by a project approach that relies on: a) ownership: placement of responsibility for implementing project activities and for achieving outcomes with permanent local social and institutional stakeholders in the Sierra-Costa region from the outset; b) capacity-building: strengthening capacities of local stakeholders for developing and applying tools, mechanisms and practices to be introduced or reinforced by the project to conserve ES and BD; c) governance: lasting integration (mainstreaming) of ES and BD considerations into policy planning and implementation by institutions and civil society groups, including building and strengthening of inter-institutional coordination and synergies; d) cost-reduction and co-financing: increasing use of local resources from institutions and civil society actors, to reduce (cash) costs of activities that contribute to BD and ES conservation; co-financing not only between GEF and non-GEF funds, but also between local stakeholders, to avoid duplication or overlapping of activities and rationalize BD and ES conservation-based policy implementation, thus enhancing sustainability. These principles will be put into practice in each one of the three project components.

154. Several measures will contribute to ensuring continuity of activities related to monitoring and assessment of key BD/ES indicators and of links between the status of BD/ES indicators and land use patterns beyond the project lifetime. A standardized methodology across the project region for monitoring ES and BD key indicators will be introduced, including the establishment of a permanent mechanism for regular coordination among actors involved in the monitoring processes. In addition, supported by actors with long monitoring experience in the region, such as CONANP, CI, and ECOSUR, the project will promote regular involvement in the monitoring process by other actors, particularly municipalities and selected communities. Training of stakeholder institutions in the use of the standardized methodology will improve their skills in monitoring selected BD and ES indicators, as well as their capacity to expand monitoring activities into different sub-watersheds and protected areas in the future.

155. Transfer of knowledge about the status and dynamics of ES and BD components to land users, planners and policy-makers will occur on a more regular basis as relevant actors, such as CONANP, CONAGUA, IHN, ECOSUR, UNACH and others, develop a broader knowledge base about these themes. This will also occur as the project introduces specific practices and approaches for institutionalized knowledge transfer and coordination among land users, watershed committees and other land use and policy decision-makers. Providing land users and institutional actors such as watershed committees with regular, reliable and updated information about BD and ES tendencies in the region will increase the chances that they will make a practice of integrating such knowledge

into their decision-making. Moreover, it will contribute to a shift from supply-driven to demand-driven information flow regarding ES and their interaction with land use practices, as decision-makers develop a better understanding of the usefulness of such information and make more targeted requests to fill their information needs.

156. The project will enhance the sustainability of land users' access to PES-based incentives for taking ES and BD- friendly land-use decisions by bundling strategies that include the following characteristics.

- Rather than create new projects, the project will cooperate with and strengthen existing initiatives of partner organizations, identifying bottlenecks – for example in marketing capacities – and providing project support that will yield high environmental benefits for minimal investment[60]. Examples are the initiatives of Ambio, FONCET and Reforestamos Mexico to sell carbon and watershed services; ProNatura's projects to expand the market for sustainably harvested wood and sustainable xate products; ECOSUR's and Ambio's efforts to pilot methods for reducing greenhouse gas emissions from cattle pastures; and TNC's efforts to develop the Sustainable Cattle and Climate Change Network. Projects in which local actors are already engaged and have proven experience are more likely to be sustained over the long term than new supply-driven initiatives.
- The project will promote increasing access to market-based and user-funded incentive mechanisms, both for ES and BD conservation and eco-friendly production practices.
- The project will develop and communicate recommendations for enhancing the effectiveness and sustainability of government-funded mechanisms (such as the CONAFOR PES program), including their capacity to prioritize high-risk areas for BD/ES, thus increasing the likelihood that land users in critical areas for globally significant biodiversity and ecosystem services will have continued access to funds that incentivize environmentally friendly practices.
- The project will strengthen the capacity of land users to understand and comply with technical and environmental requirements of PES mechanisms and markets for eco-friendly products, such as sustainable production and forest restoration techniques, quality and certification standards, product diversification and others.
- The project will strengthen the capacity of supporting actors (government agencies, NGOs, universities) to make such incentives programs more relevant and accessible to land users; it will also provide land users with training and technical assistance to comply with the above-mentioned requirements of the PES mechanisms and sustainable production practices, including certification to enable them to develop successful carbon project proposals that are aligned with international methodologies and instruments.

157. The mainstreaming of BD and ES considerations into land use policies, planning and promotion by watershed committees and government agencies at different levels in the Sierra-Costa region will be an ongoing process. It will become more sustainable over the long run to the degree that the project succeeds in activating a continuing practice whereby permanent local institutional actors have adopted BD and ES considerations and are incorporating them into their development and land use policy objectives.

158. Project activities aimed at promoting and consolidating the long-term BD and ES mainstreaming process include development of planning and decision-making tools and provision of training for policy and planning decision-makers in watershed committees and other government agencies and public-private bodies to use these tools. They also include establishing and piloting coordination mechanisms for BD and ES conservation policies between watershed committees and other relevant agencies, as well as communicating by different means (workshops, manuals, inter-institutional working groups etc.) lessons learned, best practices and policy recommendations derived from pilot activities to key government, non-government and public-private agencies in the region (such as CONAFOR, CONAGUA, CONANP, COFOSECH, SECAM, CMDRS, COPLADEM, and others) so they can incorporate ES and BD considerations into their standard development and restoration

[60] Gurr, 2009: 3

policies, programmes, plans and regulations. An additional project measure to enhance the sustainability of the BD and ES mainstreaming process involves building the capacity of the State Working Group of Ecosystem Services (GESE) to analyze and adapt recommendations for integrating ES and BD considerations into economic development and sector policies and regulations and for improving institutional coordination.

159. Political and institutional conditions in Mexico, and particularly in Chiapas, are becoming gradually more favourable for sustainable development policies. BD and ES concerns have been introduced in institutional development plans and policies in recent years, including within the agricultural, infrastructure and social sector plans of federal and state governments. One indicator of this tendency is that a growing percentage of development program resources in these sectors is being channelled to environmental protection activities. The project will build on these political declarations of intent by offering methods and tools to translate them into tangible and durable actions.

3.9. Replication

160. The project is expected to produce different experiences and best practices of ecosystem service and biodiversity conservation that will offer opportunities for replication in similar contexts in Chiapas, Mexico and elsewhere. These opportunities lie principally in the fields of monitoring and assessment of ES and BD indicators and their relationship with land use patterns and practices (IHN, ECOSUR, UNACH, CI); transfer of knowledge about status and tendencies of ES and BD and ES/BD-land use links to land users and decision-makers (CONANP, CONAFOR, CONAGUA, COFOSECH); integration of ES and BD information and considerations into land use policies, planning and promotion activities of watershed committees (CONAGUA, municipalities); communication of ES and BD conservation policies and planning on the sub-watershed scale to municipal, state and federal agencies improving policy coordination (CONAGUA, CONANP); increased access of land users to government-funded and market-based mechanisms to provide incentives for the implementation of land use practices and strategies that conserve ES and BD values and improve local livelihoods (CONAFOR, CONANP, Ambio, ProNatura, TNC, IDESMAC and others). Actually, key project stakeholders from the governmental and non-governmental sectors are interested to learn from the particular approach and results of the project and to apply such learning outside the Sierra-Costa region.

161. The project will facilitate the replication of successful practices of ES and BD monitoring and research by developing and documenting a standardized monitoring methodology for the project region which is transferable to other areas with similar conditions. This methodology includes participation of and coordination among institutional and social actors in the monitoring process. Information and analysis provided by monitoring and research activities, including methods used, will be made accessible for interested actors within and outside the project region. Based on analysis of factors influencing land use decisions, recommendations for land use policies will be developed that are potentially useful in similar scenarios.

162. Training programmes for land users, watershed committee members, extensionists and government agencies to enable them to mainstream ES and BD considerations into natural resources management policies and actions will be replicable, as training modules, training materials and decision-making tools will be documented. Moreover, actors from government agencies, NGOs and universities implementing ES and BD conservation programs will get close knowledge of the training programmes, be it as trainers or trainees, and will use this knowledge to replicate its contents and methods in other parts of Chiapas and the country.

163. Pilot experiences in ES and BD friendly production practices and restoration activities of the project will be systematized, identifying lessons learned and best practices, for example in establishing new partnerships between timber and non-timber harvesters or sustainable cattle producers and regional or international buyers. Specific recommendations for integrating ES and BD considerations into mainstream economic development and sector policies and regulations and for improving institutional coordination will be developed. Lessons learned, best practices and policy recommendations derived from pilot activities will be communicated to key government, non-government and public-private agencies in the region (like CONAFOR, COFOSECH, CONAGUA, SECAM,

CMDRS, COPLADEM, and others) to incorporate ES and BD considerations into their standard development and restoration policies, programmes, plans and regulations.

164. As the Sierra-Costa region of Chiapas shares many of its characteristics as an integrated highland-lowland system with the other parts of the so-called Chiapas-Fonseca freshwater ecoregion, there are ample opportunities for replicating practices and methods experienced by the present project in the Sierra-Costa regions of Guatemala and El Salvador.

3.10. Public awareness, communications and mainstreaming strategy

165. Mainstreaming biodiversity conservation into natural resource management at the sub-watershed level through integrating ecosystem service considerations in the decision-making in the Sierra-Costa region of Chiapas is the project objective. So the general project strategy is also its mainstreaming strategy. As land use and habitat change are strategic variables for biodiversity and ecosystem services conservation, the principal elements of the project strategy for mainstreaming BD/ES considerations into natural resource management are strengthening the necessary knowledge base on BD and ES dynamics and their links with land use patterns, creating an enabling policy and institutional environment and increasing economic incentives for BD and ES-friendly land use decisions.

166. Inclusion of and collaboration with a broad range of stakeholders and institutions is of key importance for the mainstreaming strategy of the project: Component 1 (Increase of knowledge base on ES and BD by monitoring and research) is targeted in the first place at the scientific community; component 2 (Mainstreaming ES and biodiversity into land use policies and planning by watershed committees and policy coordination at different levels) is targeted at government agencies, particularly watershed committees; and component 3 (Increasing access by land users to public and private PES mechanisms) will be targeting land users and non-government stakeholders.

167. The project's communication strategy is a central element of its mainstreaming efforts and will operate at two levels. On the one hand, the project will organize specific events and make use of existing communications channels to disseminate the results, findings and/or recommendations produced under each component to the target audiences for those activities. For example, under component 1 the project will publish the findings of monitoring and research activities about the status of ES and BD, and their links with land use patterns. The findings will also be incorporated into the training manuals that will be used in the training events for WSC members, policy makers, community extensionists, technical advisors and land-users, with different versions of these manuals adapted to the different target groups. As another example, recommendations for integrating ES and BD into the land use policies and decisions by WSC, based on analysis of factors influencing land use decisions, will be presented in a brochure that will be distributed to WSC members and land users in the pilot watersheds, and to other WSCs and policy makers at the state level in Chiapas, at a series of events in years 2 and 3 of the project.

168. Recommendations for incorporating ES and BD into the sectoral development policies of other government, non-government and public-private agencies, along with lessons learned and best practices for ES- and BD-friendly production practices and restoration activities, will be disseminated in a manual that will be distributed to these agencies. The State Working Group of Ecosystem Services (GESE) will serve as a platform for analyzing and adapting ES policy recommendations by the project and for diffusing them among relevant state actors and NGOs. The project will also collaborate with GESE in monitoring and communicating progress in mainstreaming ES and BD considerations in sector policies and regulations.

169. On a second level, other communications materials and activities will be directed at a broader audience, such as the three information events to be held under output 1.5 to disseminate lessons learned about direct and indirect impacts of hurricanes Mitch and Stan on land use practices and water balances. The target audiences for these events will include various public and civil society organizations. Media representatives will also be invited in order to inform a broader public about the project's findings. The project will also invite media representatives

to results presentations and related sessions of events organized for the exchange of experiences between land users, local authorities and local organizations -- for example about reforestation, soil conservation and ecosystem restoration activities. In addition, the project will create a web page to present, for example, the best practices and benefits of integrating ES and BD into decision-making by watershed committees and proposed approaches for protecting ES and BD in the sub-watersheds of the Sierra-Costa region.

3.11. Environmental and social safeguards

170. The project is expected to have positive environmental impacts because of its focus on conserving biodiversity and ecosystem service values. By integrating biodiversity and ecosystem service considerations into land use planning in the Sierra-Costa region, the project will help to conserve many species of global concern and preserve or restore essential ecosystem functions in critical habitat areas. Restoration and conservation of watershed functions and riparian corridors in key watershed areas, such as the slopes of the Sierra Madre, will help increase the resilience of these landscapes to changing rainfall and water flow levels and thereby help buffer them against climate change impacts.

171. The project focus on improved understanding and conservation of ecosystem services is also expected to entail positive social impacts, as these services provide important benefits to communities and towns in the region, such as improved water supply and quality and more protection against landslides, soil erosion and flooding of settlements and agricultural lands.

172. Payments for forest conservation and restoration from existing government-funded and market-based programs will improve livelihoods mainly in rural communities situated in the upper and middle parts of the sub-watersheds. Gaining access to premium markets for products that are produced under environmentally friendly practices (including the reduced or non-use of agrochemicals, the conservation and restoration of riparian forests, the conservation or restoration of tree cover in shaded tree crop and silvopastoral systems) will help poor farmers, both men and women, to achieve better incomes. These positive socioeconomic impacts will be the more sustainable as they will be built increasingly on partnerships in the real economy and be less dependent on time-limited governmental programs.

173. In fact, there are some negative or questionable environmental effects of government-funded programs, in particular CONAFOR's PES programs, with which this project will cooperate. In the case of the modality of payments for hydrological environmental services, most of the beneficiary areas are located in areas with low risk of deforestation; the five-year duration of the contract put the long-term benefit for conservation at risk; there is no adequate training for technicians and beneficiaries[61], not only about requirements to access the program's payments, but also about the environmental reasoning behind them. The present project will build up safeguards against these risks by a) developing tools and methods for better focussing PES on high-risk areas; b) promoting vigorously market-based and user-funded alternatives to the governmental PES programs; c) based on the project's experience in the Sierra Madre, developing recommendations for overcoming the aforementioned weaknesses, for example those of insufficient training of technicians and land users, and communicating them to CONAFOR.

174. A reported negative social effect of CONAFOR's PES program that the project will consider in its social safeguard strategy is that contracts for payments for hydrological services now tend to be awarded to better-organized and relatively wealthier communities[62]. A safeguard to mitigate this tendency will involve introducing explicit social selection criteria, including gender equity, in training programs for watershed committee extensionists to give preference to the more marginal communities and land users. In addition, by building greater systemic capacity among land users (including tenants), communities & their supporting organizations to prepare qualified PES projects and by enhancing the existing PES program (under component 3), the project will improve

[61] Zepeda et. al., 2009: 3
[62] Zepeda et. al., 2009: 3

access to such payments by poorer communities who are now at a greater relative disadvantage than better organized communities.

175. Another social safeguard relates to potential risks from community conflicts or low social cohesion that might undermine access to PES programs or premium markets for sustainable products that require organized action by land users. The project will address this risk by carrying out social and organizational viability assessments before committing its support to organized PES and sustainable production initiatives in selected communities. For example, projects that will be carried out in the communal lands of *ejidos* should count on the consent of the community as expressed by a formal agreement of the assembly of *ejidatarios*.

SECTION 4: INSTITUTIONAL FRAMEWORK AND IMPLEMENTATION ARRANGEMENTS

176. The present project is the product of a partnership between CONANP, IHN and CI, based on their common interest and experience in the development of ecosystem service approaches to biodiversity conservation. The partnership is strengthened by the inclusion of COFOSECH and CONAGUA and their competencies in forest restoration and watershed management, which has contributed to the definition of project results and activities. The institutional framework of the project includes other actors from the government, NGO, academic and civil society sectors (see following section 5) who will be involved in implementing the project strategy for mainstreaming biodiversity and ecosystem service considerations in the decision-making in the Sierra-Costa region of Chiapas.

177. The project will establish a Steering Committee (PSC) composed of CONANP, CI, IHN, COFOSECH and CONAGUA as executing partners, and UNEP as GEF implementing agency[63]. The formal representative of each executing partner will be the institution's general director in the state of Chiapas or corresponding region, although they may nominate a representative to attend PSC meetings. The steering committee will be chaired by CI and meet quarterly. Its principal functions will be to approve regular work plans, provide strategic guidance and oversight to project implementing organizations, review progress and evaluation reports, discuss problems or strategic issues that might arise during implementation and provide support for the necessary inter-institutional coordination and contributions to project activities. The PSC will maintain continuous exchange of information among its members by electronic means, and additional ad hoc steering committee meetings can be convened via telephone conference or other means, if necessary.

178. Project implementing partners and executing agency: CONANP, IHN, COFOSECH, CONAGUA as implementing partners and CI as executing agency have initiated and led the development of the project and, as members of its Steering Committee, will play the lead role in implementing and monitoring the project and maintaining its strategic focus. They will contribute most of the co-financing for the project and will also implement specific activities under the three project components. For example, CONANP will co-finance and carry out BD monitoring activities as well as sustainable production and ecosystem restoration pilot projects, including the provision of training and technical assistance. IHN will participate mainly in ES and BD monitoring and research, but also in promoting and supporting eco-friendly production activities and in strengthening the land use planning and policy coordination activities of the watershed committees. COFOSECH will play a strong role in pilot reforestation, soil conservation and ecosystem restoration activities, as well as in activities to improve land users' access to PES and support for sustainable production practices. CONAGUA will engage in strengthening the planning and implementing capacities of watershed committees, monitoring water quality, providing training in ES and BD friendly production practices and supporting reforestation, soil conservation and ecosystem restoration pilot projects. CI, in addition to its role as Executing Agency, will participate in implementing the following activities: baseline studies on land use patterns and factors influencing land-use decisions; training and technical assistance in ES and BD friendly production and restoration practices; training to improve land users' access to government-funded and market-based PES programs, including strengthening of marketing capacities; and other technical and management support.

179. UNEP/DGEF, as GEF implementing agency, will participate in the PSC and be in charge of supervision of Monitoring and Evaluation for the project, including overseeing the mid-term and final evaluations, review and approval of semi-annual and annual reports, technical review of project outputs and providing inputs to the PMU as needed. UNEP will provide guidance on relating the GEF-financed activities of the project to global, regional and national environmental assessments, scientific and technical analysis of ES and BD, policy frameworks and plans, and international environmental agreements.

[63] See for details and graphical representation of implementation arrangements Appendix 10: Decision-making flowchart and organigram.

180. A Technical Advisory Committee (TAC) will provide technical, scientific and policy advice to the project both to the Steering Committee and the Project Management Unit (see paragraph xxx). It will meet as necessary (at least quarterly) and will be composed of key stakeholder institutions, principally: CONANP, CI, IHN, COFOSECH, CONAGUA, CONAFOR, IEA and SEMAVI. The Project Steering Committee will also try to engage SAGARPA, SECAM, SEDESOL and SEDESO in the near future. Recognized experts with both scientific knowledge and practical experience in the fields of biodiversity conservation, ecosystem service payments, sustainable production and watershed management can be invited to participate in this committee. The Technical Committee will be an important communication platform for facilitating coordination between governmental and non-governmental actors in the project area.

181. The Project Management Unit (PMU) will be responsible for day-to-day implementation of all project activities, either directly or through management of sub-grants, and for coordination of all activities among the project implementing partners and other institutions. It will support PSC meetings and other activities and manage project finances. CI's Mexico office, located in Tuxtla Gutierrez, Chiapas, will host the PMU, which will be composed of a Capacity Building Advisor/ Project Director, a Project Administrative and Technical Assistant and, during the first months of implementation, an Institutional Advisor. The PMU will receive occasional, targeted technical support from other CI personnel[64].

182. The Capacity Building Advisor/ Project Director will provide overall technical leadership of the project and will also lead activities related to capacity building of the watershed committees targeted by the project. The Advisor will devote significant attention to the watershed committees, ensuring and supporting their active participation and the effectiveness of activities to build their capacity. S/he will provide overall technical guidance related to the project theme of integrating ecosystem services and biodiversity into land use planning at sub-watershed scale. S/he will ensure ongoing coordination and exchange of information with the related initiatives identified in section 2.7 and, in particular, oversee implementation of the workshops with the CONAFOR project, the Mixteca project in Oaxaca, and the other identified initiatives that will focus on capacity-building and other activities.

183. The Project Administrative and Technical Assistant will carry out day-to-day operational and administrative functions, particularly with regard to procurement, contracting of consultants, budget management, reporting and routine communications with partners and other stakeholders, support for PSC, TAC and coordination meetings with the Mixteca and CONAFOR PES projects and other relative initiatives, and travel and logistical arrangements for field missions and other meetings with local and regional actors. In addition, this position will provide some technical support to the Project Director and other technical staff, as well as consultants, including routine communications and follow-up with consultants, project partners, watershed committee staff, and other stakeholders. S/he will be responsible also for preliminary review of technical reports and documents; and other related support as appropriate.

184. The Institutional Advisor will provide strategic advisory and technical support to the Capacity Building Advisor/ Project Director with regard to institutional capacity building and coordination, particularly focusing on the watershed committees and municipalities targeted by the project and all relevant agencies. S/he will particularly support the Capacity Building Advisor/ Project Director in selecting (preparing criteria and terms of reference), supervising and evaluating the institutions and specialists that will execute (as contracted consultants or as partners in cooperation agreements) the various training and technical assistance activities for capacity-building of watershed committees, municipalities and other relevant institutional actors for watershed policies and planning. S/he will also support the Project Director in promoting inter-institutional coordination among key stakeholders and with other related initiatives in Chiapas and other regions of the country, preparing concept papers and meetings.

185. CI personnel in Chiapas and Washington will provide additional, targeted technical and administrative support to the PMU as part of CI's match contribution, including in particular a project supervisor, based in

[64] For detailed description of PMU personnel profiles see Appendix 11: Terms of Reference

Chiapas, who will monitor the progress and results of project activities and determine if any strategic or management corrective actions are needed. CI's PES Advisor, also based in Chiapas, will support project activities to increase access by land users to public and private PES mechanisms. In addition, a staff member of CI's Biodiversity Assessments & Ecosystem Health team will provide technical input related to freshwater aspects of BD and ES monitoring and research activities, and CI's Land Use Advisor will provide occasional support for activities designed to integrate ES and BD considerations into land use policies and planning. CI administrative and finance staff will also provide some additional support to the Project Administrative and Technical Assistant in certain aspects of budget administration, development and administration of sub-grants and consulting agreements, project accounting, and support for audits.

186. These formal implementation arrangements will ensure a constant exchange of information and experiences among the project implementing agencies and other key partners and organizations. The project will utilize a proactive communication strategy to maintain effective operational and policy coordination and to disseminate key results to target audiences (as described in section 3.10).

SECTION 5: STAKEHOLDER PARTICIPATION

187. During the project preparation phase, consultations were undertaken with several categories of stakeholders as follows: a) regular communication and consultation among institutions participating directly in the development and design of the project (CONANP, IHN, CI, COFOSECH and CONAGUA); b) workshops with additional stakeholders that will be actively and directly engaged in implementing project activities, including key government agencies such as CONAFOR, SEMAVI, INESA; NGOs such as TNC, Ambio, ProNatura, Reforestamos México; research institutes like ECOSUR, UNACH, INIFAP; and watershed committee managers; and c) a meeting with mayors from the project area.

188. The project proponents organized two consultation workshops during the PPG phase. The first workshop (see list of participants in Appendix 21) provided a review of the overall project objectives, components and outcomes to the meeting participants and solicited their inputs to the design of the studies undertaken subsequently to inform the project design. Consultants then carried out targeted studies related to:

- *Synthesis and Review of Existing Efforts and Institutional Capacity for Monitoring Environmental Services and Biodiversity in the Sierra Madre de Chiapas, Mexico*
- *Watershed Policy and Governance in the Sierra Madre de Chiapas, Mexico*
- *Review of Payment for Ecosystem Services (PES) Programs in the Sierra Madre de Chiapas, México*
- *Review of Agricultural and Forestry Certification Programs Using Environmental Criteria and Identification of Market Expansion Opportunities in the Sierra Madre de Chiapas, Mexico*
- *Identification of Opportunities for Strengthening Training Programs in Natural Resource Management and Payment for Environmental Services in the Sierra Madre de Chiapas, Mexico.*

189. The project proponents then held a second workshop to review and validate the results of these studies and discuss their implications for the project design. These consultations allowed a wide range of stakeholders to provide complementary information on the current status of ongoing BD monitoring activities in the Sierra Madre, on existing training programs related to ES and BD, on the problems and needs of watershed committees, experiences in watershed management planning and on current practices and trends in government-funded and market-based PES programs. As a result of these consultations, the project proponents and the wider group of stakeholders now have better knowledge and understanding of the project objectives, the barriers it will address, and ongoing relevant activities and gaps (the baseline). A list of participants to this workshop is included in Appendix 22.

190. The consultation with mayors from the project region was held in Tuxtla Gutiérrez with representatives from several municipalities where it is intended to implement pilot projects, such as: Villaflores, Tonalá, Tuxtla Chico and Motozintla. These municipalities are representative of the north-western, central and south-eastern parts of the Sierra-Costa region. The municipalities expressed their interest to participate in the project's activities and asked to present the initiative to a broader audience of local actors in their respective jurisdiction.

191. Also as a result of these consultations, the project proponents have confirmed the interest and willingness of other stakeholders to participate in project implementation by executing and co-financing specific project activities, to engage in efforts to improve inter-institutional coordination, and to give broad institutional support to the project as a whole.

192. National and state government agencies, such as SEMARNAT, CONAFOR, CONABIO, SAGARPA, INIFAP, SEMAVI, SECAM, COMCAFÉ, and INESA will be involved in project implementation in different ways. Some of these agencies will participate directly in, and possibly provide additional funding for, specific activities related to their area of expertise. For example, CONABIO will participate in ES and BD monitoring and research and contribute information and technical know-how from its program of ecosystem monitoring based on remote sensing. INIFAP will also participate in ES and BD monitoring and research and be a partner in strengthening land use planning and policy coordination capacities of the watershed committees. CONAFOR will

participate in improving land users' access to government-funded and market-based PES programs, as well as in reforestation, soil conservation and ecosystem restoration activities. SAGARPA, SECAM, and COMCAFÉ will provide support to sustainable production activities. Other agencies will participation in the project Technical Advisory Committee, contributing to improving inter-institutional coordination and backing the project's efforts to mainstream ES and BD concerns in regional development, specifically watershed management policies.

193. In view of the important role of municipalities in local development policies and given the function of mayors as formal presidents of watershed committees, their participation in project planning and implementation is crucial. The project will raise awareness within municipal agencies of the importance of long-term perspectives in watershed management and involve them in planning and implementing adequate ES and BD protection policies within their jurisdictions. As noted above, CONAGUA will play a key role in project activities related to strengthening and engagement of the municipalities and watershed management committees and will serve as one of the main channels for the project to engage them regularly and effectively.

194. Public-private bodies like the Planning Committee for Municipal Development (COPLADEM), the Municipal Council for Sustainable Rural Development (CMDRS) and the Advisory Councils (CA) of biosphere reserves are relevant actors as they have a voice in local and regional development policies. The project will promote improved communication between watershed committees and these participatory public entities, transmitting ES and BD considerations into their planning and decision-making.

195. Non-governmental organizations, like Ambio, TNC, ProNatura, IDESMAC, FONCET, Reforestamos Mexico and others will play a prominent role during project implementation by contributing their technical know-how, knowledge of local socioeconomic and socio-cultural conditions and practical experience in different thematic areas that are relevant for the project. These include: ES and BD monitoring (Ambio, ProNatura, and IDESMAC); capacity strengthening of watershed committees (TNC); training and technical assistance for eco-friendly production practices and forest restoration activities (ProNatura, IDESMAC, FONCET); and access to government-funded and market-based PES programs (Ambio, FONCET, Reforestamos México).

196. Relevant social organizations include *ejidos* and *comunidades* (two forms of community based land use organizations); unions of *ejidos* (normally on a municipal scale); local and regional associations of cattle farmers; regional associations of forest farmers; cooperatives and similar forms of producers' organizations (for example the *Organización Regional de Palmeros de la Sierra Madre* and others); and voluntary groups engaged in nature and environmental protection. Generally, the project will engage with one or more of these organizations according to their presence in specific target areas when implementing activities with land users.

197. Participation by institutions in the academic and research sector will focus on ES and BD monitoring, on research regarding relationships between land use, habitat change and ES and BD loss and on training and technical assistance for local policy decision-makers and land users promoting and introducing ES and BD-friendly land use practices. Important stakeholders from this sector are: ECOSUR, with its experience in monitoring animal and plant species and land use change in Chiapas, in designing agroforestry and silvopastoral systems that contribute to the mitigation of GHG emissions and in technical assistance – through farmers'schools – for sustainable production practices. UNACH will participate in strengthening the land use planning and policy coordination capacities of watershed committees

SECTION 6: MONITORING AND EVALUATION PLAN

198. The project will follow UNEP standard monitoring, reporting and evaluation processes and procedures. Substantive and financial project reporting requirements are summarized in Appendix 8. Reporting requirements and templates are an integral part of the UNEP legal instrument to be signed by the executing agency and UNEP.

199. The project M&E plan is consistent with the GEF Monitoring and Evaluation policy. The Project Results Framework presented in Appendix 4 includes SMART indicators for each expected outcome as well as mid-term and end-of-project targets. These indicators, along with the key deliverables and benchmarks included in Appendix 6, will be the main tools for assessing project implementation progress and whether project results are being achieved. The means of verification are summarized in Appendix 7. M&E related costs are fully integrated in the overall project budget. Overall project impact will be measured, at the Objective level, as follows:

Indicator	Target
The degree to which policies and regulations governing sectoral activities in- and outside the environment sector include measures to conserve and sustainably use biodiversity, in particular:	
Percentage of target watershed committees (WSC) in the Sierra-Costa region that have systematically integrated ecosystem service and biodiversity considerations into their sub-watershed management plans and activities at end of project	By end of project: 80% of WSC have systematically integrated ES and BD considerations into their sub-watershed management plans and activities.
Number of municipalities in the project area that have systematically integrated ecosystem service and biodiversity considerations into their development plans and policies	By end of project: At least five municipalities in the project area have systematically integrated ES and BD considerations into their development plans and policies.
Number of state and federal key stakeholder institutions outside the environment sector with high potential impact on sub-watershed development in the Sierra-Costa region that are implementing policies, programs and projects that have systematically integrated ES and BD considerations	By end of project: At least six state and federal key stakeholder institutions outside the environment sector with high potential impact on sub-watershed development in the Sierra-Costa region are implementing policies, programs and projects that have systematically integrated ES and BD considerations.
Percentage of target sub-watersheds where NGOs implement projects and activities that have systematically integrated ES and BD considerations and are aligned with management plans of watershed committees	By end of project: In at least 70% of target sub-watersheds NGOs implement projects and activities that have systematically integrated ES and BD considerations and are aligned with management plans of WSC.

200. The M&E plan will be reviewed and revised as necessary during the project inception workshop to ensure project stakeholders understand their roles and responsibilities vis-à-vis project monitoring and evaluation. Indicators and their means of verification may also be fine-tuned at the inception workshop. Day-to-day project monitoring is the responsibility of the project management team but other project partners will have responsibilities to collect specific information to track the indicators. It is the responsibility of the Project Director

to inform UNEP of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely fashion.

201. The project Steering Committee will receive periodic reports on progress and will make recommendations to UNEP concerning the need to revise any aspects of the Results Framework or the M&E plan. Project oversight to ensure that the project meets UNEP and GEF policies and procedures is the responsibility to the Task Manager in UNEP-GEF. The Task Manager will also review the quality of draft project outputs, provide feedback to the project partners, and establish peer review procedures to ensure adequate quality of scientific and technical outputs and publications.

202. At the time of project approval 65 percent of baseline data is available. Baseline data gaps will be addressed during the first year of project implementation. A plan for collecting the necessary baseline data is presented in Appendix 7. The main aspects for which the project has gathered some information but for which additional details are needed, particularly for the pilot sub-watersheds, are:

- Current levels of ES and BD integration into development plans and activities of watershed committees (WSC), municipalities, other key institutions and NGOs in the Sierra-Costa region.
- Existing levels of coordination of WSC plans with the plans of other key stakeholders to introduce or reinforce sustainable production and restoration and soil conservation practices in pilot sub-watersheds.
- Identification of personnel at stakeholder institutions with authority to mainstream ecosystem services and biodiversity considerations into natural resources management policies and plans at the sub-watershed level.
- Quantity and coverage (in hectares) of existing individual and organized initiatives to introduce sustainable production and restoration and soil conservation practices in pilot sub-watersheds.
- Number of land users in pilot sub-watersheds with access to government-funded and market-based PES programs.
- Products in pilot sub-watersheds with access to premium markets.
- Number of land users and land users' organizations with access to premium markets of sustainable products.
- Number of sub-watershed extensionists enabled to give technical assistance to land users for introducing or strengthening sustainable production practices.
- Identification of priority areas in pilot sub-watersheds for application of CONAFOR's PES mechanism.
- Existing market feasibility studies and marketing plans for market-based PES mechanisms and sustainable products.
- Existing partnerships (contracts) with buyers of ES or sustainable products.
- Land and producer coverage of certified production in pilot sub-watersheds.

203. Project supervision will take an adaptive management approach. The Task Manager will develop a project supervision plan at the inception of the project, which will be communicated to the project partners during the inception workshop. The emphasis of the Task Manager supervision will be on outcome monitoring but without neglecting project financial management and implementation monitoring. Progress vis-à-vis delivering the agreed project global environmental benefits will be assessed with the Steering Committee at agreed intervals. Project risks and assumptions will be regularly monitored both by project partners and UNEP. Risk assessment and rating is an integral part of the Project Implementation Review (PIR). The quality of project monitoring and evaluation will also be reviewed and rated as part of the PIR. Key financial parameters will be monitored quarterly to ensure cost-effective use of financial resources.

204. A mid-term management review or evaluation will take place on the second quarter of year 2 as indicated in the project milestones. The review will include all parameters recommended by the GEF Evaluation Office for terminal evaluations and will verify information gathered through the GEF tracking tools, as relevant. The review will be carried out using a participatory approach whereby parties that may benefit or be affected by the project will be consulted. Such parties were identified during the stakeholder analysis (see section 2.5 of the project document). The project Steering Committee will participate in the mid-term review and develop a management

response to the evaluation recommendations along with an implementation plan. It is the responsibility of the UNEP Task Manager to monitor whether the agreed recommendations are being implemented. An independent terminal evaluation will take place at the end of project implementation. The Evaluation and Oversight Unit (EOU) of UNEP will manage the terminal evaluation process. A review of the quality of the evaluation report will be done by EOU and submitted along with the report to the GEF Evaluation Office not later than 6 months after the completion of the evaluation. The standard terms of reference for the terminal evaluation are included in Appendix 9. These will be adjusted to the special needs of the project. The table below summarizes the M&E plan.

M&E activity	Responsible Parties	**Budget US$**	Period
Inception Workshop	▪ Project Management Unit ▪ UNEP	1.500	Within 2 months of project start-up
Inception Report	▪ Project Management Unit ▪ UNEP	None	Immediately after Inception Workshop
Measurement of progress and performance indicators	▪ Project Management Unit ▪ Executing agencies and consultants	None (Costs are included in management budget)	Annually, before the APR/PIR and preparation of AWPs
Quarterly Progress Reports	▪ Project Management Unit	None	Quarterly
Annual Report/Project Implementation Report (APR/PIR)	▪ Project Management Unit ▪ UNEP	None	Annually
Steering Committee Meetings	▪ Project Management Unit ▪ UNEP ▪ National Counterparts	None	Following Inception Workshop and subsequently at least quarterly
Mid-term Evaluation	▪ Project Management Unit ▪ UNEP ▪ External Consultants	15.000	Project mid-term (October 2nd year)
Terminal Evaluation	▪ Project Management Unit ▪ UNEP ▪ External Consultants	15.000	End of project implementation
Terminal Report	▪ Project Management Unit ▪ UNEP	None	At least one month before end of project
Audit	▪ UNEP ▪ Project Management Unit	48.287	Annually
Lessons learned	▪ UNEP ▪ Project Management Unit	None	Annually
Field visits	▪ Project Management Unit ▪ UNEP ▪ National counterparts	None 1500	Permanently
TOTAL INDICATIVE COST		79.787	

205. The GEF tracking tools are attached as Appendix 15. These will be updated at mid-term and at the end of the project and will be made available to the GEF Secretariat along with the project PIR report. As mentioned above the mid-term and terminal evaluation will verify the information of the tracking tool.

SECTION 7: PROJECT FINANCING AND BUDGET

7.1. Overall project budget

Financing Plan Summary for the project (US-$)

	Project Preparation a	Project Grant b	Total c = a + b	Agency Fee	For the record: Project Grant at PIF
GEF	70,000	1,484,044	1,554,044	148,500	1,485,000
Co-financing	105,970	5,902,275	6,008,245		4,850,000
Total	**175,970**	**7,386,319**	**7,562,289**	**148,500**	**6,335,000**

Project Framework (US-$)

Project components and outputs	GEF-financing*		Co-financing*		Total ($)
	($) a	%	($) b	%	c = a + b
1.Development of the knowledge base for appraisal of ES	**327,997**	**21%**	**179,917**	**3%**	**507,914**
1.1 Methods, tools and protocols for monitoring of ES, BD, and land use data	29,500	**2%**	0	**0%**	**29,500**
1.2 Baseline information on key indicators	94,237	**6%**	69,134	**1%**	**163,371**
1.3 Monitoring and research on dynamics and benefits of ES, and links between land use, ES, BD and livelihoods	187,900	**12%**	90,433	**2%**	**278,333**
1.4 Identification of factors influencing land use decisions	16,360	**1%**	11,577	**0%**	**27,937**
1.5 Lessons learned about impact of hurricanes Mitch and Stan on land use and water balances	0	**0%**	8,773	**0%**	**8,773**
2.Mainstreaming ecosystem services and biodiversity into land use policies, planning and promotion	**628,809**	**42%**	**3,622,425**	**60%**	**4,251,234**
2.1 Training of key actors for mainstreaming ES and BD considerations into natural resources management policies and plans	36,076	**2%**	41,946	**1%**	**78,022**
2.2 Sustainable production practices (SPP) that conserve ES and BD introduced and/or strengthened	263,848	**18%**	1,408,598	**23%**	**1,672,446**

2.3 Restoration and soil conservation pilot activities (RSCA) that conserve ES and BD implemented	139,847	**9%**	2,160,937	**36%**	**2,300,784**
2.4 Recommendations to incorporate ES and BD into mainstream policies of key actors developed and communicated	57,611	**4%**	10,944	**0%**	**68,555**
2.5 Increased coverage of working watershed committees in the Sierra-Costa region	19,979	**1%**	0	**0%**	**19,979**
2.6 Improved coordination of capacity building activities for watershed committees, land users and other stakeholders in the project region	111,448	**8%**	0	**0%**	**111,448**
3. Increasing access by land users to public and private PES mechanisms	**392,325**	**28%**	**311,389**	**7%**	**703,714**
3.1 Training and technical assistance on preparing projects that qualify for government PES programs	16,020	**2%**	49,470	**1%**	**65,490**
3.2 Proposals developed and communicated for strengthening CONAFOR's PES program	55,702	**4%**	21,631	**0%**	**77,333**
3.3 Market feasibility studies and marketing plans for market-based PES mechanisms and sustainable products	88,350	**6%**	148,805	**3%**	**237,155**
3.4 Increased marketing capacity for market-based PES mechanisms and sustainable products built among land users, as well as among actors supporting them	232,253	**16%**	91,483	**3%**	**323,736**
4. Project operation and administration	**134,913**	**9%**	**1,788,544**	**30%**	**1,923,457**
4.1 Project staff	0	**0%**	0	**0%**	**0**
4.2 Support for project management	0	**0%**	830,177	**14%**	**830,177**
4.3 Project operation	134,913	**9%**	958,366	**16%**	**1,093,279**
Total project costs	**1,484,044**	**100%**	**5,902,275**	**100%**	**7,386,319**

* Percentage refers to contribution at CEO endorsement to total financing in each component and output.

7.2. Project co-financing

Sources of confirmed co- financing	Classification	Type		Total US-$	%*
		Cash	In-kind		
Conservation International (Starbucks)	NGO	1,741,299		1,741,299	29.5
CONANP	Nat'l Gov't	1,564,812	885,000	2,449,812	41.5
COFOSECH	State Gov't	256,644	1,304,520	1,561,164	26.5
IHN	State Gov't	15,000	135,000	150,000	2.5
Other				0	0.0
Total Co-financing		3,577,755	2,324,520	5,902,275	100.0

7.3. Project cost-effectiveness

206. The basic assumptions of the project with regard to cost-effectiveness are that the sustainable management and conservation of natural resources, including biodiversity, is best achieved 1) through local management at the sub-watershed scale, 2) through an incentive-driven approach based on environmental service rewards, and 3) building on existing institutional structures in the government, NGO and academic sector for supporting capacity building processes.

207. Strengthening the local management of natural resources at the sub-watershed scale is particularly cost-effective under the conditions in Mexico, where the federal government and the municipalities provide basic funding for watershed committees; this project will focus on building the capacity and developing the necessary tools and protocols that these committees can use for planning and monitoring the state of the environment. Experience in the existing watershed committees has shown that the sub-watershed is the appropriate scale for coordinating the efforts of different governmental and non-governmental institutions, thereby achieving programmatic and funding synergies. One alternative would be to plan and coordinate natural resource conservation exclusively at higher scales (e.g., the state level) where it is difficult to integrate site-specific information, especially in such heterogeneous regions such as the Sierra Madre de Chiapas and its adjacent sub-watersheds. Another alternative would be to perform these tasks at a smaller scale but not linked to sub-watersheds (e.g., exclusively at the municipal level), which would be less effective in a region where sub-watershed processes are of such predominant importance for the functioning of ecosystems as in the "Sierra-Costa" region of Chiapas.

208. This project also favors a reward-and-incentive approach to the management of natural resources rather than an approach based exclusively on rules and policing (which are both necessary as well) for numerous reasons, including cost effectiveness. In an area of difficult access such as the Sierra Madre, which is dominated by small landholders, it is very difficult to enforce land use regulations if these are not also in the interests of the land users. The project's approach is therefore to facilitate access to incentives and rewards for communities for land use practices and activities that benefit the environment and help ensure the delivery of environmental services to downstream users. Through this approach, the interests of upstream and downstream land users will often coincide and better results can be expected in terms of resource conservation than with a traditional approach based solely on the (often unsuccessful) enforcement of rules.

209. An important factor of the current design's cost efficiency is the implementation and sustainability strategy that builds on existing institutional structures in the government, NGO and academic sectors, instead of paying for their establishment through project funds. While there will be costs associated with the project team, the participating institutions' administrative costs and a great part of project implementation costs are largely self-funded as part of their normal business practices. So, GEF funds will be focused in a cost-effective manner on capacity-building at all levels, from land users to national government agencies.

APPENDIX 3: INCREMENTAL COST ANALYSIS

	Baseline (B)	Alternative (A)	Increment (A-B)
Global Benefits	• Continued loss of forest cover, habitat destruction and reduction of species • Ecosystem services degradation and loss of related global benefits, especially carbon storage and water provision • Existing knowledge base on ES and BD and their links with land use patterns do not provide sufficient elements for policy decision-making and planning	• Conservation of globally significant ecosystems, habitats and species • Stabilization of ecosystem services and related global benefits • Systematic monitoring and research for increasing the global knowledge base on ES and BD and their links with land use patterns	• Forest cover stabilized or slightly increased in areas of deforestation risk within project area • Conservation status of a selected group of indicator species improved in project area • Ecosystem services and related global benefits are stabilized • Significant contribution to global knowledge base on ES and BD and their links with land use patterns for informed policy making on defining land use planning and incentive schemes
Domestic benefits	• Deterioration of local and regional benefits provided by ES and BD • Limited Es and BD- friendly opportunities to improve livelihoods • No systematic and inter-institutionally coordinated policies to conserve and sustainably use biodiversity by ES and BD- friendly land use planning on the sub-watershed level	• Plans, projects and activities for conserving ES and BD provide increasing benefits to local and regional population • Creation of opportunities to improve livelihoods through ES and BD- friendly land use systems and payments from public and private PES mechanisms • Implementation of systematic and inter-institutionally coordinated policies to conserve and sustainably use biodiversity by ES and BD- friendly land use planning on the sub-watershed level	• Increased benefits to local and regional population by policies and activities for conserving ES and BD • Local livelihoods improved through ES benefits provided by ES and BD- friendly land use systems and through payments from public and private PES mechanisms • Policies and plans governing sectoral activities in sub-watersheds of the Sierra-Costa region include measures to conserve and sustainably use ES and BD in a significantly higher degree than before project begin.
Component 1: Development of the knowledge base for ES appraisal and their interaction with land uses among key stakeholders at the sub-watershed level	Slow growth of knowledge base regarding ES/BD and their links with land uses, in particular: • Information needs on status and dynamics of important ES and BD components in the project area are only	Knowledge base on ES/BD and their links with land uses is increased, in particular: • Comprehensive information on key indicators of ES and BD by sub-watershed across the project region	

APPENDIX 3: INCREMENTAL COST ANALYSIS

	partially covered. • Documentation about links between land use and ES/BD in the project area is casuistic and unsystematic. • Documentation about factors influencing individual and collective land use decisions by land users is incomplete and offers insufficient elements for land use policy decisions CI 35,000 CONANP 32,200 COFOSECH 0 IHN 52,700 **Component cost 119,900**	becomes available. • Links between land use and ES/BD in the project area are systematically assessed and documented. • Factors influencing individual and collective land use decisions by land users are assessed and documented, providing elements for land use policy decisions **Component cost 589,253**	CI 74,798 CONANP 43,708 COFOSECH 0 IHN 70,496 **Co-financing 189,002** Cost to GEF 280,352 **Component cost 469,353**
Component 2: Mainstreaming ecosystem services and biodiversity into land use policies, planning and promotion by watershed committees and policy coordination with other key government agencies	ES and BD considerations are not systematically integrated into land use policies at the sub-watershed level, in particular: • In most sub-watersheds of the project area there are no watershed management plans that have effectively integrated ES and BD concerns into their objectives, methods and activities. • Coordination between watershed committees (WSC) and other relevant institutions with regard to the promotion of sustainable land uses at the sub-watershed level is inexistent or ineffective. • Projects supporting sustainable production practices (SPP) and restoration and soil conservation activities (RSCA) are scarce, uncoordinated and have little impact on ES and BD conservation.	ES and BD considerations are systematically integrated into land use policies at the sub-watershed level, in particular: • Sub-watersheds with working WSC in the project region are trained and assisted to integrate ES and BD considerations into their management plans, projects and activities. • Coordination between WSC and other relevant institutions with regard to the promotion of sustainable land uses at the sub-watershed level is improved and effective. • Projects supporting SPP and RSCA have a better coverage (especially in higher risk areas), are coordinated between actors in sub-watersheds and have considerable impact on ES and BD conservation.	CI 370,696 CONANP 1,973,871 COFOSECH 1,304,520

APPENDIX 3: INCREMENTAL COST ANALYSIS

	CI 125,000 CONANP 950,000 COFOSECH 640,000 IHN 36,000 **Component cost 1,751,000**	**Component cost 6,141,684**	IHN 64,205 **Co-financing 3,713,292** Cost to GEF 677,391 **Component cost 4,390,684**
Component 3: Increasing access by land users to public and private PES mechanisms (carbon, watershed services, biodiversity) to provide funding and incentives for the implementation of land use practices and strategies that conserve ES and BD and improve local livelihoods, (targeting land users and non-government stakeholders)	Low and stagnant number of land users that have access to public and private PES mechanisms, in particular: • Land users are very insufficiently informed and trained to prepare and implement CONAFOR PES projects. • Market studies and marketing plans for market-based PES mechanisms and premium sustainable products are not available for land users in sub-watersheds of the project region. • Low and stagnant numbers of land users in target sub-watersheds that are trained and assisted for accessing market-based PES mechanisms and premium markets for sustainable products. • Incentives of public and private PES mechanisms for implementing ES and BD- friendly land use practices are on a low level and inadequately focused, having little impact on land use decisions and improvement of livelihoods. CI 205,000 CONANP 25,000 COFOSECH 0 IHN 0 **Component cost 230,000**	Considerable growth of number of land users that have access to public and private PES mechanisms, in particular: • Land users are adequately informed, trained and assisted to prepare and implement CONAFOR PES projects. • Land users in target sub-watersheds dispose of market studies and marketing plans for market-based PES mechanisms and premium sustainable products. • Growing numbers of land users in target sub-watersheds are trained and assisted for accessing market-based PES mechanisms and premium markets of sustainable products. • Incentive levels of public and private PES mechanisms for implementing ES and BD- friendly land use practices are becoming higher. **Component cost 1,081,530**	CI 342,085 CONANP 70,633 COFOSECH 0 IHN 7,255 **Co-financing 419,973** Cost to GEF 431,558 **Component cost 851,530**

APPENDIX 3: INCREMENTAL COST ANALYSIS

Project Management	**Component cost** **0**	Effective coordination to achieve project outputs by active participation of key stakeholders in project activities at sub-watershed and regional levels. **Component cost** **1,626,940**	CI 953,719 CONANP 313,792 COFOSECH 256,644 IHN 8,041 **Co-financing** **1,532,196** Cost to GEF 94,744 **Component cost** **1,626,940**
TOTAL COST	**2,100,900**	**9,439,407**	CI 1,741,298 CONANP 2,402,004 COFOSECH 1,561,164 IHN 149,997 **Co-financing** **5,854,463** Cost to GEF 1,484,044 **Total cost** **7,338,507**

* Watershed Committees

APPENDIX 4: PROJECT RESULTS FRAMEWORK – page 1

Project strategy	Objectively verifiable indicators	Sources of verification	Assumptions
STRATEGIC OBJECTIVE: To contribute to the conservation of biodiversity (BD) and ecosystem services (ES) in Mexico			
PROJECT OBJECTIVE: Biodiversity conservation is mainstreamed into natural resources management at the sub-watershed level through the integration of ecosystem services considerations in future decision-making in the Sierra-Costa region of Chiapas, Mexico	The degree to which policies and regulations governing sectoral activities in- and outside the environment sector include measures to conserve and sustainably use biodiversity, in particular: 80% of target watershed committees in the Sierra-Costa region have systematically integrated ecosystem service and biodiversity considerations into their sub-watershed management plans and activities at end of project At least five municipalities in the project area have systematically integrated ecosystem service and biodiversity considerations into their development plans and policies At least six state and federal key stakeholder institutions outside the environment sector with high potential impact on sub-watershed development in the Sierra-Costa region are implementing policies, programs and projects that have systematically integrated ES and biodiversity considerations In at least 70% of target sub-watersheds, NGOs implement projects and activities that have systematically integrated ES and biodiversity considerations and are aligned with management plans of watershed committees The status of key indicator species and improvements in the health of aquatic and terrestrial ecosystems in pilot sub-watersheds reaches target levels (see output 1.2 footnote) as a result of expanded implementation of PES schemes, sustainable production practices (SPP) and restoration/soil conservation activities (RSCA) Net change in forest cover in areas of deforestation	• Project management information system • Annual project implementation reports • Sub-watershed management plans • Municipal Development Plans (strategic and triennial) • Annual project implementation reports System (established by project) to monitor improvements in: a) mainstreaming ES and BD considerations in sector policies; b) institutional coordination of sub-watershed management policies and planning • Annual project implementation reports • Cooperation agreements between committees and NGOs Baseline studies and monitoring of key indicators of biodiversity and ecosystem health carried out in outputs 1.2 and 1.3	**Project objective to strategic objective:** Market-generated incentives for unsustainable land use and production practices decrease or increase less than economic incentives created or strengthened by project Overall government support for unsustainable land use and production practices is decreasing Impact of hurricanes, rainfalls and wildfires on forest cover remains on post-2005 levels

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	risk within project area is 0% or slightly positive as a result of expanded implementation of PES schemes, sustainable production practices (SPP) and restoration/soil conservation activities (RSCA) At least 2,500 land users in target sub-watersheds, including at least 20% female land users, perceive livelihood improvements from new or increased payments from public & private PES mechanisms and the ecosystem service benefits provided by ES and BD-friendly land use systems.		Fine scale deforestation risk map developed by project under output 3.1 Survey of representative samples of land users in target sub-watersheds about perceived livelihood improvements resulting from new/expanded access to public and private PES incentives payments			
Project strategy	**Objectively verifiable indicators**				**Sources of verification**	**Assumptions**
	Indicators	**Baseline**	**Mid-term-target at end of 1st or 2nd year (accumulated)**	**End of project target (accumulated)**		
Component 1: Development of the knowledge base for ES appraisal and their interaction with land uses among key stakeholders at the sub-watershed level						
Outcome of component 1: Increased understanding (by monitoring institutions) of the relationships between land uses and BD/ES as a result of sub-watershed scale monitoring of: a) the status of important ES and BD components and their indicators in the project area; b) the interdependence of land use patterns & policies and ES/BD status; c) ES benefits provided by different land use systems under varying levels of intensity; d) factors influencing land use decisions by land users.	1. Information coverage on status & dynamics of key components of globally significant BD and ES in project area, as measured through status of following indicators: - biodiversity and biological integrity* - water quality** & other ecosystem health indicators - land use patterns and changes - other key indicators for outcomes 2 and 3 as noted below */**(see footnotes for output 1.2) 2.Information coverage on links between local land use patterns and policies, on the one hand, and ES/BD status	1. Information needed by monitoring institutions on status and dynamics of important ES and BD components is only partially covered (measured by amount of data collected on status indicators for terrestrial and aquatic species and ecosystem health – see footnotes in output 1.2) 2. Documentation on links between specific land use practices and ES/BD indicator	1.Information needs on key indicators of ES and BD status in the project area are covered at 70% by project year 2 2. Documentation on links between land use and ES/BD status in the project area covers about	1.Information needs on key indicators of ES and BD status in the project area covered at 90% by project year 3 2.Documentation on links between land use and ES/BD status in the project area covers about	1.Reports and published studies about key indicators of ES and BD status in the project area 2. Reports and published studies about links between land use and ES/BD status	**Outcomes to project objective:** Key actors (communities, watershed committees, government agencies, universities) are willing to participate in monitoring process Regular coordination of actors involved in monitoring processes can be ensured. Levels of protocol compliance of actors involved in monitoring process are high. Continuity of monitoring and assessment of key indicators and BD/ES-

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	(including their benefits), on the other, by representative studies for the project area 3.Factors influencing individual & collective land use decisions by land users (including understanding of interactions between land use and ES) are documented by comparative studies across sub-watersheds, land uses and land owner types	status in the project area is sporadic and unsystematic 3.Documentation about factors influencing land use decisions is sporadic	50% of strategic links identified during baseline by project year 2	80% of strategic links identified during baseline by project year 3 3.Factors influencing land use decisions are documented in comparative studies	in the project area 3.Report on factors influencing land use decisions bv land owners, *ejidatarios* and *comuneros*	land use links by involved actors can be ensured beyond project lifetime.
Output 1.1: Methods, tools and protocols for assessment and monitoring of ES, BD, and land use data and policies, for use by watershed committees, other key government agencies, NGO partners and universities	1.Standardized methodology using state of the art techniques and procedures introduced across project region for assessment and monitoring of BD and ES, as well as their links with land use patterns 2. Mechanism established to ensure regular coordination among actors involved in monitoring processes 3. N° of stakeholder institutions and n° of staff members trained to use standardized methodology (tools and protocols) for assessment and monitoring of selected BD and ES indicators	1. Actors use different tools and protocols for monitoring BD, ES and land use patterns 2.Assessment and monitoring of BD and ES is not coordinated between actors 3.None	1. Tools and protocols (as part of standard methodology) developed at end of 1st year 2. Coordination mechanism established at end of 1st year 3. At the end of 2nd year, 12 institutions and 40 of their staff members have received training to use standardized methodology	1.Tools and protocols are validated and used by at least 8 stakeholder institutions by project year 3 2. At least 8 stake-holder institutions participate in coordinated monitoring process 3. By project year 3, 15 institutions and 50 of their staff members have received training	1. Report of specialist moderating process of developing standardized M&E methodology Report of facilitator defining roles of actors involved in monitoring processes and describing coordination mechanism and procedures Trainers' reports; teaching materials used	

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	and their links with land use patterns					
Output 1.2: Baseline gaps addressed and project baseline information (database, maps) on key indicators completed	1.Baseline studies are available for each sub-watershed, filling gaps in baseline information on the status of key indicators of: - biodiversity and biological integrity* - water quality** - land use patterns and changes - other key indicators for outcomes 2 and 3 as noted below 2. Baseline studies filling gaps in baseline information on key indicators are published	1. Baseline information for project area is incomplete 2. Insufficient diffusion of information on key indicators in project area	1. Baseline information on the status of key indicators in each target sub-watershed completed within first 9 months of project implementation 2. One publication at end of 1st year; 3 publications at end of 2nd year	2. Three publications at end of 3rd year	1.Reports of specialists carrying out baseline studies 2. Publications of baseline studies, including maps	
	*Biodiversity and biological integrity indicators representing global environmental benefits will be selected according to presence of globally significant species in each sub-watershed and their ecological functions. **Water quality indicators will include freshwater fish, amphibians & macro-invertebrates. Exact indicators will be selected according to their functions within each sub-watershed, and indicators for upper sub-watershed zones will differ from those for lower sub-watersheds. ***Information to be monitored for terrestrial and freshwater species and ecosystems will include: diversity and abundance of indicator species, population size and viability; and habitat quality and ecosystem health. Target levels for improvement in the status of ES and BD indicators and ecosystems will be determined by comparing data collected to that known for populations in healthy ecosystems and to target levels of known indices (e.g. the Index of Biotic Integrity). Improvements in the status of globally significant species will be assessed by measured improvements in their population sizes and habitat quality, which will be used to update the IUCN Red List of Threatened Species and regional threatened species assessments. For aquatic ecosystems, improvements in these indicators will reflect improved water quality & ecosystem health as a result of changes in oxygenation, pollutant and siltation levels resulting from improved land use practices. For terrestrial ecosystems: indicators of ecosystem health may include tree cover and diversity; visible soil erosion levels, and presence/status of conservation-dependent mammals, pollinators and birds.					
Output 1.3: Increased local research and publications on status, dynamics and benefits of ecosystem services and interrelationships between land use, ES (especially water quality), biodiversity and livelihoods (including gender aspects) across sub-	1. Data base and maps representing the status and dynamics of all key indicators (water quality, biodiversity, land use patterns, other) and their correlations in 10 sub-watersheds of the Sierra-Costa region are updated	1. Regular updating of data base and maps about status and dynamics of key indicators and their correlations is lacking for target sub-watersheds and project region	1.Annual update of data base and maps about status and dynamics of key indicators and their correlations in 10 sub-watersheds of the Sierra-Costa region	1.Updated data base and maps about status and dynamics of all key indicators and their correlations in 10 sub-watersheds of the Sierra-Costa region	1.Quarterly and annual reports of institution (specialists) in charge of giving technical support and follow-up to monitoring processes	

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watersheds	2.Documentation of benefits from ES in the target sub-watersheds 3.N° of research projects about links between land use, ES/BD and livelihoods in the region 4. N° of publications about a) results from pilot monitoring; b) benefits from ES; c) links between land use, ES/BD and livelihoods	2.Benefits from ES in the target sub-watersheds (WS) are not systematically identified and documented 3/4.There are sporadic, insufficient and unsystematic research projects and publications demonstrating links between land use, ES/BD and livelihoods in project region	2. Documentation of ES benefits in 3 WS in year 1; in 6 WS in year 2; one general summary document covering benefits identified to date in year 2 3. Two research projects in years 1 + 2 each on links between LU, ES/BD & livelihoods 4. a) 1 publication in year 2 b) 1 publication in year 2 c) 3 publications in year 2	2.Documentation of benefits from ES in 10 target WS; one general summary document for entire project region by project year 3 3. Six research projects and publications at end of project 4. a) 2 publications at end of project b) 1 publication at end of project c) 6 publications at end of project	2.Documents presenting benefits from ES 3.Interim and final reports of research projects 4. The publications	
Output 1.4: Identification of factors influencing individual and collective land use decisions by land owners, *ejidatarios* and *comuneros*	1.Explanatory model for individual and collective land use decisions by land owners, *ejidatarios* and *comuneros* is developed 2.Validation by key project stakeholders of recommendations for land use policies, based on explanatory model for land use decisions (recommendations supporting policies and regulations governing sectoral activities that include measures to conserve BD)	1.Explanations of land use decisions are casuistic, non-comprehensive and insufficient to inform sustainable land use policies	1.Explanatory model for individual &collective land use decisions by land owners, *ejidatarios* and *comuneros* is developed by project year 2 2.Recommendations for land use policies, based on analysis of factors influencing land use decisions, are developed and disseminated among key stakeholders at sub-watershed and community levels and at the state level by project year 2	2.Recommendations for land use policies based on explanatory model for land use decisions, are known and validated by at least 80% of key project stakeholders	1.Report of research team identifying factors influencing land use decisions of land owners, *ejidatarios* and *comuneros* *2a.* Brochure containing recommendations on land use policies 2b.Reports of workshops validating recommendations for land use policies	

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Output 1.5: Lessons learned about the impact of hurricanes Mitch (1998) and Stan (2005) on land use and water balances	1. N° of compiled & synthesized studies on the impacts of and lessons learned from hurricanes Stan (2005), Mitch and Javier (both in 1998) on land use and water balances in the Sierra Madre de Chiapas	1.None - a broad compilation and systematic analysis of lessons learned about the direct and indirect impacts of hurricanes Stan (2005), Mitch and Javier (both in 1998) on land use and water balances is still not available	1.Results of existing studies about direct and indirect impacts of hurricanes Stan (2005), Mitch and Javier (both in 1998) on land use practices and water balances compiled and synthesized at end of year 1; report of lessons learned published during year 2	1.Three events to present lessons learned from synthesizing studies about impacts of hurricanes Stan (2005), Mitch and Javier (both in 1998) implemented during years 2 + 3	1.Report of lessons learned from synthesizing studies about impacts of hurricanes Stan (2005), Mitch and Javier (both in 1998)	
Project strategy	**Objectively verifiable indicators** **Indicators**	**Baseline**	**Mid-term-target at end of 1st or 2nd year (accumulated)**	**End of project target (accumulated)**	**Sources of verification**	**Assumptions**
Component 2: Mainstreaming ecosystem services and biodiversity into land use policies, planning and promotion by watershed committees and policy coordination with other key government agencies						
Outcome of component 2: Ecosystem services and biodiversity considerations are mainstreamed into land use policies, planning and promotion by WSC and policies are coordinated with other key government agencies, resulting in improved status of key BD & ES indicator in target sub-watersheds (as measured under output 1.3)	1.N° of target WSC that have systematically integrated ES and BD considerations into their land use policies and planning 2. N° of other key institutions that have adopted project recommendations for integrating ES and BD considerations into their policies 3. N° of WSC implementing coordinated plans with	1.ES/BD concerns are not systematically integrated into most WSC policies or projects. Detailed baseline information will be provided by output 1.2 2. None 3. Most WSC have no coordinated plans for	1.At end of 1st year, 5 WSC; at end of 2nd year, 7 WSC have systematically integrated ES and BD considerations into their policies 2. Five key stakeholder institutions have validated & adopted recommendations for integrating ES& BD considerations into their policies by project year 2 3. At end of 1st year, 3 WSC; at end of 2nd year, 5 WSC	1. Nine WSC have explicitly integrated ES and BD considerations into their projects and activities 2. At least 8 key stakeholder institutions have validated& adopted recommendations for integrating ES& BD considerations into their policies 3. At least 7 & 8 WSC implement coordinated plans to	1.Minutes of WSC sessions Reports of WSC managers 2. Formal communication of stakeholder institutions to GESE (State Working Group of ES) validating recommendations 3. Inter-institutional plans to coordinate	CONAGUA and municipalities corroborate their willingness to strengthen WSC, increasing and stabilizing provision of WSC with human and material resources; giving more continuity to WSC management staff beyond 3-year period of municipal administrations, etc. Participation of key stakeholders, especially land users´ representatives, in WSC sessions becomes more regular.

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	other institutions to introduce or reinforce sustainable production practices (SPP) and restoration & soil conservation activities (RSCA) 4. Improved status of key BD/ES indicators in these watersheds (as monitored by output 1.3)	introducing SPP or RSCA. Quantitative baseline information on no. of coordinated plans will be provided by output 1.2 4. Baseline information on status of key BD and ES indicators provided by output 1.2	have coordinated plans to introduce or reinforce each of SPP & RSCA 4. Initial improvements in status of key BD and ES indicators (as per output 1.2 footnote) by end of year 2	introduce or reinforce SPP and RSCA, respectively 4. Status of key indicator species and improvements in health of aquatic and terrestrial ecosystems reach target levels (see output 1.2 footnote) by end of year 3	introduction and reinforcement of SPP and RSCA in sub-watersheds 4. Monitoring studies under output 1.3 (for indicator status)	Key government agencies and NGOs are disposed to implement and co-finance coordinated projects with WSC to introduce or reinforce SPP and RSCA; they are also open for integrating ES and BD considerations of global and local significance into their policies.
Output 2.1 Training programs for key WSC members, other policy-makers, extension agents and land users on mainstreaming ES & BD considerations into natural resources management policies and plans at the sub-watershed level (coordinated by a watershed committee capacity building officer)	1. N° of training manuals adapted to the capacity building needs and demands of watershed committee members and staff, other policy-makers and land users 2. N° of training events and n° of trained members of stakeholder institutions 3. N° of backstopping visits of capacity building advisor and other specialists to watershed committee meetings to help integrating ES and BD considerations into sub-watershed plans and activities	1. Most training materials do not address adequately the needs and demands of stakeholders in sub-watershed policies and management 2. Baseline information will be provided by output 1.2 3. Backstopping of watershed committees by some institutions has helped strengthen them, but is not implemented regularly	1. One training manual is produced at the end of 1st year, 3 (total) by the end of 2nd year 2. Five one- and 3 two-day training courses during 1st year; 12 one- and 7 two-day training courses at end of 2nd year with an average of 20 participants have been implemented 3. 40 backstopping visits to watershed committee meetings in 1st year; 90 by end of 2nd year	1.Three training manuals, adapted to specific needs of different target groups, have been produced 2. Twenty one-day and 10 two- day training courses for different target groups with an average of 20 participants have been implemented 3. 150 backstopping visits to watershed committee meetings in all target sub-watersheds at end of 3rd year	Manuals 2. Reports of training events; quarterly and annual reports of Capacity Building Advisor 3. Annual reports of Capacity Building Advisor	

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Output 2.2: Sustainable production practices (SPP) in agriculture, livestock farming and forestry that conserve ES and BD are introduced and/or strengthened in at least seven sub-watersheds, improving the status of key BD and ES indicators (as measured under output 1.3)	1. N° of, and hectares covered by, new or existing land user initiatives to introduce SPP that conserve BD and ES	1.Baseline information on existing SPP initiatives will be provided by output 1.2	1.At end of 1st year, at least 60; at end of 2nd year, at least 100 SPP initiatives covering at least 7 sub-watersheds	1.At least 150 SPP initiatives covering 12,000 hectares	1.Files on local SPP projects kept by WSC and project management	
	2. N° of land users participating in initiatives to introduce or strengthen SPP	2. Baseline information on No. of land users participating in SPP initiatives will be provided by output 1.2	2. At end of 1st year, 900; at end of 2nd year, 1,500 land users participating	2. 2,000 land users having introduced or strengthened SPP	2. Files on local SPP projects kept by WSC and project management	
	3. N° of extensionists trained to give technical assistance to land users to introduce or strengthen SPP	3. Baseline information on number of extensionists trained to support SPP will be provided by output 1.2	3. At end of 1st year, 50; 2nd year, 80 extensionists trained	3. 100 extensionists trained to give technical assistance on SPP to land users	3. Quarterly and annual reports of Capacity Building Officer	
	4. N° of land users receiving training and in-the-field technical assistance for SPP in target sub-watersheds	4. Baseline information will be provided by output 1.2	4. At end of 1st year, 350; 2nd year, 1,200 land users trained to introduce or strengthen SPP	4. 1,500 land users trained to introduce or strengthen SPP	4. Quarterly and annual reports of Capacity Building Officer	
	5. Improvements in status of key BD and ES indicators in areas where SPP are introduced	5. Baseline information on status of key BD and ES indicators will be provided by output 1.2	5. Initial improvements in status of key BD and ES indicators by end of year 2	5. Status of key indicator species and improvements in health of aquatic and terrestrial ecosystems reach target levels (see output 1.2 footnote) by end of year 3	5. Monitoring studies conducted under output 1.3	
Output 2.3: Restoration and soil conservation pilot activities (RSCA) demonstrating approaches that conserve ES and BD are implemented in	1. N° of, and hectares covered by, individual or organized initiatives to introduce RSCA	1.Baseline information will be provided by output 1.2	1.At end of 1st year, at least 80; at end of 2nd year, at least 120 RSCA initiatives	1. At least 150 RSCA initiatives covering 18,000 hectares	1.Files on local RSCA projects kept by WSC and project management	
	2. N° of land users participating in	2. Baseline information will be	2. At end of 1st year, 900; at end of 2nd	2. 2,000 land users introducing or	2. Files on local	

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at least eight sub-watersheds, improving the status of key biodiversity and ecosystem service indicators (as measured under output 1.3)	initiatives to introduce or strengthen RSCA	provided by output 1.2	year, 1,500 land users participating	strengthening RSCA	RSCA projects kept by WSC and project management	
	3. N° of extensionists trained to give technical assistance to land users to introduce or strengthen RSCA	3. Baseline information will be provided by output 1.2	3. At end of 1st year, 50; 2nd year, 80 extensionists trained	3. 100 extensionists trained to give technical assistance on RSCA to land users	3. Quarterly and annual reports of Capacity Building Officer	
	4. N° of land users receiving training and in-the-field technical assistance for RSCA	4. Baseline information will be provided by output 1.2	4. At end of 1st year, 350; 2nd year, 1,200 land users trained to introduce or strengthen RSCA	4. 1,500 land users trained to introduce or strengthen RSCA	4. Quarterly and annual reports of Capacity Building Officer	
	5. Improvements in status of key BD and ES indicators in areas where RSCA are introduced	5. Baseline information on status of key BD and ES indicators will be provided by output 1.2	5. Initial improvements in key BD and ES indicators by end of year 2	5. Status of key indicator species and improvements in health of aquatic and terrestrial ecosystems reach target levels (see output 1.2 footnote) by end of year 3	5. BD and ES indicator monitoring under output 1.3	
Output 2.4: Recommendations developed, communicated and monitored to incorporate ES and BD into sectoral development and restoration policies and regulations of key public and private agencies and to improve coordination among these agencies with regard to the promotion of sustainable land uses at the sub-watershed level	1. Accessible documentation of lessons learned and recommendations for integrating ES and BD considerations into economic development and sector policies and regulations at the sub-watershed level	1. Manual lacking	1. First version of manual elaborated at end of 2nd year	1 Revised version of manual at end of project	1 The manual itself	
	2. N° of institutions involved in ad hoc working group created to analyze and adapt recommendations for integrating ES and BD considerations into their policies	2. None	2. Twelve institutions involved at end of 2nd year	2. Fifteen institutions involved at end of project	2. Minutes of working group sessions	

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	3. System for monitoring improvements in: a) mainstreaming ES and BD considerations in sector policies; b) institutional coordination of sub-watershed management policies and planning	3. System does not exist	3 System established by project year 2	3. System working by project year 3	3 Presentation *brochure* of monitoring system; quarterly and annual reports of monitoring system	
Output 2.5: Increased coverage of actively working watershed committees in the Sierra-Costa region	1. N° and percentage of actively operating watershed committees (WSC) 2.Documentation of best practices, results and benefits of watershed committees	1.Five working WSC in a universe of more than 40 sub-watersheds on both sides of the Sierra Madre 2.Information material of CONAGUA	1.Eight working WSC at end of 2nd year 2.Promotion *brochure* published before end of 2nd year	1.Twelve working WSC at end of 3rd year 2.Promotion *brochure* published	1.Minutes of promotion meetings; constitutive documents of WSC 2.Promotion *brochure*	
Output 2.6: Improved coordination of capacity building activities for watershed committees, land users and other stakeholders in the project region	1. N° of institutions involved in coordinated capacity building activities for watershed committees, land users and other stakeholders in the project region	1.Training activities for watershed committees, land users and other stakeholders in the project region are dispersed and uncoordinated	1.Four institutions involved in coordinated capacity building activities at end of 1st year; 6 at end of 2nd year	1.Ten institutions involved in coordinated capacity building activities at end of 3rd year	1.Quarterly and annual reports of Capacity Building Advisor	

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Project strategy	Objectively verifiable indicators				Sources of verification	Assumptions
	Indicators	**Baseline**	**Mid-term-target at end of 1st or 2nd year (accumulated)**	**End of project target (accumulated)**		
Component 3: Increasing access by land users to public and private PES mechanisms (carbon, watershed services, biodiversity) to provide funding and incentives for the implementation of land use practices and strategies that conserve ES and BD and improve local livelihoods, (targeting land users and non-government stakeholders)						
Outcome of component 3: Land users have increased access to public and private PES mechanisms (carbon, watershed services, biodiversity) to provide funding and incentives to implement land use practices and strategies that conserve ES and BD and improve local livelihoods (targeting land users and non-government stakeholders) in the Chiapas region	1.Increase in area of land with high priority for ES and globally significant BD whose users access ES payments by a) government-funded and b) market-based programs and implement sustainable land use practices that contribute to improvements in the status of key biodiversity indicators of global significance 2.Improvements in the status of key BD and ES indicators in areas with increased access to public and private PES mechanisms as a result of improved land use practices 3.N° of additional LU (**) in target sub-watersheds with access to government PES programs **men and women 4.N° of additional LU (**) in target sub-watersheds with access	1-5.Baseline information for all outcome indicators of component 3, including status of BD and ES indicators, will be provided by output 1.2	<u>1.Project year 2:</u> Land users on (a) 4,500 / (b) 2,250 hectares of land with high priority for ES and BD access ES payments by a) government-funded and b) market-based PES programs 2.Initial improvements in status of key BD and ES indicators in areas with increased access to PES by end of year 2, as measured under output 1.3 3.300 additional land users*** access government-funded PES programs *** with 15% increase above baseline among women land users 4. 150 additional	<u>1.End of project:</u> Land users on (a) 7,500 / (b) 3,750 hectares of land with high priority for ES and BD access ES payments by a) government-funded and b) market-based PES programs 2.Status of key indicator species and improvements in health of aquatic and terrestrial ecosystems reach target levels (see output 1.2 footnote) by end of year 3 in areas with increased access to PES 3.500 additional land users**** access government-funded PES programs, **** with 30% increase above baseline among women land users 4. 250 additional	1.CONAFOR data on annual results of PSA program Reports from actors marketing BD and ES (carbon and other) credits (Ambio, FONCET, CONAFOR, etc.) 2.Monitoring studies conducted under output 1.3 3.Information from land users' (LU) organizations and supporting actors (NGOs and others)	BD conservation criteria are incorporated explicitly and effectively in the strategies and operational rules of government-funded and market-based PES programs. Government PES programs and funds will be maintained on at least the same level. CONAFOR remains open to proposals to strengthen its PES programs by better targeting risk areas; developing market-based schemes, among other aspects. There is an unexploited potential of buyers on domestic and international markets for ES and SP of the Sierra-Costa region. Initiatives to access PES programs or premium markets for SP that require organized action of

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	to market-based PES programs 5.N° of LU organizations in target sub-watersheds with access to premium markets of sustainable products (SP)		land users*** access market-based PES programs 5. Ten LU organizations have access to premium markets of SP	land users**** access market-based PES programs 5. Fifteen LU organizations have access to premium markets of SP	4-5. Aforementioned reports of CONAFOR, Ambio, FONCET LU organizations	land users can build on minimum levels of social cohesion in target watershed communities.
Output 3.1: Training and technical assistance on preparing projects that qualify for government PES programs that conserve globally significant biodiversity	1.Priority areas in terms of ES and BD conservation for application of CONAFOR's PES mechanism in target sub-watersheds identified 2. N° of land users in PES priority areas of target sub-watersheds comprehensively informed about available public PES mechanisms 3. N° of land users in PES priority areas of target sub-watersheds enabled to prepare and implement CONAFOR PES projects 4. Improvements in the status of key BD and ES indicators in areas where new land users successfully implement CONAFOR PES projects 5. N° of extensionists and providers of professional services (PPS) enabled to develop successful	1.To be defined by the project's fine scale deforestation risk map 2. Land users are very superficially, if at all, informed about available public PES mechanisms 3. Land users are very insufficiently trained to prepare and implement CONAFOR PES projects 4. Baseline information on status of BD and ES indicators will be provided by output 1.2 5. None	1.Priority areas for application of CONAFOR's PES mechanism in target sub-watersheds defined in year 1 2. 120 new land users informed by project year 1; 280 by project year 2 about available public PES mechanisms 3. 50 new land users enabled at end of 1st year; 175 at end of 2nd year 4. Initial improvements in status of key BD and ES indicators in areas where new land users successfully implement CONAFOR PES projects (measured under output 1.3) 5. 20 extensionists	1.Priority areas for application of CONAFOR's PES mechanism in target sub-watersheds defined 2. 360 new land users comprehensively informed about available public PES mechanisms 3. 225 new land users enabled to prepare and implement CONAFOR PES projects 4. Status of key indicator species and improvements in health of aquatic and terrestrial ecosystems reach target levels (see output 1.2 footnote) by end of year 3 in areas where new land users successfully implement CONAFOR PES projects (measured	1.Deforestation risk index map for Sierra Madre and map of priority areas developed by researcher 2. Reports about information workshops presented by training expert 3. Reports about hands-on training courses presented by training expert 4. Monitoring studies conducted under output 1.3 5. Final report	

	carbon project proposals aligned with international criteria		and PPS have obtained at end of 1st year certificate (diploma) enabling them to develop successful carbon project proposals	under output 1.3) 5. 20 extensionists and PPS have obtained certificate (diploma) enabling them to develop successful carbon project proposals	about results of certification process presented by training expert	
Output 3.2: CONAFOR PES program strengthened by: providing data for the selection of high-risk areas in terms of ES and BD conservation; and adding elements for the development of market-based schemes, an incentive-based mechanism for technicians' certification and an integrated approach to sub-watershed management at the community level, thereby enhancing its effectiveness in conserving biodiversity and ecosystem services.	1.High-risk areas for ES and BD conservation in target watersheds identified 2.CONAFOR has improved capacity to link PES beneficiaries in areas of high BD & ES value to ES buyers 3.Existence of incentive-based scheme for certification of ProArbol technical advisors where the quality of projects they develop is reflected in their certification by CONAFOR 4. CONAFOR PES program uses an integrated approach to sub-watershed management at the community level in order to promote the	1.Information on high-risk areas for ES and BD conservation is incomplete and unsystematic 2. ProArbol evaluations have generated proposals to strengthen CONAFOR operational rules but not succeeded in improving beneficiary access to PES markets after the CONAFOR PES 5-yr period 3. None 4. CONAFOR PES program is not linked to other sustainable production or conservation projects	1.Map of high-risk areas for ES and BD conservation ready at end of 1st year 2.Strategic plan and proposal to modify operational rules to guide CONAFOR on linking PES beneficiaries to ES buyers developed and socialized at end of 2nd year 3. Incentive-based scheme for the certification of ProArbol technical advisors developed at end of 2nd year 4. Proposal to strengthen the CONAFOR PES program by introducing a more integrated approach to sub-watershed	1.Map of high-risk areas for ES and BD conservation updated 2. CONAFOR is considering a strategic plan and proposal for modified operational rules to link PES beneficiaries to ES buyers 3. Incentive-based scheme for the certification of ProArbol technical advisors is in use (or "has been approved") by CONAFOR 4. CONAFOR adopts proposal to strengthen its PES program by introducing a more integrated approach to sub-watershed	1.Map of high-risk areas for ES and BD conservation in target WSC 2.Document on strategic plan and proposal 2. Report on process of developing proposal and final workshop with CONAFOR officials at the federal level 3. Incentive-based scheme document 3. Report on incentive scheme; final workshop with CONAFOR officials at the federal level 4. Document presenting integrated sub-watershed management approach	

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	sustainability of interventions to conserve BD and ES		management at the community level developed at end of 2nd year	management at the community level		
Output 3.3: Market feasibility studies and marketing plans for market-based PES mechanisms and sustainable products (premium markets) that, by definition, conserve BD and ES	1. N° of cost-benefit analyses of market-based PES mechanisms and new sustainable production practices that, by definition, conserve BD and ES to be promoted by project available	1. Cost-benefit analyses are not available for target sub-watersheds	1.Nine cost-benefit analyses are available at end of 1st year (3 of market-based PES mechanisms and 6 of SPP that conserve BD and ES)	1.Nine cost-benefit analyses are available (3 of market-based PES mechanisms and 6 of SPP that conserve BD and ES)	1.Analyses themselves and report of specialist who elaborated analyses	
	2.N° of market feasibility studies for market-based PES mechanisms	2.Market feasibility studies for market-based PES mecha-nisms are not available for target sub-watersheds	2.Two market feasibility studies for market-based PES mechanisms available at end of year 2	2.three market feasibility studies for market-based PES mechanisms available at end of project	2.Studies themselves and reports of specialists	
	3.N° of market feasibility studies for sustainable products	3.None	3. Two market feasibility studies for SP of target sub-watersheds available at end of 1st year; 6 at end of 2nd year	3. Eight market feasibility studies for sustain-able products of pilot sub-watersheds available at end of project	3.Studies themselves and reports of specialists	
	4.N° of marketing plans for market-based PES mechanisms	4.Marketing plans for market-based PES mechanisms are not available for target sub-watersheds	4. One marketing plan for market-based PES mechanisms available at end of 1st year; 3 at end of 2nd year	4. Three marketing plans for market-based PES mechanisms available at end of project	4.Studies themselves and reports of specialists	
	5. N° of marketing plans for sustainable products	5. None	5. Four marketing plans for sustainable products of target sub-watersheds available at mid of 2nd year	5. Six marketing plans for sustainable products of target sub-watersheds available at mid of 3rd year	5. Studies themselves and reports of specialists	

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Output 3.4: Increased capacity to implement marketing plans for different market-based PES mechanisms and sustainable products is built among land users and their organizations, as well as among actors supporting them (NGOs, extension agents, technical advisors), and the area under certified production increases, with improvements in BD/ES indicator status	1. N° of manuals produced for accessing market-based PES mechanisms and premium markets for sustainable products from target sub-watersheds	1.Several actors have produced manuals for accessing market-based PES mechanisms and premium markets for SP from target sub-waters	1.Seven manuals produced at end of 2nd year	1.Ten manuals produced at end of project	Manuals	
	2.N° of workshops conducted and participants trained in target sub-watersheds for accessing market-based PES mechanisms and premium markets for sustainable products	2.None	2. Seven workshops and 175 trainees at end of 1st year; 21 workshops and 525 trainees at end of 2nd year	2.Thirty workshops and 750 trainees at end of project	2. Workshop reports; annual reports of Capacity Building Advisor	
	3.N° of land users' organizations of 1st and 2nd degree assisted by project to access market-based PES mechanisms and premium markets	3.None	3.Twelve land user organizations assisted to access market-based PES mechanisms and premium markets at end of 2nd year	3.Fifteen land user organizations assisted to access market-based PES mechanisms and premium markets	Annual reports of Capacity Building Advisor	
	4.N° of new partnerships (contracts) with buyers of PES instruments	4. Baseline information will be provided by output 1.2	4.Three new partnerships (contracts) with buyers of PES instruments at end of 2nd year	4. Five new partnerships (contracts) with buyers of PES instruments at end of project	4. Written agreements (contracts) with partners	
	5.N° of new partnerships (contracts) with buyers of sustainable products	5. None	5. Ten new partnerships (contracts) with buyers of sustainable products at end of 2nd year	5.Fifteen new partnerships (contracts) with buyers of sustainable products at end of project	5. Written agreements (contracts) with partners	
Output 3.4 (cont.): Increased capacity to implement marketing plans for different market-based	6. N° of trade fairs in Mexico and abroad attended by land users and actors supporting them during project life	6. None	6. Five trade fairs attended by land users and actors supporting them (3 in Mexico, 2	6. Eight trade fairs attended by land users and actors supporting them (5 in Mexico, 3	6. Reports and conclusions about visits to trade fairs; notes on new contacts with	

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PES mechanisms and sustainable products is built among land users and their organizations, as well as among actors supporting them ((NGOs, extension agents, technical advisors), and the area under certified production increases, with improvements in BD/ES indicator status			abroad) at end of 2nd year	abroad)	potential partners (buyers)	
	7. N° of certified land users /organizations that are certified in organic, eco-friendly or fair trade production (in process or established)	7. Baseline information will be provided by output 1.2	7. 250 new certified land users / 3 new organizations at end of year 2	7. 400 new certified land users / 5 new organizations at end of project	7. Certificates of organic, eco-friendly or fair trade products	
	8. N° of hectares of land under certified production (in process or established)	8. Baseline information will be provided by output 1.2	8. 2,000 new hectares under certified production at end of 2nd year	8. 3,200 new hectares under certified production at end of project	8. Annual reports of Capacity Building Officer	
	9. Improvements in the status of BD and ES indicators on land under certified production	9. Baseline to be established under output 1.2	9. Initial improvements in status of BD and ES indicators in newly certified production areas	9. Status of key indicator species & improvements in health of aquatic and terrestrial ecosystems reach target levels (see output 1.2 footnote) by end of year 3 in newly certified production areas	9. Monitoring studies conducted under output 1.3	
	10. Increase in capital for financing the collection and distribution (*acopio*) of sustainable products managed by land users' organizations	10. None	10. US-$300,000 new funds for financing the collection (*acopio*) of sustainable products managed by land users' organizations at end of 2nd year	10. US-$ 500,000 new funds for financing the collection (*acopio*) of sustainable products managed by land users' organizations at end of project	10. Report of specialist contracted to design and help implement financing strategy of land users' organizations	

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ACTIVITIES
Component 1: Development of the knowledge base for ES appraisal and their interaction with land uses among key stakeholders at the sub-watershed level
Outcome of component 1: Increased understanding (by monitoring institutions) of the relationships between land uses and BD/ES as a result of sub-watershed scale monitoring of: a) the status of important ES and BD components and their indicators in the project area; b) the interdependence of land use patterns & policies and ES/BD status; c) ES benefits provided by different land use systems under varying levels of intensity; d) factors influencing land use decisions by land users.
Output 1.1: Methods, tools and protocols for assessment and monitoring of ES, BD, and land use data and policies, for use by watershed committees, other key government agencies, NGO partners and universities
1.1.1 Develop standardized methodology across project region for assessment and monitoring of BD and ES - focusing on water quality and carbon - , as well as their interdependence with land use patterns and activities; this includes adaptation of existing tools and protocols for monitoring water quality, biodiversity and other key indicators, both from existing pilot programs in the project region (e.g. Coapa sub-watershed) and from monitoring efforts in Mexico and other countries, to specific needs and conditions of sub-watersheds in the project region
1.1.2 Define relative roles of all actors involved in monitoring processes and propose a mechanism to ensure regular coordination among them
1.1.3 Train actors involved in the monitoring process (communities, watershed committees, government agencies, universities) in using tools and protocols for assessment and monitoring of selected BD and ES indicators and their inter-relationships with land use patterns and decisions at the sub-watershed level
Output 1.2: Baseline gaps addressed and project baseline information (database, maps) on key indicators completed
1.2.1 Gather information to fill gaps in baseline data on key indicators, by sub-watersheds across project region, including a system of biological indicators of water quality
1.2.2 Produce maps representing the baseline status and dynamics of key indicators, including baseline mapping of biological indicators that would allow future water quality monitoring at little cost and through a network of non-specialists
Output 1.3: Increased local research and publications on status, dynamics and benefits of ecosystem services and interrelationships between land use, ES (especially water quality), biodiversity and livelihoods across sub-watersheds (documentation of results from pilot monitoring activities in 10 sub-watersheds)
1.3.1 Update database and maps representing status and dynamics (tendencies) of key indicators and their correlations over the course of the project to reflect results of pilot monitoring activities
1.3.2 Identify and document benefits from ES in the target sub-watersheds (using the categories of the Millennium Ecosystem Assessment 2003: regulation, provision, cultural values, support)

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1.3.3 Evaluate and classify the interrelationships between land use and ES/BD, including (among others): - the impacts of land use systems (type and density of vegetation, diversity and complexity of forest cover, pastures and industrial systems) on water quantity and quality; - the impacts of coffee and livestock production systems of varying gradients and intensities (conventional vs. organic production practices) on carbon, water and BD indicators, and on profitability; - the impacts of water quality conditions on key biodiversity indicators; - interaction between land use, ES/BD and livelihoods (including gender aspects).
1.3.4 Edit and publish information and analysis gathered under activities 1.3.1 – 1.3.3 in an illustrative way, useful for watershed committee managers, community extensionists, technical advisors, land users, as well as other key stakeholders
Output 1.4: Identification of factors influencing individual and collective land use decisions by land owners, *ejidatarios* and *comuneros*
1.4.1 Systematize existing and conduct additional research on factors that influence land use decisions
1.4.2 Based on analysis of factors influencing land use decisions, develop recommendations for land use policies, planning, training and promotion programs implemented by watershed committees and other government agencies
Output 1.5: Lessons learned about the impact of hurricanes Mitch (1998) and Stan (2005) on land use and water balances
1.5.1 Compile and synthesize results of existing studies about direct and indirect impacts of hurricanes Mitch (and following hurricanes around September 1998) and Stan (2005) on land use practices and water balances, relating impacts to land use patterns and previous land use changes (deforestation and others)
Component 2: Mainstreaming ecosystem services and biodiversity into land use policies, planning and promotion by watershed committees and policy coordination with other key government agencies
Outcome 2: Ecosystem services and biodiversity considerations are mainstreamed into land use policies, planning and promotion by WSC and policies coordinated with other key government agencies, resulting in improved status of key BD & ES indicator in target sub-watersheds (as measured under output 1.3)
Output 2.1 Training programmes for key WSC members, other policy-makers, extensionists and land users on mainstreaming ES & BD considerations into natural resources management policies and plans at the sub-watershed level (coordinated by a watershed committee capacity building officer)
2.1.1 Help adapt and improve offer relative to capacity building needs and demand of watershed committee members and extensionists, policy-makers and officials from other key government agencies to use knowledge about ES and BD values, their interaction with land uses and methods and tools to incorporate ES and BD considerations in land use and natural resource management policies and planning
2.1.2 Develop special training modules, materials and decision-making tools (including participatory methods to engage land users in sub-watershed planning)
2.1.3 Provide training and on-the-job back-stopping for watershed committee members, extensionists, land users and officials from other key government agencies
Output 2.2: Sustainable production practices (SPP) in agriculture, livestock farming and forestry that conserve ES and BD are introduced and/or strengthened in at least seven sub-watersheds, improving the conservation status of key BD and ES indicators (as measured under output 1.3)
2.2.1 Watershed committees and other governmental and non-governmental agencies design coordinated inter-agency plans to promote and assist financing of ES and BD friendly production practices in agriculture, livestock farming and forestry in at least seven sub-watersheds with a total of up to 12,000 hectares
2.2.2 Competent institutions provide training to staff of the watershed committee extension services and other cooperating governmental and non-governmental agencies, to promote and provide technical assistance for ES and BD friendly production practices in agriculture (coffee, cocoa), livestock farming (cattle) and

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forestry (xate palm, timber)
2.2.3 Extension staff that have received training under activity 2.2.2 provide technical assistance to land users in adopting sustainable agricultural, livestock and forestry practices *(this activity is coordinated with activity 3.4.2: Conduct training activities and technical assistance to build capacity of land users and supporting actors to implement marketing plans for market based PES mechanisms and sustainable products).*
Output 2.3: Restoration and soil conservation pilot activities (RSCA) demonstrating approaches that conserve ES and BD are implemented in at least eight sub-watersheds, improving the conservation status of key biodiversity and ecosystem service indicators (as measured under output 1.3)
2.3.1 Watershed committees and other governmental (COFOSECH, CONANP) and non-governmental agencies design coordinated inter-agency plans to implement pilot activities for reforestation, soil conservation and ecosystem restoration (including pilot restoration of riparian forests targeting areas that were hit by hurricane Stan)
2.3.2 Extension services of watershed committees and of other cooperating government and non-government agencies are trained to promote and assist pilot activities for reforestation, soil conservation and ecosystem restoration
2.3.3 Extensionists trained under activity 2.3.2 promote pilot reforestation, soil conservation and ecosystem restoration activities that conserve ES and BD on up to 18,000 ha in at least 8 sub-watersheds; pilot activities within a sub-set of this area will incorporate ES and BD conservation practices into restoration of riparian forests in areas affected by hurricane Stan
Output 2.4: Recommendations developed, communicated and monitored to incorporate ES and BD into sectoral development and restoration policies and regulations of key government, non-government and public-private agencies and to improve coordination among these agencies with regard to the promotion of sustainable land uses at the sub-watershed level
2.4.1 Systematize pilot experiences in ES and BD friendly production practices and restoration activities (of project and elsewhere), identifying lessons learned and best practices, and develop specific recommendations for integrating ES and BD considerations into mainstream economic development and sector policies and regulations and for improving institutional coordination
2.4.2 Communicate by different means (workshops, manuals, inter-institutional working groups etc.) lessons learned, best practices and policy recommendations derived from above-mentioned pilot activities to key government, non-government and public-private agencies in the region (like CONAFOR, COFOSECH, CONAGUA, SECAM, CMDRS, COPLADEM, and others) to incorporate ES and BD considerations into their standard development and restoration policies, programs, plans and regulations
2.4.3 Establish system to monitor improvements in: a) mainstreaming ES and BD considerations in sector policies and regulations; b) institutional coordination of sub-watershed management policies and planning
Output 2.5: Increased coverage of working watershed committees in the Sierra-Costa region
2.5.1 Analyze best practices and benefits of watershed committees and publish results for promoting the establishment of new watershed committees
2.5.2 Assist formation and strengthening of committees in sub-watersheds of the Sierra Madre of Chiapas where they still not exist or are inactive
Output 2.6: Improved coordination of capacity building activities for watershed committees, land users and other stakeholders in the project region
Component 3: Increasing access by land users to public and private PES mechanisms (carbon, watershed services, biodiversity) to provide funding and incentives for the implementation of land use practices and strategies that conserve ES and BD and improve local livelihoods, (targeting land users and non-government stakeholders)
Outcomes of component 3:

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Outcome of component 3: Land users have increased access to public and private PES mechanisms (carbon, watershed services, biodiversity) to provide funding and incentives to implement land use practices and strategies that conserve ES and BD and improve local livelihoods (targeting land users and non-government stakeholders) in the Chiapas region
Output 3.1: Training and technical assistance on preparing projects that qualify for government PES programs that conserve globally significant biodiversity
3.1.1 Carry out training events at different locations reaching land users in PES priority areas of target sub-watersheds to inform them about available public PES mechanisms in the Sierra-Costa region of Chiapas
3.1.2 Provide improved technical assistance to land users, extensionists, providers of professional services and officials of key stakeholder institutions (CONAGUA, CONANP, COFOSECH, SAGARPA, SECAM etc.) for preparing, negotiating, implementing and monitoring projects in priority areas that qualify for government-funded PES programs
Output 3.2: CONAFOR PES program strengthened by providing data for the selection of high-risk areas in terms of ES and BD conservation, the development of market-based schemes, an incentive-based mechanism for technicians' certification and an integrated approach to sub-watershed management at the community level, thereby enhancing its effectiveness in conserving biodiversity and ecosystem services.
3.2.1 Develop a mechanism to expand CONAFOR's capacity to link those communities about to complete the 5-year period of PES to ES buyers
3.2.2 Develop an incentive-based scheme for the certification of ProArbol technical advisors where the quality of the projects developed by them is reflected on their certification by CONAFOR
3.2.3 Develop a proposal to strengthen the CONAFOR PES program by introducing a more integrated approach to sub-watershed management at the community level
Output 3.3: Market feasibility studies and marketing plans for market-based PES mechanisms and sustainable products (premium markets) that, by definition, conserve BD and ES
3.3.1 Carry out cost-benefit analysis of market-based PES mechanisms and new sustainable production practices to be promoted by project to ensure that they bring in the medium term increased income to land users
3.3.2 Carry out market studies for market-based PES mechanisms and sustainable production practices that are currently or potentially viable for land users in the Sierra-Costa region of Chiapas, differentiating between locations at upper, middle and lower sub-watershed levels *(the studies will consider new mechanisms, such as the sale of carbon credits for conversion from traditional to sustainable pasture practices or for treatment of wastewater from coffee production, that would complement CONAFOR's PSA program, the sale of biodiversity credits and others)*
3.3.3 Develop marketing plans for the market-based PES mechanisms and sustainable products identified under activities 2.2.1 and 3.3.2 as most promising for the sub-watersheds in the project region
Output 3.4: Increased capacity to implement marketing plans for different market-based PES mechanisms and sustainable products is built among land users and their organizations, as well as among actors supporting them ((NGOs, extension agents, technical advisors), and the area under certified production increases, with improvements in BD/ES indicator status
3.4.1 Prepare training modules and manuals for capacity building activities to support implementation of marketing plans (these training materials will include the market feasibility studies and marketing plans produced under 3.3.2 and 3.3.3, which will serve as decision support tools that can be used by extensionists, technical advisors, NGOs, etc. in training land users)
3.4.2 Conduct training activities and technical assistance to build capacity of land users and supporting actors to implement marketing plans for market based PES mechanisms and sustainable products *(training in accessing premium markets for environmentally friendly products is coordinated with technical assistance for sustainable production practices in activity 2.2.3)*

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3.4.3 Strengthen existing, and promote creation of new, alliances among land users and between land users and actors supporting them (NGOs, government agencies) to facilitate their access to market-based PES mechanisms and premium markets
3.4.4 Assist land users to obtain financing for marketing costs of sustainable products

APPENDIX 5: WORKPLAN AND TIMETABLE

Project: Mainstreaming the conservation of ecosystem services and biodiversity at the sub-watershed scale in Chiapas, Mexico

Component 1:
Development of the knowledge base for ES appraisal and their interaction with land uses among key stakeholders at the sub-watershed level

Outcome of component 1:

Increased understanding (by monitoring institutions) of the relationships between land uses and BD/ES as a result of sub-watershed scale monitoring of:

a) the status of important ES and BD components and their indicators in the project area;

b) the interdependence of land use patterns & policies and ES/BD status;

c) ES benefits provided by different land use systems under varying levels of intensity;

d) factors influencing land use decisions by land users.

Output 1.1: Methods, tools and protocols for assessment and monitoring of ES, BD, and land use data and policies, for use by watershed committees, other key government agencies, NGO partners and universities

Activities	Year 1				Year 2				Year 3			
	1	2	3	4	1	2	3	4	1	2	3	4
1.1.1 Develop standardized methodology across project region for assessment and monitoring of BD and ES - focusing on water quality and carbon - , as well as their interdependence with land use patterns and activities												
1.1.2 Define relative roles of all actors involved in monitoring processes and propose a mechanism to ensure regular coordination among them												
1.1.3 Train actors involved in the monitoring process (communities, watershed committees, government agencies, universities) in using tools and protocols for assessment and monitoring of selected BD and ES indicators and their inter-relationships with land use patterns and decisions at the watershed level												
Output 1.2: Baseline gaps addressed and project baseline information (database, maps) on key indicators completed												
1.2.1 Gather information to fill gaps in baseline data on key indicators, by watershed across project region, including a system of biological indicators of water quality												
1.2.2 Produce maps representing the baseline status and dynamics of key indicators, including baseline mapping of biological indicators that would allow future water quality monitoring at little cost and through a network of non-specialists												
Output 1.3: Increased local research and publications on status, dynamics and benefits of ecosystem services and interrelationships between land use, ES (especially water quality), biodiversity and livelihoods (including gender aspects) across sub-watersheds												

APPENDIX 5: WORKPLAN AND TIMETABLE

1.3.1 Update database and maps representing status and dynamics (tendencies) of key indicators and their correlations over the course of the project to reflect results of pilot monitoring activities												
1.3.2 Identify and document benefits from ES in the target sub-watersheds (using the categories of the Millennium Ecosystem Assessment 2003: regulation, provision, cultural values, support)												
1.3.3 Evaluate and classify the interrelationships between land use and ES/BD												
1.3.4 Edit and publish information and analysis gathered under activities 1.3.1 – 1.3.3 in an illustrative way, useful for watershed committee managers, community extensionists, technical advisors, land users, as well as other key stakeholders												
Output 1.4: Identification of factors influencing individual and collective land use decisions by land owners, *ejidatarios* and *comuneros*												
1.4.1 Systematize existing and conduct additional research on factors that influence land use decisions												
1.4.2 Based on analysis of factors influencing land use decisions, develop recommendations for land use policies, planning, training and promotion programs implemented by watershed committees and other government agencies												
Output 1.5: Lessons learned about the impact of hurricanes Mitch (1998) and Stan (2005) on land use and water balances												
1.5.1 Compile and synthesize results of existing studies about direct and indirect impacts of hurricanes Mitch (and following hurricanes around September 1998) and Stan (2005) on land use practices and water balances, relating impacts to land use patterns and previous land use changes (deforestation and others)												

APPENDIX 5: WORKPLAN AND TIMETABLE

Project: Mainstreaming the conservation of ecosystem services and biodiversity at the sub-watershed scale in Chiapas, Mexico

Component 2: **Mainstreaming ecosystem services and biodiversity into land use policies, planning and promotion by watershed committees and policy coordination with other key government agencies**												
Outcome of component 2: Ecosystem services and biodiversity considerations are mainstreamed into land use policies, planning and promotion by WSC and policies coordinated with other key government agencies, resulting in improved status of key BD & ES indicators in target sub-watersheds (as measured under output 1.3)												
Output 2.1: Training programmes for key WSC members, other policy-makers, extensionists and land users on mainstreaming ES & BD considerations into natural resources management policies and plans at the sub-watershed level (coordinated by a watershed committee capacity building officer)												
Activities	**Year 1**				**Year 2**				**Year 3**			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2.1.1 Help adapt and improve offer relative to capacity building needs and demand of watershed committee members and extensionists, policy-makers and officials from other key government agencies to use knowledge about ES and BD values, their interaction with land uses and methods and tools to incorporate ES and BD considerations in land use and natural resource management policies and planning												
2.1.2 Develop special training modules, materials and decision-making tools (including participatory methods to engage land users in watershed planning)												
2.1.3 Provide training and on-the-job back-stopping for watershed committee members, extensionists, land users and officials from other key government agencies												
Output 2.2: Sustainable production practices (SPP) in agriculture, livestock farming and forestry that conserve ES and BD are introduced and/or strengthened in at least seven sub-watersheds, improving the conservation status of key BD and ES indicators (as measured under output 1.3)												
2.2.1 Watershed committees and other governmental and non-governmental agencies design coordinated inter-agency plans to promote and assist financing of ES and BD friendly production practices in agriculture, livestock farming and forestry in at least seven sub-watersheds with a total of up to 12,000 hectares												
2.2.2 Competent institutions provide training to staff of the watershed committee extension services and other cooperating governmental and non-governmental agencies, to promote and provide technical assistance for ES and BD friendly production practices in agriculture (coffee, cocoa), livestock farming (cattle) and forestry (xate palm, timber)												

APPENDIX 5: WORKPLAN AND TIMETABLE

2.2.3 Extension staff that have received training under activity 2.2.2 provide technical assistance to land users in adopting sustainable agricultural, livestock and forestry practices *(this activity is coordinated with activity 3.4.2: Conduct training activities and technical assistance to build capacity of land users and supporting actors to implement marketing plans for market based PES mechanisms and sustainable products).*												
Output 2.3: Restoration and soil conservation pilot activities (RSCA) demonstrating approaches that conserve ES and BD are implemented in at least eight sub-watersheds, improving the conservation status of key biodiversity and ecosystem service indicators (as measured under output 1.3)												
2.3.1 Watershed committees and other governmental (COFOSECH, CONANP) and non-governmental agencies design coordinated inter-agency plans to implement pilot activities for reforestation, soil conservation and ecosystem restoration (including pilot restoration of riparian forests targeting areas that were hit by hurricane Stan)												
2.3.2 Extension services of watershed committees and of other cooperating government and non-government agencies are trained to promote and assist pilot activities for reforestation, soil conservation and ecosystem restoration												
2.3.3 Extensionists trained under activity 2.3.2 promote pilot reforestation, soil conservation and ecosystem restoration activities that conserve ES and BD on up to 18,000 ha in at least 8 sub-watersheds; pilot activities within a sub-set of this area will incorporate ES and BD conservation practices into restoration of riparian forests in areas affected by hurricane Stan												
Output 2.4: Recommendations developed, communicated and monitored to incorporate ES and BD into sectoral development and restoration policies and regulations of key government, non-government and public-private agencies and to improve coordination among these agencies with regard to the promotion of sustainable land uses at the sub-watershed level												
2.4.1 Systematize pilot experiences in ES and BD friendly production practices and restoration activities (of project and elsewhere), identifying lessons learned and best practices, and develop specific recommendations for integrating ES and BD considerations into mainstream economic development and sector policies and regulations and for improving institutional coordination												
2.4.2 Communicate by different means (workshops, manuals, inter-institutional working groups etc.) lessons learned, best practices and policy recommendations derived from above-mentioned pilot activities to key government, non-government and public-private agencies in the region (like CONAFOR, COFOSECH, CONAGUA, SECAM, CMDRS, COPLADEM, and others) to incorporate ES and BD considerations into their standard development and restoration policies, programs, plans and regulations												
2.4.3 Establish system to monitor improvements in: a) mainstreaming ES and BD												

APPENDIX 5: WORKPLAN AND TIMETABLE

considerations in sector policies and regulations; b) institutional coordination of watershed management policies and planning												
Output 2.5: Increased coverage of actively working watershed committees in the Sierra-Costa region												
2.5.1 Analyze best practices and benefits of watershed committees and publish results for promoting the establishment of new watershed committees												
2.5.2 Assist formation and strengthening of committees in sub-watersheds of the Sierra Madre of Chiapas where they still not exist or are inactive												
Output 2.6: Improved coordination of capacity building activities for watershed committees, land users and other stakeholders in the project region												
2.6.1 Coordinate, supervise, facilitate, follow up, and monitor all capacity building activities for watershed committees, land users and other stakeholders in the project region												

APPENDIX 5: WORKPLAN AND TIMETABLE

Project: Mainstreaming the conservation of ecosystem services and biodiversity at the sub-watershed scale in Chiapas, Mexico

Component 3: **Increasing access by land users to public and private PES mechanisms (carbon, watershed services, biodiversity) to provide funding and incentives for the implementation of land use practices and strategies that conserve ES and BD and improve local livelihoods (targeting land users and non-government stakeholders)**												
Outcome of component 3: Land users have increased access to public and private PES mechanisms (carbon, watershed services, biodiversity) to provide funding and incentives to implement land use practices and strategies that conserve ES and BD and improve local livelihoods (targeting land users and non-government stakeholders) in the Chiapas region												
Output 3.1: Training and technical assistance on preparing projects that qualify for government PES programs that conserve globally significant biodiversity												
Activities	**Year 1**				**Year 2**				**Year 3**			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
3.1.1 Carry out events at different locations reaching land users in PES priority areas of target sub-watersheds to inform them about available public PES mechanisms in the Sierra-Costa region of Chiapas												
3.1.2 Provide improved technical assistance to land users, extensionists, providers of professional services and officials of key stakeholder institutions (CONAGUA, CONANP, COFOSECH, SAGARPA, SECAM etc.) for preparing, negotiating, implementing and monitoring projects in priority areas that qualify for government-funded PES programs												
Output 3.2: CONAFOR PES program strengthened by: providing data for the selection of high-risk areas in terms of ES and BD conservation; and adding elements for the development of market-based schemes, an incentive-based mechanism for technicians' certification and an integrated approach to sub-watershed management at the community level, thereby enhancing its effectiveness in conserving biodiversity and ecosystem services.												
3.2.1 Develop a mechanism to expand CONAFOR's capacity to link those communities about to complete the 5-year period of PES to ES buyers												
3.2.2 Develop an incentive-based scheme for the certification of ProArbol technical advisors where the quality of the projects developed by them is reflected on their certification by CONAFOR												
3.2.3 Develop a proposal to strengthen the CONAFOR PES program by introducing a more integrated approach to watershed management at the community level												
Output 3.3: Market feasibility studies and marketing plans for market-based PES mechanisms and sustainable products (premium markets) that, by definition,												

APPENDIX 5: WORKPLAN AND TIMETABLE

conserve BD and ES												
3.3.1 Carry out cost-benefit analysis of market-based PES mechanisms and new sustainable production practices to be promoted by project to ensure that they bring in the medium term increased income to land users												
3.3.2 Carry out market studies for market-based PES mechanisms and sustainable products that are currently or potentially viable for land users in the Sierra-Costa region of Chiapas, differentiating between locations at upper, middle and lower sub-watershed levels *(the studies will consider new mechanisms, such as the sale of carbon credits for conversion from traditional to sustainable pasture practices or for treatment of wastewater from coffee production, that would complement CONAFOR's PSA program, the sale of biodiversity credits and others)*												
3.3.3 Develop marketing plans for the market-based PES mechanisms and sustainable products identified under activities 2.2.1 and 3.3.2 as most promising for the sub-watersheds in the project region												
Output 3.4: Increased capacity to implement marketing plans for different market-based PES mechanisms and sustainable products is built among land users and their organizations, as well as among actors supporting them (NGOs, extension agents, technical advisors), and the area under certified production increases, with improvements in BD/ES indicator status												
3.4.1 Prepare training modules and manuals for capacity building activities to support implementation of marketing plans (these training materials will include the market feasibility studies and marketing plans produced under 3.3.2 and 3.3.3, which will serve as decision support tools that can be used by extensionists, technical advisors, NGOs, etc. in training land users)												
3.4.2 Conduct training activities and technical assistance to build capacity of land users and supporting actors to implement marketing plans for market based PES mechanisms and sustainable products *(training in accessing premium markets for environmentally friendly products is coordinated with technical assistance for sustainable production practices in activity 2.2.3)*												
3.4.3 Strengthen existing, and promote creation of new, alliances among land users and between land users and actors supporting them (NGOs, government agencies) to facilitate their access to market-based PES mechanisms and premium markets												
3.4.4 Assist land users to obtain financing for marketing costs of sustainable products												

APPENDIX 6: KEY DELIVERABLES AND BENCHMARKS

Project: Mainstreaming the conservation of ecosystem services and biodiversity at the sub-watershed scale in Chiapas, Mexico

Component 1: **Development of the knowledge base for ES appraisal and their interaction with land use among key stakeholders at the sub-watershed level**
Output 1.1: Methods, tools and protocols for assessment and monitoring of ES, BD, and land use data and policies, for use by watershed committees, other key government agencies, NGO partners and universities B Development of tools and protocols for standard ES and BD monitoring methodology in the region (year 1, month 9) B Monitoring coordination mechanism established in year 1, month 9 B Training of actors involved in the monitoring process (from year 1, month 9 to year 3, month 3) D Monitoring tools and protocols for standard methodology available in year 1, month 12
Output 1.2: Baseline gaps addressed and project baseline information (database, maps) on key indicators completed B Implementation of baseline studies filling gaps in baseline information on key indicators of water quality, biodiversity and biological integrity, land use patterns and changes and other key indicators (year 1, month 12) B Production of maps representing the baseline status of key indicators (year 1, month 12) D Baseline studies are available in year 1, month 12; maps in year 1, month 12 D One publication about key ES and BD indicators in year 1, month 12; two publications in year 2, month 12
Output 1.3: Increased local research and publications on status, dynamics and benefits of ecosystem services and interrelationships between land use, ES (especially water quality), biodiversity and livelihoods (including gender aspects) across sub-watersheds B Data gathering and processing for updating information on key indicators (from year 1, month 12 to year 3, month 8) B Identification of benefits from ES in the target sub-watersheds (year 1, month 10) B Implementation of research projects about links between land use, ES/BD and livelihoods in the region (from year 1, month 12 to year 3, month 6) D Updated database and maps representing status and dynamics of key indicators and their correlations in 10 sub-watersheds of the Sierra-Costa region (from year 1, month 12 to year 3, month 8) D Documents presenting benefits from ES in target sub-watersheds (year 1, month 12) D Publications about a) results from pilot monitoring; b) benefits from ES; c) links between land use, ES/BD and livelihoods (from year 2, month 9 to year 3, month 6)

APPENDIX 6: KEY DELIVERABLES AND BENCHMARKS

Output 1.4: Identification of factors influencing individual and collective land use decisions by land owners, ejidatarios and comuneros

B Conduct research on factors that influence land use decisions (year 2, month 3)
B Conduct participatory research workshops on factors that influence land use decisions (year 2, month 3)
B Based on analysis of factors influencing land use decisions, development of recommendations for land use policies, planning, training and promotion programmes (year 2, month 7)
B Conduct workshop to revise and validate recommendations for land use policies (year 2, month 8)

D Brochure giving recommendations for land use policies, based on analysis of factors influencing land use decisions (year 2, month 9)

Output 1.5: Lessons learned about the impact of hurricanes Mitch (1998) and Stan (2005) on land use and water balances

B Compilation and synthesis of existing studies about direct and indirect impacts of hurricanes Mitch (1998) and Stan (2005) on land use practices and water balances (year 1, month 12)
B Presentation of lessons learned about the impact of hurricanes Mitch (1998) and Stan (2005) on land use and water balances (year 2, month 6)

D Report of lessons learned published (year 2, month 4)

Component 2:

Mainstreaming ecosystem services and biodiversity into land use policies, planning and promotion by watershed committees and policy coordination with other key government agencies

Output 2.1 Training programmes for key WSC members, other policy-makers, extensionists and land users on mainstreaming ES & BD considerations into natural resources management policies and plans at the sub-watershed level (coordinated by a watershed committee capacity building officer)

B Design training program related to ES and BD values & their interaction with land uses and tools to incorporate ES and BD considerations in land use policies and planning (year 1, month 10)
B Presentation of training programme to project stakeholders (year 2, month 2)
B Development of special training modules, materials and decision-making tools for mainstreaming ES and BD in watershed planning (year 2, month 3)
B Conduct training courses for watershed committee members, staff and extensionists, land users and officials from other key government agencies to help integrate ES and BD considerations into watershed plans and activities (from year 1, month 11 to year 3, month 12)
B Participation of watershed committee staff in relevant training certificate programs that enable them to mainstream ecosystem services and biodiversity considerations into natural resources management policies and plans at the watershed level (from year 2, month 1 to year 3, month 8)
B Implementation of on-the-job back-stopping for watershed committee members, staff and extensionists (from year 1, month 10 to year 3, month 12)

D Leaflet presenting training programme to project stakeholders (year 1, month 12)
D Three training manuals adapted to knowledge gaps, needs and demand of different project stakeholders (watershed committee members and staff, other policy-makers and land users) (year 2, month 3)
D Training certificates for 30 staff members of watershed committees in methods and tools for mainstreaming ecosystem services and biodiversity considerations into natural resources management policies and plans at the watershed level (year 2, month 8 to year 3, month 8)

APPENDIX 6: KEY DELIVERABLES AND BENCHMARKS

Output 2.2: Sustainable production practices (SPP) in agriculture, livestock farming and forestry that conserve ES and BD are introduced and/or strengthened in at least seven sub-watersheds, improving the conservation status of key BD and ES indicators (as measured under output 1.3)

B Identification, selection and planning of projects for ES and BD friendly production practices, including key stakeholders in identification and selection process (from year 1, month 7 to year 3, month 3)
B Design and establishment of a mechanism to assist land users to obtain co-financing for upfront costs of conversion to sustainable production practices (from year 1, month 9 to year 3, month 4)
B Training courses for staff of watershed committee extension services and other cooperating governmental and non-governmental agencies, to promote and provide technical assistance for ES and BD friendly production practices (from year 1, month 8 to year 3, month 6)
B Provision of technical assistance to land users in adopting sustainable agricultural, livestock and forestry practices by extension staff that have received the corresponding training (from year 1, month 10 to year 3, month 12)
B Exchange of experiences between land users about sustainable agricultural, livestock and forestry practices (from year 1, month 11 to year 3, month 12)

D Portfolio of sustainable production projects available year 1, month 9 and updated in year 2 and year 3
D Cash and in-kind contributions from land users, watershed committees, governmental and non-governmental agencies for upfront costs (equipment and other inputs) of sustainable production projects defined in year 1, month 9; year 2, month 6; year 3, month 6

Output 2.3: Restoration and soil conservation pilot activities (RSCA) demonstrating approaches that conserve ES and BD are implemented in at least eight sub-watersheds, improving the conservation status of key biodiversity and ecosystem service indicators (as measured under output 1.3)

B Identification, selection and planning of feasible projects of restoration and soil conservation pilot activities, including key stakeholders in identification and selection process (from year 1, month 5 to year 3, month 4)
B Design and establishment of a mechanism to assist land users to obtain co-financing for costs of restoration and soil conservation pilot activities (from year 1, month 7 to year 3, month 4)
B Training courses for staff of watershed committee extension services and other cooperating governmental and non-governmental agencies, to promote and provide technical assistance for restoration and soil conservation activities (from year 1, month 8 to year 3, month 6)
B Provision of technical assistance to land users for restoration and soil conservation activities by extension staff that have received the corresponding training (from year 1, month 10 to year 3, month 12)
B Exchange of experiences between land users about restoration and soil conservation activities (from year 1, month 11 to year 3, month 12)

D Portfolio of restoration and soil conservation pilot projects available year 1, month 9 and updated in year 2 and year 3
D Cash and in-kind contributions from land users, watershed committees, governmental and non-governmental agencies for upfront costs (equipment and other inputs) of restoration and soil conservation pilot projects defined in year 1, month 9; year 2, month 6; year 3, month 6

APPENDIX 6: KEY DELIVERABLES AND BENCHMARKS

Output 2.4: Recommendations developed, communicated and monitored to incorporate ES and BD into sectoral development and restoration policies and regulations of key government, non-government and public-private agencies and to improve coordination among these agencies with regard to the promotion of sustainable land uses at the sub-watershed level

B Systematization of pilot experiences in sustainable production practices and restoration activities (of project and elsewhere), identifying lessons learned and best practices (year 2, month 3-5; year 3, month 3-5)
B Development of specific recommendations for integrating ES and BD considerations into mainstream economic development and sector policies and regulations and for improving institutional coordination, based on lessons learned from pilot experiences in SPP and RSCA (year 2, month 6; year 3, month 6)
B Communication of lessons learned, best practices and policy recommendations derived from above-mentioned pilot activities to key government, non-government and public-private agencies in the region (year 2, month 6; year 3, month 8)
B Design and establishment of system to monitor improvements in: a) mainstreaming ES and BD considerations in sector policies and regulations; b) institutional coordination of sub-watershed management policies and planning (year 2, month 3 to year 3, month 10)

D Manual presenting lessons learned and recommendations for integrating ES and BD considerations into economic development and sector policies and regulations and for improving institutional coordination (year 2, month 5 and updated year 3, month 5)
D System to monitor improvements in: a) mainstreaming ES and BD considerations in sector policies and regulations; b) institutional coordination of sub-watershed management policies and planning installed year 2, month 11; operation follow-up until year 3, month 11

Output 2.5: Increased coverage of actively working watershed committees in the Sierra-Costa region

B Analysis of best practices and benefits of watershed committees in the Sierra-Costa region and other regions with similar conditions (year 2, month 4)
B Implementation, in coordination with CONAGUA, of a training program for members and staff of new watershed committees (year 2, month 7; year 3, month 9)

D Brochure presenting results of assessing best practices and benefits of watershed committees for promoting the establishment of new watershed committees (year 2, month 5)

Output 2.6: Improved coordination of capacity building activities for watershed committees, land users and other stakeholders in the project region

B Coordination, supervision, facilitation, follow up and monitoring of all capacity building activities for watershed committees, land users and other stakeholders in the project region (from year 1, month 1 to year 3, month 12)

APPENDIX 6: KEY DELIVERABLES AND BENCHMARKS

Component 3:

Increasing access by land users to public and private PES mechanisms (carbon, watershed services, biodiversity) to provide funding and incentives for the implementation of land use practices and strategies that conserve ES and BD and improve local livelihoods (targeting land users and non-government stakeholders)

Output 3.1: Training and technical assistance on preparing projects that qualify for government PES programs that conserve globally significant biodiversity

B Conduct events for land users in PES priority areas of pilot watersheds to inform them about possibilities for accessing public PES mechanisms in the Sierra-Costa region of Chiapas (from year 1, month 7 to year 3, month 6)
B Development of proposal for improving methods and materials of CONAFOR's training courses for service providers and land users (year 1, month 12)
B Implementation of hands-on training courses in target sub-watersheds to develop land users' capacity to prepare, implement and monitor CONAFOR PES projects in priority areas (from year 1, month 10 to year 3, month 9)

D Fine-scale deforestation risk index map for the Sierra Madre developed in year 1, month 10
D Proposal for improving methods and materials of CONAFOR's training courses for service providers and land users (year 1, month 12)
D Extensionists and providers of professional services have obtained certificate (*diploma*) enabling them to develop successful carbon project proposals (year 1, month 12)

Output 3.2: CONAFOR PES program strengthened by: providing data for the selection of high-risk areas in terms of ES and BD conservation; and adding elements for the development of market-based schemes, an incentive-based mechanism for technicians' certification and an integrated approach to sub-watershed management at the community level, thereby enhancing its effectiveness in conserving biodiversity and ecosystem services

B Development and socialization of a strategy to expand CONAFOR's capacity to link communities about to complete the 5-year period of its PSA program to market-based PES schemes (from year 1, month 10 to year 2, month 8)
B Development and presentation of an incentive-based scheme for the certification of ProArbol technical advisors for improving quality of project proposals elaborated by them (from year 2, month 6, to year 2, month 11)
B Development of a proposal to strengthen the CONAFOR PES program by introducing a more integrated approach to sub-watershed management at the community level (year 2, month 12)

D Proposal for a strategy to expand CONAFOR's capacity to link communities about to complete the 5-year period of its PSA program to market-based PES schemes (year 2, month 3) (presentation comes afterwards)
D Incentive-based scheme for the certification of ProArbol technical advisors where the quality of the projects developed by them is reflected on their certification by CONAFOR (year 2, month 8) (presentation comes afterwards)

APPENDIX 6: KEY DELIVERABLES AND BENCHMARKS

Output 3.3: Market feasibility studies and marketing plans for market-based PES mechanisms and sustainable products (premium markets) that, by definition, conserve BD and ES

B Identification of cost-effective market-based PES mechanisms and new sustainable production practices that bring in the medium term increased income to land users (year 1, month 11)
B Conduct market feasibility studies for market-based PES mechanisms and sustainable production practices that are currently or potentially viable for land users in the Sierra-Costa region of Chiapas (year 2, month 2 and year 3, month 2)
B Development of marketing plans for the market-based PES mechanisms and sustainable products identified as most promising for the watersheds in the project region (from year 1, month 11 to year 3, month 5)

D Three market feasibility studies for market-based PES mechanisms (one by year 2, month 2; two by year 3, month 1) and eight for sustainable products (2 by year 1, month 12; 5 by year 2, month 6; 1 by year 3, month 2)
D Three marketing-plans for market-based PES mechanisms (year 2, month 8)
D Six marketing plans for sustainable products (4 by year 2, month 6; 2 by year 3, month 5)

Output 3.4: Increased capacity to implement marketing plans for different market-based PES mechanisms and sustainable products is built among land users and their organizations, as well as among actors supporting them (NGOs, extension agents, technical advisors), and the area under certified production increases, with improvements in BD/ES indicator status

B Preparation of training modules and manuals for capacity building activities to support implementation of marketing plans for different market-based PES mechanisms and sustainable products (year 1, month 10 to year 3, month 4)
B Implementation of training activities and technical assistance to build capacity of land users and supporting actors to implement marketing plans for market based PES mechanisms and sustainable products (year 1, month 12 to year 3, month 11)
B Provision of technical assistance to land users in contacting, negotiating and building partnerships with buyers of PES instruments and sustainable products (year 1, month 10 to year 3, month 12)
B Participation of land users in 8 trade fairs for sustainable products (5 in Mexico, 3 abroad) (until year 3, month 10)
B Provision of technical assistance to land users in pilot projects for certification of sustainable (organic, eco-friendly and fair trade) products (year 2, month 1 to year 3, month 10)
B Technical and financial assistance for promotional and advertisement activities for sustainable products (year 2, month 5 to year 3, month 10)
B Development and implementation of strategy to strengthen existing, and promote creation of new, alliances among land users and between land users and actors supporting them, in initiatives to access market-based PES mechanisms and premium markets (year 1, month 11 to year 3, month 2)
B Provision of training and technical assistance to land users' organizations to manage and maintain funds for collection and storage (*acopio*) of sustainable products (from year 1, month 11 to year 3, month 8)

D Four training modules and manuals for capacity building to implement marketing plans of market-based PES schemes (year 1, month 12; year 2, month 4; year 3, month 4)
D Six training modules and manuals for capacity building to implement marketing plans of sustainable products (year 1, month 11; year 2, month 4; year 3, month 4)
D Documentation on six pilot certification projects available in year 2, month 12 and year 3, month 10

APPENDIX 7: COSTED M&E PLAN

Results-Based Monitoring and Evaluation Framework

Project: Mainstreaming the conservation of ecosystem services and biodiversity at the micro-watershed scale in Chiapas, Mexico

1. Monitoring Framework and Budget [1]

Objective / Outcome [2]	Outcome / objective level indicator[3]	Baseline Conditions[4]	Mid point Target[5] (as relevant)	End of Project Target	Means of Verification[6]	Monitoring / sampling (frequency / size) [7]	Location / Group	Responsibility	Time frame [8]	Budget (Object of expenditure & cost)[9]
Project objective: Biodiversity	The degree to which policies	Baseline information will			System (established by		Target sub-watersheds	Project staff, including in	Y2-Y3	Costs included in project monitoring

[1] Detailed monitoring plan should be included in the M&E project section. This table is primarily intended to reflect how the outcome level indicators will be tracked to facilitate monitoring of **results** (as opposed to monitoring of project implementation progress). The implementation of the Results-based Monitoring Framework will be assessed at mid point and at end of project (through the Mid-Term review and Terminal Evaluation processes). The quality of M&E implementation will be rated with the Project Implementation Review (PIR). The contents of this table should be validated and agreed upon at the project inception meeting.

[2] All project outcomes should be included in this column. The objective here is to provide the means to monitor progress in achieving the results set for the life of the project. Goals and long term impact indicators should not be included in this section, but may be discussed in other sections of the project document and M&E plan.

[3] Only key indicators should be included (not more than 2 or 3 per outcome). Appropriate selection of outcome indicators is essential to assess progress in achieving project results.

[4] Please note that if no baseline information for a particular indicator exists it is difficult to justify the targets. Also, please note that baseline data should be collected during the project preparation phase (PPG). If essential baseline data is not complete at the time of Work Program entry (for FSP) or CEO approval (for MSPs) the end of the first year of project implementation is the deadline for collecting the necessary data. The plan for the collection of such baseline data should be added in the next section along with its associated cost.

[5] The mid point target will be reviewed at the Mid-Term Review along with validation of other focal area Tracking Tools. It is acknowledged that mid-point targets may not be relevant to all projects or all project outcomes. Flexibility will be applied.

[6] The means of verification is the source of data that the project team will use to track the indicator (e.g., if the indicator is "forest cover diversity", the means of verification could be "field surveys data" and "satellite imagery). Reviewing of project reports alone is insufficient.

[7] This column should describe for each indicator the size (e.g., whether entire protected area or only a fraction, or, for example, in the case of a survey, how many people would be covered). The frequency (e.g., once in the lifetime of the project, quarterly during the first year, yearly, etc.)

[8] Expected date (month/year) in which the monitoring activity will take place

[9] For example, 15 satellite images @ $1,000 each = $15,000, or 4 field sampling trips by 2 staff @ $300 each= $1,200

APPENDIX 7: COSTED M&E PLAN

conservation is mainstreamed into natural resource management at the sub-watershed level through integrating ecosystem service considerations in the decision-making in the Sierra-Costa region of Chiapas, Mexico	and regulations governing sectoral activities in- and outside the environment sector include measures to conserve and sustainably use biodiversity, in particular: % of target watershed committees in the Sierra-Costa region having systematically integrated ES and BD considerations into their sub-watershed management plans and activities N° of municipalities in the project area that have systematically integrated ES and BD considerations into their development plans and policies	be provided by output 1.2 (baseline information on key indicators completed)	30% of target sub-watershed committees in the Sierra-Costa region have systematically integrated ecosystem service and biodiversity considerations into their sub-watershed management plans and activities at end of project At least two municipalities in the project area have systematically integrated ecosystem service and biodiversity considerations into their development plans and policies	80% of target sub-watershed committees in the Sierra-Costa region have systematically integrated ecosystem service and biodiversity considerations into their sub-watershed management plans and activities at end of project At least five municipalities in the project area have systematically integrated ecosystem service and biodiversity considerations into their development plans and policies	project) to monitor improvements in: a) mainstreaming ES and BD considerations in sector policies; b) institutional coordination of sub-watershed management policies and planning Project management information system Annual project implementation reports Sub-watershed management plans Municipal Development Plans (strategic & triennial) Annual project implementation reports	End of 2nd and 3rd year End of 2nd and 3rd year		particular Capacity Building Advisor/PD, Institutional Land Use Policy Advisor WSC managers CONAGUA		system budgets for outputs 1.2 and 1.3

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	N° of state and federal key stakeholder institutions outside the environment sector with high potential impact on sub-watershed development in the Sierra-Costa region implementing policies, programs and projects that have systematically integrated ES and biodiversity considerations		At least three state and federal key stakeholder institutions outside the environment sector with high potential impact on sub-watershed development in the Sierra-Costa region are implementing policies, programs and projects that have systematically integrated ES and biodiversity considerations	At least six state and federal key stakeholder institutions outside the environment sector with high potential impact on sub-watershed development in the Sierra-Costa region are implementing policies, programs and projects that have systematically integrated ES and biodiversity considerations	System (established by project) to monitor improvements in: a) mainstreaming ES and BD considerations in non-environment sector policies; b) institutional coordination with sub-watershed management policies and planning Annual project implementation reports	End of 2nd and 3rd year				
	% of target sub-watersheds where NGOs implement projects and activities that have systematically integrated ES and biodiversity considerations and are aligned with management plans of watershed committees		In at least 30% of target sub-watersheds, NGOs implement projects and activities that have systematically integrated ES and biodiversity considerations and are aligned with management plans of watershed committees	In at least 70% of target sub-watersheds, NGOs implement projects and activities that have systematically integrated ES and biodiversity considerations and are aligned with management plans of watershed committees	Cooperation agreements between committees and NGOs Annual project implementation reports	End of 2nd and 3rd year				
	Improved status of key biodiversity and ecosystem			The status of key indicator species & improvements	Baseline studies and monitoring of key indicators	End of project				

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	service indicators in each sub-watershed due to expanded implementation of PES schemes, sustainable production practices (SPP) and restoration/soil conservation activities (RSCA)			in the health of aquatic & terrestrial ecosystems in pilot sub-watersheds reaches target levels (see RF output 1.2 footnote) as a result of expanded implementation of PES, SPP and RSCA	of biodiversity and ecosystem health carried out in outputs 1.2 and 1.3					
	Change in forest cover in areas of deforestation risk within project area by expanded implementation of PES schemes, SPP and RSCA			Net change in forest cover in areas of deforestation risk within project area is 0% or slightly positive as a result of expanded implementation of PES schemes, SPP and RSCA	Fine scale deforestation risk map developed by project under output 3.1 Forest cover monitoring reports by CONAFOR and CONABIO	End of project				
	N° of land users (including female land users) that perceive improvement of livelihoods through ES benefits provided by ES and BD-friendly land use systems and through payments from public and private PES mechanisms			At end of project, at least 2,500 land users in target sub-watersheds, including at least 20% female land users, perceive livelihood improvements from new or increased payments from public & private PES mechanisms and the	Survey of representative samples of land users in target sub-watersheds about perceived livelihood improvements resulting from new/expanded access to public and private PES incentives payments	End of project				

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				ecosystem service benefits provided by ES and BD-friendly land use systems.						
Outcome of component 1: Increased understanding (by monitoring institutions) of the relationships between land uses and BD/ES as a result of sub-watershed scale monitoring of: a) the status of important ES and BD components and their indicators in the project area; b) the interdependence of land use patterns & policies and ES/BD status; c) ES benefits provided by different land use systems under varying levels of intensity; d) factors influencing land use decisions by land users.	a) Information coverage on status & dynamics of key components of globally significant BD and ES in project area, measured through status of following indicators: - biodiversity and biological integrity* - water quality** & other ecosystem health indicators - land use patterns and changes - other key indicators for outcomes 2 and 3 as noted below health b-c) Degree of information coverage on specific links between local land use patterns and policies, on the one hand, and ES/BD status (including their	a) Info. needed by monitoring institutions on status and dynamics of important ES and BD components is only partially covered (measured by amount of data collected on status indicators for terrestrial and aquatic species and ecosystem health – see footnotes in output 1.2) b-c) Documentation on links between specific land use practices and ES/BD indicator status in the project area is sporadic and unsystematic	a) Information needs on key indicators of ES and BD status in the project area are covered at 70% by project year 2 b-c) Documentation on links between land use and ES/BD status in the project area covers about 50% of links identified during	a) Information needs on key indicators of ES and BD status in the project area covered at 90% by project year 3 b-c) Documentation on links between land use and ES/BD status in the project area covers about 80% of strategic links identified during baseline by	a) Reports and published studies about key indicators of ES and BD status in the project area b-c) Reports and published studies about links between land use and ES/BD in the project area	Annually b-c) Annually	Target sub-watersheds Target sub-watersheds	Project staff, including BD and ES Monitoring Advisor Project staff, including BD and ES Monitoring Advisor	Y1-Y3 Y1-Y3	Costs included in project monitoring system budgets for outputs 1.2 and 1.3 Costs included in project monitoring system budgets for outputs 1.2 and 1.3

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	benefits), on the other, by representative studies for the project area		baseline by project year 2	project year 3						
	d) Factors influencing individual and collective land use decisions by land users (including their understanding of interactions between land use and ES, among other factors) are documented by comparative studies across sub-watersheds, land uses and land owner types	d) Documentation about factors influencing individual and collective land use decisions by land users is sporadic	d) Factors influencing individual and collective land use decisions by land users are documented by comparative studies by project year 2	d) Factors influencing individual and collective land use decisions by land users are documented by comparative studies	d) Report of research team identifying factors influencing individual and collective land use decisions of land owners, *ejidatarios* and *comuneros*	d) Annually	Target sub-watersheds	Project staff, including BD and ES Monitoring Advisor	Y1-Y3	Costs included in project monitoring system budgets for outputs 1.2 and 1.3
Outcome of component 2: Ecosystem services and biodiversity considerations are mainstreamed into land use policies, planning and promotion by WSC and policies are coordinated with other key government agencies, resulting in improved status of key BD & ES indicators in target sub-watersheds (as measured under output 1.3)	N° of target WSC in the Sierra-Costa region that have systematically integrated ES and BD considerations into their land use policies and planning	ES/BD concerns are not systematically integrated into most WSC policies or projects. Detailed baseline information will be provided by output 1.2	At end of 1st year, 5 WSC; at end of 2nd year, 7 WSC have systematically integrated ES and BD considerations into their policies	9 WSC have explicitly integrated ES and BD considerations into their projects and activities	Minutes of WSC sessions Reports of WSC managers	Annually	WSC in target sub-watersheds	Project staff, including Institutional Land Use Policy Advisor WSC managers CONAGUA	Y1-Y3	Costs included in project monitoring system budgets for outputs 1.2 and 1.3
	N° of other key institutions that have adopted project recommendations for integrating ES and BD	None	5 key stakeholder institutions have validated recommendations for integrating ES	At least 8 key stakeholder institutions have validated recommendations for integrating ES and BD	Formal communication of stakeholder institutions to GESE (State Working Group of ES) validating	Annually	WSC in target sub-watersheds	Project staff, including Institutional Land Use Policy Advisor WSC managers CONAGUA	Y1-Y3	Costs included in project monitoring system budgets for outputs 1.2 and 1.3

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	considerations into their policies		and BD considerations into their policies by project year 2	considerations into their policies	recommendations					
	N° of WSC implementing coordinated plans with other institutions to introduce or reinforce sustainable production practices (SPP) and restoration & soil conservation activities (RSCA)	Most WSC have no coordinated plans for introducing SPP or RSCA. Quantitative baseline information on n° of coordinated plans will be provided by output 1.2	At end of 1st year, 3 WSC; at end of 2nd year, 5 WSC have coordinated plansto introduce or reinforce each of SPP & RSCA	At least 7 & 8 WSC implement coordinated plans to introduce or reinforce SPP and RSCA, respectively	Interinstitutional plans to coordinate introduction and reinforcement of SPP and RSCA in sub-watersheds	Annually	WSC in target sub-watersheds	Project staff, including Institutional Land Use Policy Advisor WSC managers CONAGUA	Y1-Y3	Costs included in project monitoring system budgets for outputs 1.2 and 1.3
	Improved status of key BD/ES indicators in these watersheds (as monitored by output 1.3)	Baseline information on status of key BD and ES indicators provided by output 1.2	Initial improvements in status of key BD and ES indicators (as per output 1.2 footnote) by end of year 2	Status of key indicator species and improvements in health of aquatic and terrestrial ecosystems reach target levels (see output 1.2 footnote) by end of year 3	Monitoring studies under output 1.3 (for indicator status)	Annually	Stakeholder institutions in the project area	Project staff, including Institutional Land Use Policy Advisor GESE	Y1-Y3	Costs included in project monitoring system budgets for outputs 1.2 and 1.3
Outcome of component 3: Land users have increased access to public and private PES mechanisms (carbon, watershed services,	Increase in area of land with high priority for ES and globally significant BD whose users access ES payments by a)	Baseline information for all outcome indicators of component 3, including status of BD and ES indicators, will	Project year 2: Land users on (a) 4,500 / (b) 2,250 hectares of land with high priority for ES and BD access ES payments by	End of project: Land users on (a) 7,500 / (b) 3,750 hectares of land with high priority for ES and BD access ES payments by a)	CONAFOR data on annual results of PSA program Reports from actors marketing BD and ES (carbon and	Annually	Target sub-watersheds	Project staff, including PES Advisor WSC managers CONAFOR	Y1-Y3	Costs included in project monitoring system budgets for outputs 1.2 and 1.3

APPENDIX 7: COSTED M&E PLAN

biodiversity) to provide funding and incentives to implement land use practices and strategies that conserve ES and BD and improve local livelihoods (targeting land users and non-government stakeholders) in the Chiapas region	government-funded and b) market-based programs and implement sustainable land use practices that contribute to improvements in the status of key biodiversity indicators of global significance	be provided by output 1.2	a) government-funded and b) market-based PES programs	government-funded and b) market-based PES programs	other) credits (Ambio, FONCET, CONAFOR, etc.)			Project staff, including PES Advisor WSC managers CONAFOR	Y1-Y3	Costs included in project monitoring system budgets for outputs 1.2 and 1.3
	Improvements in the status of key BD and ES indicators in areas with increased access to public and private PES mechanisms as a result of improved land use practices		Initial improvements in status of key BD and ES indicators in areas with increased access to PES by end of year 2, as measured under output 1.3	Status of key indicator species and improvements in health of aquatic and terrestrial ecosystems reach target levels (see RF output 1.2 footnote) by end of year 3 in areas with increased access to PES	Monitoring studies conducted under output 1.3	Annually	Target sub-watersheds	Project staff, including PES Advisor WSC managers	Y1-Y3	Costs included in project monitoring system budgets for outputs 1.2 and 1.3
	N° of additional LU (**) in target sub-watersheds with access to government PES programs **men and women		300 additional land users*** access government-funded PES programs *** with 15% increase above baseline among women land users	500 additional land users**** access government-funded PES programs, **** with 30% increase above baseline among women land users	Information from land users' (LU) organizations and supporting actors (NGOs and others)	Annually	Target sub-watersheds	Project staff, including PES Advisor CONAFOR	Y1-Y3	Costs included in project monitoring system budgets for outputs 1.2 and 1.3
	N° of additional LU (**) in target sub-watersheds with access to		150 additional land users*** access market-based PES	250 additional land users**** access market-based PES	Aforementioned reports of CONAFOR, Ambio, FONCET	Annually	Target sub-watersheds	Project staff, including PES Advisor	Y1-Y3	Costs included in project monitoring system budgets for outputs 1.2 and 1.3

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	market-based PES programs N° of LU organizations in target sub-watersheds with access to premium markets of sustainable products (SP)		programs 10 LU organizations have access to premium markets of SP	programs 15 LU organizations have access to premium markets of SP	LU organizations Aforementioned reports of CONAFOR, Ambio, FONCET, LU organizations	Annually	Target sub-watersheds	Project staff, including PES Advisor	Y1-Y3	Costs included in project monitoring system budgets for outputs 1.2 and 1.3

2. Cost of acquisition of essential baseline data during first year of project[10]: Included in budget for output 1.2 ($163,371)

3. Cost of project inception workshop (please include proposed location, number of participants): $1,500

4. Cost of Mid-Term Review/Evaluation: $ 15,000

5. Cost of Terminal Evaluation: $ 15,000

6. Any additional M&E costs [11]: Included in budget for output 1.3 ($200,046)

Total costs: $31,500 plus estimated budget for outputs 1.2 and 1.3 ($363,417), totalling $394,917

[10] Refer to detailed M&E work plan for additional information on what data will be collected and what activities will be undertaken. The data to be collected needs to be consistent with the indicators included in the table above.

[11] Please describe the activity and included the expected cost. Additional M&E costs could be related to the following: (i) Additional reviews and evaluation processes for phased and tranched projects; (ii) application & validation of tracking tools.

APPENDIX 8: REPORTING REQUIREMENTS

Reporting requirements	Due date	Format appended to legal instrument as	Responsibility of
Procurement plan (goods and services)	2 weeks before project inception meeting	N/A	Project Manager
Inception Report	1 month after project inception meeting	N/A	Project Manager
Expenditure report accompanied by explanatory notes	Quarterly on or before 30 April, 31 July, 31 October, 31 January	**Annex 11**	Project Manager
Cash Advance request and details of anticipated disbursements	Quarterly or when required	**Annex 7B**	Project Manager
Progress report	Half-yearly on or before 31 January	**Annex 8**	Project Manager
Audited report for expenditures for year ending 31 December	Yearly on or before 30 June	N/A	Executing partner to contract firm
Inventory of non-expendable equipment	Yearly on or before 31 January	**Annex 6**	Project Manager
Co-financing report	Yearly on or before 31 July	**Annex 12**	Project Manager
Project implementation review (PIR) report	Yearly on or before 31 August	**Annex 9**	Project Manager, TM, DGEF FMO
Minutes of steering committee meetings	Yearly (or as relevant)	N/A	Project Manager
Mission reports and “aide memoire” for executing agency	Within 2 weeks of return	N/A	TM, DGEF FMO
Final report	2 months of project completion date	**Annex 10**	Project Manager
Final inventory of non-expendable equipment		**Annex 9**	Project Manager
Equipment transfer letter		**Annex 10**	Project Manager
Final expenditure statement	3 months of project completion date	**Annex 11**	Project Manager
Mid-term review or Mid-term evaluation	Midway though project	N/A	TM or EOU (as relevant)
Final audited report for expenditures of project	6 months of project completion date	N/A	Executing partner to contract firm

APPENDIX 8: REPORTING REQUIREMENTS

Independent terminal evaluation report	6 months of project completion date	Appendix 9 to Annex 1	EOU

APPENDIX 9 - STANDARD TERMINAL EVALUATION TERMS OF REFERENCE

Terminal Evaluation of the UNEP GEF project *Promoting Payments for Ecosystem Services (PES) and Related Sustainable Financing Schemes in the Danube Basin*

1. PROJECT BACKGROUND AND OVERVIEW

Project rationale

The objective was stated as:

The indicators given in the project document for this stated objective were:

Relevance to GEF Programmes
The project is in line with:.

Executing Arrangements
The implementing agency(ies) for this project was (were) UNEP; and the executing agencies were:

WWF Danube-Carpathian Programme

The lead national agencies in the focal countries were:

Project Activities
The project comprised activities grouped in 3 components.

Budget

At project inception the following budget prepared:

	GEF	Co-funding
Project preparation funds:		
GEF Medium Size Grant		
TOTAL (including project preparation funds)		

Co-funding sources:

Anticipated:

APPENDIX 9
TERMS OF REFERENCE FOR THE EVALUATION

1. Objective and Scope of the Evaluation

The objective of this terminal evaluation is to examine the extent and magnitude of any project impacts to date and determine the likelihood of future impacts. The evaluation will also assess project performance and the implementation of planned project activities and planned outputs against actual results. The evaluation will focus on the following main questions:

1. Did the project help to { } among key target audiences (international conventions and initiatives, national level policy-makers, regional and local policy-makers, resource managers and practitioners).
2. Did the outputs of the project articulate options and recommendations for { }? Were these options and recommendations used? If so by whom?
3. To what extent did the project outputs produced have the weight of scientific authority and credibility necessary to influence policy makers and other key audiences?

Methods

This terminal evaluation will be conducted as an in-depth evaluation using a participatory approach whereby the UNEP/DGEF Task Manager, key representatives of the executing agencies and other relevant staff are kept informed and consulted throughout the evaluation. The consultant will liaise with the UNEP/EOU and the UNEP/DGEF Task Manager on any logistic and/or methodological issues to properly conduct the review in as independent a way as possible, given the circumstances and resources offered. The draft report will be circulated to UNEP/DGEF Task Manager, key representatives of the executing agencies and the UNEP/EOU. Any comments or responses to the draft report will be sent to UNEP / EOU for collation and the consultant will be advised of any necessary or suggested revisions.

The findings of the evaluation will be based on the following:

1. A desk review of project documents including, but not limited to:
   (a) The project documents, outputs, monitoring reports (such as progress and financial reports to UNEP and GEF annual Project Implementation Review reports) and relevant correspondence.
   (b) Notes from the Steering Group meetings.
   (c) Other project-related material produced by the project staff or partners.
   (d) Relevant material published on the project web-site:{ }.

2. Interviews with project management and technical support including {NEED INPUT FROM TM HERE}

3. Interviews and Telephone interviews with intended users for the project outputs and other stakeholders involved with this project, including in the participating countries and international bodies. The Consultant shall determine whether to seek additional information and opinions from representatives of donor agencies and other organizations. As appropriate, these interviews could be combined with an email questionnaire.

4. Interviews with the UNEP/DGEF project task manager and Fund Management Officer, and other relevant staff in UNEP dealing with {relevant GEF focal area(s)}-related activities as necessary. The Consultant shall also gain broader perspectives from discussions with relevant GEF Secretariat staff.

5. Field visits[1] to project staff

Key Evaluation principles

In attempting to evaluate any outcomes and impacts that the project may have achieved, evaluators should remember that the project's performance should be assessed by considering the difference between the answers to two simple questions ***"what happened?***" and ***"what would have happened anyway?"***. These questions imply that there should be consideration of the baseline conditions and trends in relation to the intended project outcomes and impacts. In addition it implies that there should be plausible evidence to **attribute** such outcomes and impacts **to the actions of the project**.

Sometimes, adequate information on baseline conditions and trends is lacking. In such cases this should be clearly highlighted by the evaluator, along with any simplifying assumptions that were taken to enable the evaluator to make informed judgements about project performance.

2. Project Ratings

The success of project implementation will be rated on a scale from 'highly unsatisfactory' to 'highly satisfactory'. In particular the evaluation shall **assess and rate** the project with respect to the eleven categories defined below:[2]

A. Attainment of objectives and planned results:

The evaluation should assess the extent to which the project's major relevant objectives were effectively and efficiently achieved or are expected to be achieved and their relevance.

- *Effectiveness:* Evaluate how, and to what extent, the stated project objectives have been met, taking into account the "achievement indicators". The analysis of outcomes achieved should include, *inter alia*, an assessment of the extent to which the project has directly or indirectly assisted policy and decision-makers to apply information supplied by biodiversity indicators in their national planning and decision-making. In particular:
  - Evaluate the immediate impact of the project on {relevant focal area} monitoring and in national planning and decision-making and international understanding and use of biodiversity indicators.
  - As far as possible, also assess the potential longer-term impacts considering that the evaluation is taking place upon completion of the project and that longer term impact is expected to be seen in a few years time. Frame recommendations to enhance future project impact in this context. Which will be the major 'channels' for longer term impact from the project at the national and international scales?
    - *Relevance*: In retrospect, were the project's outcomes consistent with the focal areas/operational program strategies? Ascertain the nature and

[1] Evaluators should make a brief courtesy call to GEF Country Focal points during field visits if at all possible.
[2] However, the views and comments expressed by the evaluator need not be restricted to these items.

significance of the contribution of the project outcomes to the Convention on Biological Diversity and the wider portfolio of the GEF.

- *Efficiency*: Was the project cost effective? Was the project the least cost option? Was the project implementation delayed and if it was, then did that affect cost-effectiveness? Assess the contribution of cash and in-kind co-financing to project implementation and to what extent the project leveraged additional resources. Did the project build on earlier initiatives, did it make effective use of available scientific and / or technical information. Wherever possible, the evaluator should also compare the cost-time vs. outcomes relationship of the project with that of other similar projects.

B. Sustainability:

Sustainability is understood as the probability of continued long-term project-derived outcomes and impacts after the GEF project funding ends. The evaluation will identify and assess the key conditions or factors that are likely to contribute or undermine the persistence of benefits after the project ends. Some of these factors might be outcomes of the project, e.g. stronger institutional capacities or better informed decision-making. Other factors will include contextual circumstances or developments that are not outcomes of the project but that are relevant to the sustainability of outcomes. The evaluation should ascertain to what extent follow-up work has been initiated and how project outcomes will be sustained and enhanced over time.

Five aspects of sustainability should be addressed: financial, socio-political, institutional frameworks and governance, environmental (if applicable). The following questions provide guidance on the assessment of these aspects:

- *Financial resources.* Are there any financial risks that may jeopardize sustenance of project outcomes? What is the likelihood that financial and economic resources will not be available once the GEF assistance ends (resources can be from multiple sources, such as the public and private sectors, income generating activities, and trends that may indicate that it is likely that in future there will be adequate financial resources for sustaining project's outcomes)? To what extent are the outcomes of the project dependent on continued financial support?
- *Socio-political:* Are there any social or political risks that may jeopardize sustenance of project outcomes? What is the risk that the level of stakeholder ownership will be insufficient to allow for the project outcomes to be sustained? Do the various key stakeholders see that it is in their interest that the project benefits continue to flow? Is there sufficient public / stakeholder awareness in support of the long term objectives of the project?
- *Institutional framework and governance.* To what extent is the sustenance of the outcomes of the project dependent on issues relating to institutional frameworks and governance? What is the likelihood that institutional and technical achievements, legal frameworks, policies and governance structures and processes will allow for, the project outcomes/benefits to be sustained? While responding to these questions consider if the required systems for accountability and transparency and the required technical know-how are in place.
- *Environmental.* Are there any environmental risks that can undermine the future flow of project environmental benefits? The TE should assess whether certain activities in the project area will pose a threat to the sustainability of the project outcomes. For example; construction of dam in a protected area could inundate a

sizable area and thereby neutralize the biodiversity-related gains made by the project; or, a newly established pulp mill might jeopardise the viability of nearby protected forest areas by increasing logging pressures; or a vector control intervention may be made less effective by changes in climate and consequent alterations to the incidence and distribution of malarial mosquitoes.

C. Achievement of outputs and activities:

- Delivered outputs: Assessment of the project's success in producing each of the programmed outputs, both in quantity and quality as well as usefulness and timeliness.
- Assess the soundness and effectiveness of the methodologies used for developing the technical documents and related management options in the participating countries
- Assess to what extent the project outputs produced have the weight of scientific authority / credibility, necessary to influence policy and decision-makers, particularly at the national level.

D. Catalytic Role

Replication and catalysis. What examples are there of replication and catalytic outcomes? Replication approach, in the context of GEF projects, is defined as lessons and experiences coming out of the project that are replicated or scaled up in the design and implementation of other projects. Replication can have two aspects, replication proper (lessons and experiences are replicated in different geographic area) or scaling up (lessons and experiences are replicated within the same geographic area but funded by other sources). Specifically:

- Do the recommendations for management of *Promoting Payments for Ecosystem Services (PES) and Related Sustainable Financing Schemes in the Danube Basin* coming from the country studies have the potential for application in other countries and locations?

If no effects are identified, the evaluation will describe the catalytic or replication actions that the project carried out.

E. Assessment monitoring and evaluation systems.

The evaluation shall include an assessment of the quality, application and effectiveness of project monitoring and evaluation plans and tools, including an assessment of risk management based on the assumptions and risks identified in the project document. The Terminal Evaluation will assess whether the project met the minimum requirements for 'project design of M&E' and 'the application of the Project M&E plan' (see minimum requirements 1&2 in *Annex 4* to this Appendix). GEF projects must budget adequately for execution of the M&E plan, and provide adequate resources during implementation of the M&E plan. Project managers are also expected to use the information generated by the M&E system during project implementation to adapt and improve the project.

M&E during project implementation

- *M&E design.* Projects should have sound M&E plans to monitor results and track progress towards achieving project objectives. An M&E plan should include a baseline (including data, methodology, etc.), SMART indicators (see Annex 4) and data analysis systems, and evaluation studies at specific times to assess results. The time frame for various M&E activities and standards for outputs should have been specified.

- *M&E plan implementation.* A Terminal Evaluation should verify that: an M&E system was in place and facilitated timely tracking of results and progress towards projects objectives throughout the project implementation period (perhaps through use of a logframe or similar); annual project reports and Progress Implementation Review (PIR) reports were complete, accurate and with well justified ratings; that the information provided by the M&E system was used during the project to improve project performance and to adapt to changing needs; and that projects had an M&E system in place with proper training for parties responsible for M&E activities.
- *Budgeting and Funding for M&E activities.* The terminal evaluation should determine whether support for M&E was budgeted adequately and was funded in a timely fashion during implementation.

F. Preparation and Readiness

Were the project's objectives and components clear, practicable and feasible within its timeframe? Were the capacities of executing institution and counterparts properly considered when the project was designed? Were lessons from other relevant projects properly incorporated in the project design? Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to project implementation? Were counterpart resources (funding, staff, and facilities), enabling legislation, and adequate project management arrangements in place?

G. Country ownership / driveness:

This is the relevance of the project to national development and environmental agendas, recipient country commitment, and regional and international agreements. The evaluation will:

- Assess the level of country ownership. Specifically, the evaluator should assess whether the project was effective in providing and communicating biodiversity information that catalyzed action in participating countries to improve decisions relating to the conservation and management of the focal ecosystem in each country.
- Assess the level of country commitment to the generation and use of biodiversity indicators for decision-making during and after the project, including in regional and international fora.

H. Stakeholder participation / public awareness:

This consists of three related and often overlapping processes: information dissemination, consultation, and "stakeholder" participation. Stakeholders are the individuals, groups, institutions, or other bodies that have an interest or stake in the outcome of the GEF-financed project. The term also applies to those potentially adversely affected by a project. The evaluation will specifically:

- Assess the mechanisms put in place by the project for identification and engagement of stakeholders in each participating country and establish, in consultation with the stakeholders, whether this mechanism was successful, and identify its strengths and weaknesses.
- Assess the degree and effectiveness of collaboration/interactions between the various project partners and institutions during the course of implementation of the project.
- Assess the degree and effectiveness of any various public awareness activities that were undertaken during the course of implementation of the project.

I. Financial Planning

Evaluation of financial planning requires assessment of the quality and effectiveness of financial planning and control of financial resources throughout the project's lifetime. Evaluation includes actual project costs by activities compared to budget (variances), financial management (including disbursement issues), and co- financing. The evaluation should:

- Assess the strength and utility of financial controls, including reporting, and planning to allow the project management to make informed decisions regarding the budget and allow for a proper and timely flow of funds for the payment of satisfactory project deliverables.
- Present the major findings from the financial audit if one has been conducted.
- Identify and verify the sources of co- financing as well as leveraged and associated financing (in co-operation with the IA and EA).
- Assess whether the project has applied appropriate standards of due diligence in the management of funds and financial audits.
- The evaluation should also include a breakdown of final actual costs and co-financing for the project prepared in consultation with the relevant UNEP/DGEF Fund Management Officer of the project (table attached in *Annex 1* to this Appendix Co-financing and leveraged resources).

J. Implementation approach:

This includes an analysis of the project's management framework, adaptation to changing conditions (adaptive management), partnerships in implementation arrangements, changes in project design, and overall project management. The evaluation will:

- Ascertain to what extent the project implementation mechanisms outlined in the project document have been closely followed. In particular, assess the role of the various committees established and whether the project document was clear and realistic to enable effective and efficient implementation, whether the project was executed according to the plan and how well the management was able to adapt to changes during the life of the project to enable the implementation of the project.
- Evaluate the effectiveness and efficiency and adaptability of project management and the supervision of project activities / project execution arrangements at all levels (1) policy decisions: Steering Group; (2) day to day project management in each of the country executing agencies and WWF Danube-Carpathian Programme.

K. UNEP Supervision and Backstopping

- Assess the effectiveness of supervision and administrative and financial support provided by UNEP/DGEF.
- Identify administrative, operational and/or technical problems and constraints that influenced the effective implementation of the project.

The ***ratings will be presented in the form of a table***. Each of the eleven categories should be rated separately with **brief justifications** based on the findings of the main analysis. An overall rating for the project should also be given. The following rating system is to be applied:

HS = Highly Satisfactory
S = Satisfactory
MS = Moderately Satisfactory
MU = Moderately Unsatisfactory
U = Unsatisfactory
HU = Highly Unsatisfactory

3. Evaluation report format and review procedures

The report should be brief, to the point and easy to understand. It must explain; the purpose of the evaluation, exactly what was evaluated and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should be presented in a way that makes the information accessible and comprehensible and include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons.

The evaluation will rate the overall implementation success of the project and provide individual ratings of the eleven implementation aspects as described in Section 1 of this TOR. *The ratings will be presented in the format of a table* **with brief justifications based on the findings of the main analysis.**

Evidence, findings, conclusions and recommendations should be presented in a complete and balanced manner. Any dissident views in response to evaluation findings will be appended in an annex. The evaluation report shall be written in English, be of no more than 50 pages (excluding annexes), use numbered paragraphs and include:

i) An **executive summary** (no more than 3 pages) providing a brief overview of the main conclusions and recommendations of the evaluation;

ii) **Introduction and background** giving a brief overview of the evaluated project, for example, the objective and status of activities; The GEF Monitoring and Evaluation Policy, 2006, requires that a TE report will provide summary information on when the evaluation took place; places visited; who was involved; the key questions; and, the methodology.

iii) **Scope, objective and methods** presenting the evaluation's purpose, the evaluation criteria used and questions to be addressed;

iv) **Project Performance and Impact** providing *factual evidence* relevant to the questions asked by the evaluator and interpretations of such evidence. This is the main substantive section of the report. The evaluator should provide a commentary and analysis on all eleven evaluation aspects (A − K above).

v) **Conclusions and rating** of project implementation success giving the evaluator's concluding assessments and ratings of the project against given evaluation criteria and standards of performance. The conclusions should provide answers to questions about whether the project is considered good or bad, and whether the results are considered positive or negative. The ratings should be provided with a brief narrative comment in a table (see *Annex 1* to this Appendix);

vi) **Lessons (to be) learned** presenting general conclusions from the standpoint of the design and implementation of the project, based on good practices and successes or problems and mistakes. Lessons should have the potential for wider application and use. All lessons should 'stand alone' and should:

- Briefly describe the context from which they are derived
- State or imply some prescriptive action;

- Specify the contexts in which they may be applied (if possible, who when and where)

vii) **Recommendations** suggesting *actionable* proposals for improvement of the current project. In general, Terminal Evaluations are likely to have very few (perhaps two or three) actionable recommendations.

Prior to each recommendation, the issue(s) or problem(s) to be addressed by the recommendation should be clearly stated.

A high quality recommendation is an actionable proposal that is:

1. Feasible to implement within the timeframe and resources available
2. Commensurate with the available capacities of project team and partners
3. Specific in terms of who would do what and when
4. Contains results-based language (i.e. a measurable performance target)
5. Includes a trade-off analysis, when its implementation may require utilizing significant resources that would otherwise be used for other project purposes.

viii) **Annexes** may include additional material deemed relevant by the evaluator but must include:

1. The Evaluation Terms of Reference,
2. A list of interviewees, and evaluation timeline
3. A list of documents reviewed / consulted
4. Summary co-finance information and a statement of project expenditure by activity
5. The expertise of the evaluation team. (brief CV).

TE reports will also include any response / comments from the project management team and/or the country focal point regarding the evaluation findings or conclusions as an annex to the report, however, such will be appended to the report by UNEP EOU.

Examples of UNEP GEF Terminal Evaluation Reports are available at www.unep.org/eou

Review of the Draft Evaluation Report

Draft reports submitted to UNEP EOU are shared with the corresponding Programme or Project Officer and his or her supervisor for initial review and consultation. The DGEF staff and senior Executing Agency staff are allowed to comment on the draft evaluation report. They may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions. The consultation also seeks feedback on the proposed recommendations. UNEP EOU collates all review comments and provides them to the evaluators for their consideration in preparing the final version of the report.

4. Submission of Final Terminal Evaluation Reports.

The final report shall be submitted in electronic form in MS Word format and should be sent to the following persons:

Segbedzi Norgbey, Chief,
UNEP Evaluation and Oversight Unit
P.O. Box 30552-00100
Nairobi, Kenya
Tel.: +(254-20)762-4181

Fax: +(254-20)762-3158
Email: Segbedzi.Norgbey@unep.org

With a copy to:

Maryam Niamir-Fuller,
Director
UNEP/Division of GEF Coordination
P.O. Box 30552-00100
Nairobi, Kenya
Tel: +(254-20)762-4166
Fax: +(254-20)762-4041/2
Email: Maryam.Niamir-Fuller@unep.org

{Name}
Task Manager
{Contact details}

The Final evaluation will also be copied to the following GEF National Focal Points.

{Insert contact details here}

The final evaluation report will be published on the Evaluation and Oversight Unit's web-site www.unep.org/eou and may be printed in hard copy. Subsequently, the report will be sent to the GEF Office of Evaluation for their review, appraisal and inclusion on the GEF website.

5. Resources and schedule of the evaluation

This final evaluation will be undertaken by an international evaluator contracted by the Evaluation and Oversight Unit, UNEP. The contract for the evaluator will begin on ddmmyyy and end on ddmmyyyy (# days) spread over # weeks (# days of travel, to {country(ies)}, and # days desk study). The evaluator will submit a draft report on ddmmyyyy to UNEP/EOU, the UNEP/DGEF Task Manager, and key representatives of the executing agencies. Any comments or responses to the draft report will be sent to UNEP / EOU for collation and the consultant will be advised of any necessary revisions. Comments to the final draft report will be sent to the consultant by ddmmyyyy after which, the consultant will submit the final report no later than ddmmyyyy.

The evaluator will after an initial telephone briefing with EOU and UNEP/GEF conduct initial desk review work and later travel to (country(ies)} and meet with project staff at the beginning of the evaluation. Furthermore, the evaluator is expected to travel to {country(ies)} and meet with representatives of the project executing agencies and the intended users of project's outputs.

In accordance with UNEP/GEF policy, all GEF projects are evaluated by independent evaluators contracted as consultants by the EOU. The evaluator should have the following qualifications:

The evaluator should not have been associated with the design and implementation of the project in a paid capacity. The evaluator will work under the overall supervision of the Chief, Evaluation and Oversight Unit, UNEP. The evaluator should be an international expert in { } with a sound understanding of { } issues. The consultant should have the following minimum qualifications: (i) experience in river basin management issues; (ii) experience with

management and implementation of nature conservation and/or freshwater projects and in particular with EU targeted at policy-influence and decision-making; (iii) experience with project evaluation. Knowledge of UNEP programmes and GEF activities is desirable. Knowledge of Romania and Bulgarian is an advantage. Fluency in oral and written English is a must.

6. Schedule Of Payment

The consultant shall select one of the following two contract options:

Lump-Sum Option

The evaluator will receive an initial payment of 30% of the total amount due upon signature of the contract. A further 30% will be paid upon submission of the draft report. A final payment of 40% will be made upon satisfactory completion of work. The fee is payable under the individual Special Service Agreement (SSA) of the evaluator and **is inclusive** of all expenses such as travel, accommodation and incidental expenses.

Fee-only Option

The evaluator will receive an initial payment of 40% of the total amount due upon signature of the contract. Final payment of 60% will be made upon satisfactory completion of work. The fee is payable under the individual SSAs of the evaluator and is **NOT** inclusive of all expenses such as travel, accommodation and incidental expenses. Ticket and DSA will be paid separately.

In case, the evaluator cannot provide the products in accordance with the TORs, the timeframe agreed, or his products are substandard, the payment to the evaluator could be withheld, until such a time the products are modified to meet UNEP's standard. In case the evaluator fails to submit a satisfactory final product to UNEP, the product prepared by the evaluator may not constitute the evaluation report.

Annex 1 to Appendix 9: OVERALL RATINGS TABLE

Criterion	Evaluator's Summary Comments	Evaluator's Rating
A. Attainment of project objectives and results (overall rating) **Sub criteria (below)**		
A. 1. Effectiveness		
A. 2. Relevance		
A. 3. Efficiency		
B. Sustainability of Project outcomes (overall rating) **Sub criteria (below)**		
B. 1. Financial		
B. 2. Socio Political		
B. 3. Institutional framework and governance		
B. 4. Ecological		
C. Achievement of outputs and activities		
D. Monitoring and Evaluation (overall rating) **Sub criteria (below)**		
D. 1. M&E Design		
D. 2. M&E Plan Implementation (use for adaptive management)		
D. 3. Budgeting and Funding for M&E activities		
E. Catalytic Role		
F. Preparation and readiness		
G. Country ownership / drivenness		
H. Stakeholders involvement		
I. Financial planning		
J. Implementation approach		
K. UNEP Supervision and backstopping		

RATING OF PROJECT OBJECTIVES AND RESULTS

Highly Satisfactory (HS): The project had no shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Satisfactory (S): The project had minor shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Moderately Satisfactory (MS): The project had moderate shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Moderately Unsatisfactory (MU): The project had significant shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Unsatisfactory (U) The project had major shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Highly Unsatisfactory (HU): The project had severe shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Please note: Relevance and effectiveness will be considered as critical criteria. The overall rating of the project for achievement of objectives and results **may not be higher** than the lowest rating on either of these two criteria. Thus, to have an overall satisfactory rating for outcomes a project must have at least satisfactory ratings on both relevance and effectiveness.

RATINGS ON SUSTAINABILITY

A. Sustainability will be understood as the probability of continued long-term outcomes and impacts after the GEF project funding ends. The Terminal evaluation will identify and assess the key conditions or factors that are likely to contribute or undermine the persistence of benefits after the project ends. Some of these factors might be outcomes of the project, i.e. stronger institutional capacities, legal frameworks, socio-economic incentives /or public awareness. Other factors will include contextual circumstances or developments that are not outcomes of the project but that are relevant to the sustainability of outcomes.

Rating system for sustainability sub-criteria

On each of the dimensions of sustainability of the project outcomes will be rated as follows.

Likely (L): There are no risks affecting this dimension of sustainability.

Moderately Likely (ML). There are moderate risks that affect this dimension of sustainability.

Moderately Unlikely (MU): There are significant risks that affect this dimension of sustainability

Unlikely (U): There are severe risks that affect this dimension of sustainability.

According to the GEF Office of Evaluation, all the risk dimensions of sustainability are deemed critical. Therefore, overall rating for sustainability will not be higher than the rating of the dimension with lowest ratings. For example, if a project has an Unlikely rating in any of the dimensions then its overall rating cannot be higher than Unlikely, regardless of whether higher ratings in other dimensions of sustainability produce a higher average.

RATINGS OF PROJECT M&E

Monitoring is a continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing project with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds. Evaluation is the systematic and objective assessment of an on-going or completed project, its design, implementation and results. Project evaluation may involve the definition of appropriate standards, the examination of performance against those standards, and an assessment of actual and expected results.

The Project monitoring and evaluation system will be rated on 'M&E Design', 'M&E Plan Implementation' and 'Budgeting and Funding for M&E activities' as follows:

Highly Satisfactory (HS): There were no shortcomings in the project M&E system. Satisfactory(S): There were minor shortcomings in the project M&E system.

Moderately Satisfactory (MS): There were moderate shortcomings in the project M&E system.

Moderately Unsatisfactory (MU): There were significant shortcomings in the project M&E system.

Unsatisfactory (U): There were major shortcomings in the project M&E system.

Highly Unsatisfactory (HU): The Project had no M&E system.

"M&E plan implementation" will be considered a critical parameter for the overall assessment of the M&E system. The overall rating for the M&E systems will not be higher than the rating on "M&E plan implementation."

All other ratings will be on the GEF six point scale.

GEF Performance Description		Alternative description on the same scale
HS	= Highly Satisfactory	Excellent
S	= Satisfactory	Well above average
MS	= Moderately Satisfactory	Average
MU	= Moderately Unsatisfactory	Below Average
U	= Unsatisfactory	Poor
HU	= Highly Unsatisfactory	Very poor (Appalling)

Annex 2 to Appendix 9: Co-financing and Leveraged Resources

Co financing (Type/Source)	IA own Financing (mill US$)		Government (mill US$)		Other* (mill US$)		Total (mill US$)		Total Disbursement (mill US$)	
	Planned	**Actual**	**Planned**	**Actual**	**Planned**	**Actual**	**Planned**	**Actual**	**Planned**	**Actual**
– Grants										
– Loans/Concessional (compared to market rate)										
– Credits										
– Equity investments										
– In-kind support										
– Other (*) - - - - -										
Totals										

Co-financing (basic data to be supplied to the consultant for verification)

* Other is referred to contributions mobilized for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector and beneficiaries.

Leveraged Resources

Leveraged resources are additional resources—beyond those committed to the project itself at the time of approval—that are mobilized later as a direct result of the project. Leveraged resources can be financial or in-kind and they may be from other donors, NGO's, foundations, governments, communities or the private sector. Please briefly describe the resources the project has leveraged since inception and indicate how these resources are contributing to the project's ultimate objective.

Table showing final actual project expenditure by activity to be supplied by the UNEP Fund management Officer. (insert here)

Annex 3 to Appendix 9

Review of the Draft Report

Draft reports submitted to UNEP EOU are shared with the corresponding Programme or Project Officer and his or her supervisor for initial review and consultation. The DGEF staff and senior Executing Agency staff provide comments on the draft evaluation report. They may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions. The consultation also seeks agreement on the findings and recommendations. UNEP EOU collates the review comments and provides them to the evaluators for their consideration in preparing the final version of the report. General comments on the draft report with respect to compliance with these TOR are shared with the reviewer.

Quality Assessment of the Evaluation Report

All UNEP GEF Mid Term Reports are subject to quality assessments by UNEP EOU. These apply GEF Office of Evaluation quality assessment and are used as a tool for providing structured feedback to the evaluator.

The quality of the draft evaluation report is assessed and rated against the following criteria:

GEF Report Quality Criteria	**UNEP EOU Assessment**	**Rating**
A. Did the report present an assessment of relevant outcomes and achievement of project objectives in the context of the focal area program indicators if applicable?		
B. Was the report consistent and the evidence complete and convincing and were the ratings substantiated when used?		
C. Did the report present a sound assessment of sustainability of outcomes?		
D. Were the lessons and recommendations supported by the evidence presented?		
E. Did the report include the actual project costs (total and per activity) and actual co-financing used?		
F. Did the report include an assessment of the quality of the project M&E system and its use for project management?		
UNEP EOU additional Report Quality Criteria	**UNEP EOU Assessment**	**Rating**
G. Quality of the lessons: Were lessons readily applicable in other contexts? Did they suggest prescriptive action?		
H. Quality of the recommendations: Did recommendations specify the actions necessary to correct existing conditions or improve operations ('who?' 'what?' 'where?' 'when?)'. Can they be implemented? Did the recommendations specify a goal and an associated performance indicator?		
I. Was the report well written? (clear English language and grammar)		
J. Did the report structure follow EOU guidelines, were all requested Annexes included?		
K. Were all evaluation aspects specified in the TORs adequately addressed?		
L. Was the report delivered in a timely manner		

GEF Quality of the MTE report = 0.3*(A + B) +

0.1*(C+D+E+F)
EOU assessment of MTE report = 0.3*(G + H) + 0.1*(I+J+K+L) **Combined quality Rating = (2* 'GEF EO' rating + EOU rating)/3** The Totals are rounded and converted to the scale of HS to HU

Rating system for quality of terminal evaluation reports

A number rating 1-6 is used for each criterion: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, Highly Unsatisfactory = 1, and unable to assess = 0.

Annex 4 to Appendix 9

GEF Minimum requirements for M&E

Minimum Requirement 1: Project Design of M&E[3]

All projects must include a concrete and fully budgeted monitoring and evaluation plan by the time of Work Program entry (full-sized projects) or CEO approval (medium-sized projects). This plan must contain at a minimum:

- SMART (see below) indicators for project implementation, or, if no indicators are identified, an alternative plan for monitoring that will deliver reliable and valid information to management
- SMART indicators for results (outcomes and, if applicable, impacts), and, where appropriate, corporate-level indicators
- A project baseline, with:
  - a description of the problem to address
  - indicator data
  - or, if major baseline indicators are not identified, an alternative plan for addressing this within one year of implementation
- An M&E Plan with identification of reviews and evaluations which will be undertaken, such as mid-term reviews or evaluations of activities
- An organizational setup and budgets for monitoring and evaluation.

[3] http://gefweb.org/MonitoringandEvaluation/MEPoliciesProcedures/MEPTools/meptstandards.html

Minimum Requirement 2: Application of Project M&E

- Project monitoring and supervision will include implementation of the M&E plan, comprising:
- Use of SMART indicators for implementation (or provision of a reasonable explanation if not used)
- Use of SMART indicators for results (or provision of a reasonable explanation if not used)
- Fully established baseline for the project and data compiled to review progress
- Evaluations are undertaken as planned
- Operational organizational setup for M&E and budgets spent as planned.

SMART INDICATORS GEF projects and programs should monitor using relevant performance indicators. The monitoring system should be "SMART":

1. **Specific**: The system captures the essence of the desired result by clearly and directly relating to achieving an objective, and only that objective.
2. **Measurable:** The monitoring system and its indicators are unambiguously specified so that all parties agree on what the system covers and there are practical ways to measure the indicators and results.
3. **Achievable and Attributable:** The system identifies what changes are anticipated as a result of the intervention and whether the result(s) are realistic. Attribution requires that changes in the targeted developmental issue can be linked to the intervention.
4. **Relevant and Realistic:** The system establishes levels of performance that are likely to be achieved in a practical manner, and that reflect the expectations of stakeholders.
5. **Time-bound, Timely, Trackable, and Targeted:** The system allows progress to be tracked in a cost-effective manner at desired frequency for a set period, with clear identification of the particular stakeholder group to be impacted by the project or program.

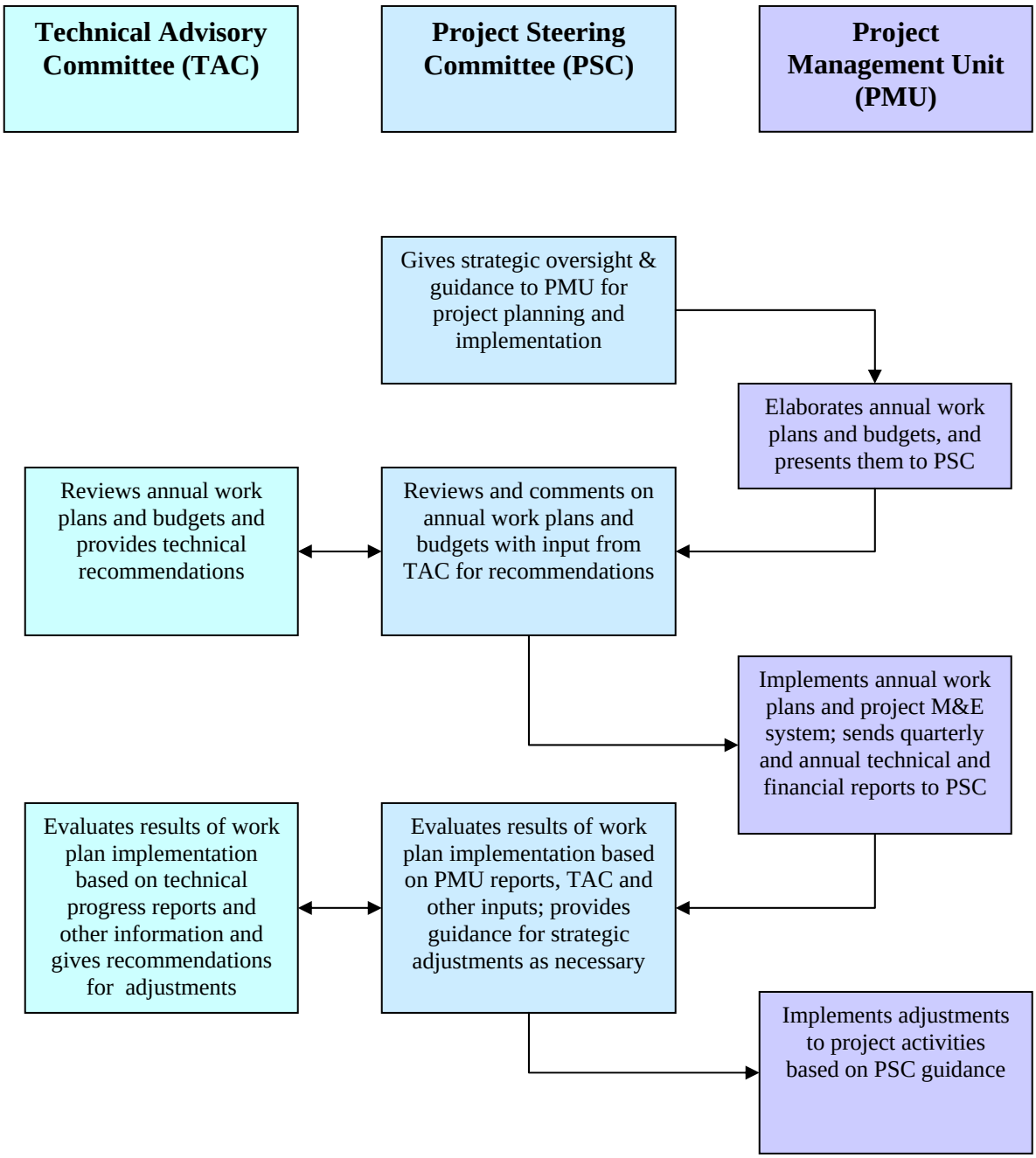
Annex 5 to Appendix 9

List of intended additional recipients for the Terminal Evaluation (to be completed by the IA Task Manager)

Name	Affiliation	Email
Aaron Zazuetta	GEF Evaluation Office	azazueta@thegef.org
Government Officials		
GEF Focal Point(s)		
Executing Agency		
Implementing Agency		
Carmen Tavera	UNEP DGEF Quality Assurance Officer	

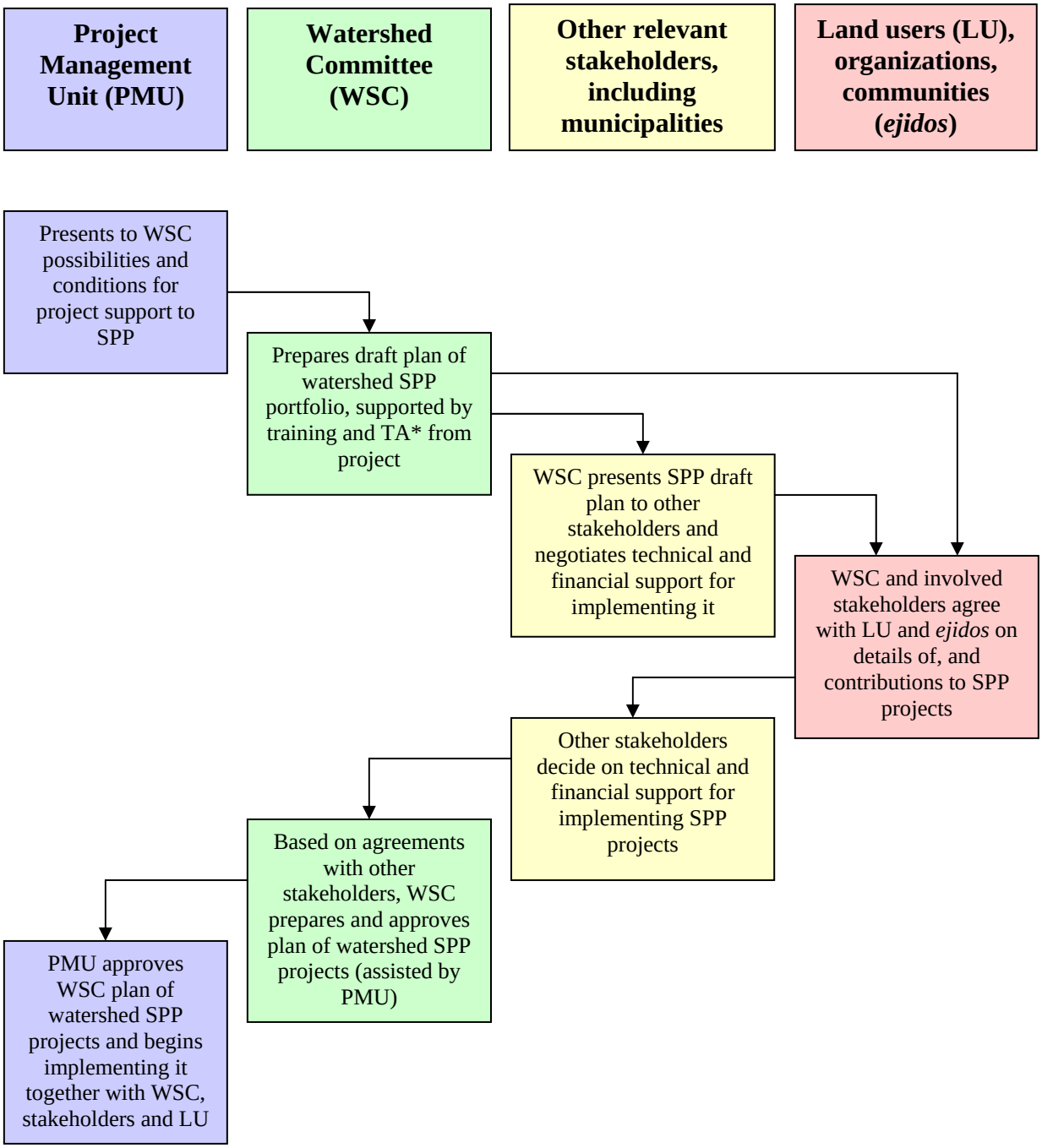
APPENDIX 10: DECISION-MAKING FLOWCHART AND ORGANIGRAM

Decision-making flowchart for elaborating, implementing and adapting annual work plan



APPENDIX 10: DECISION-MAKING FLOWCHART AND ORGANIGRAM

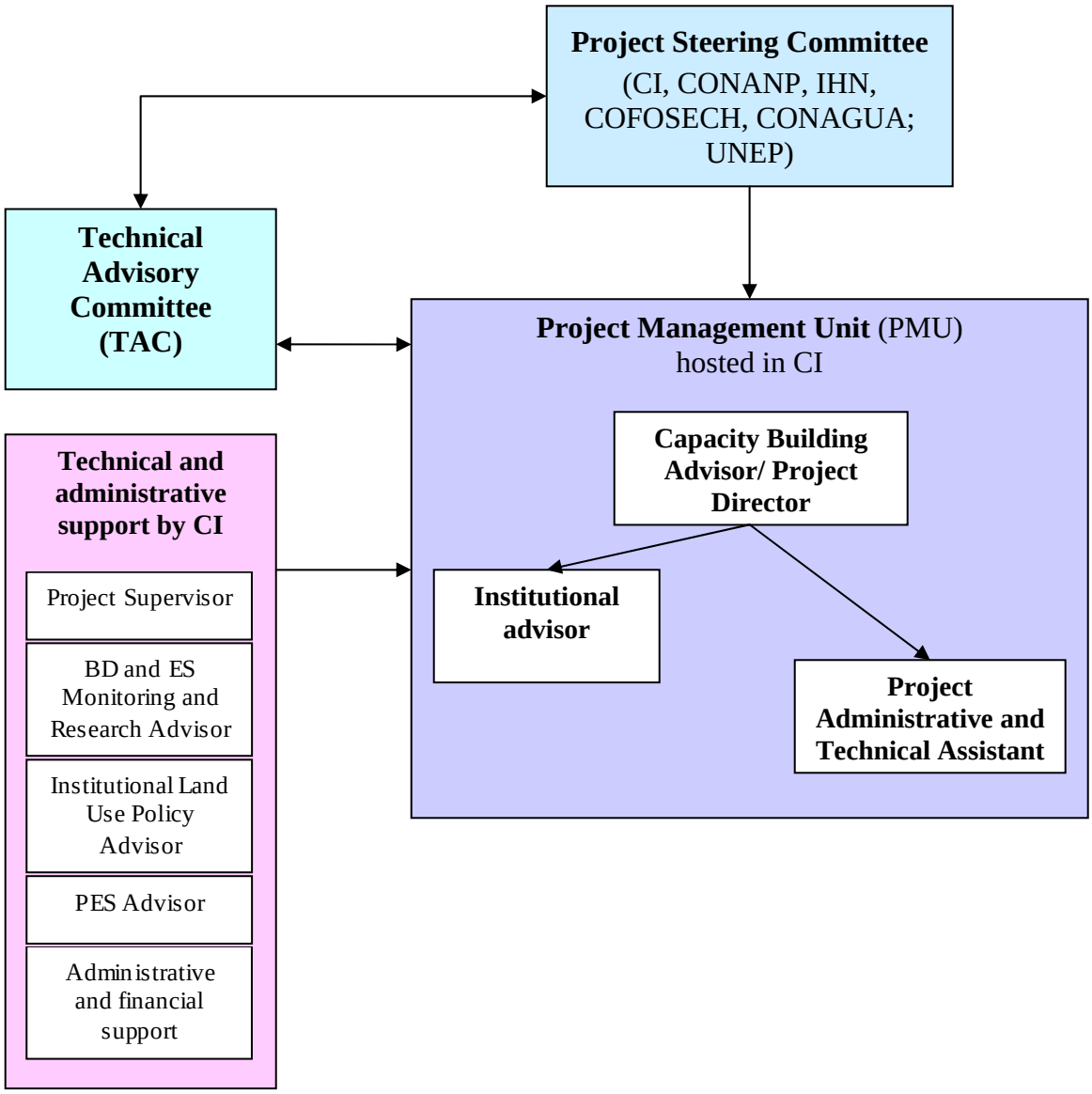
Decision-making flowchart for planning and implementing ES and BD conservation activities at the watershed level (for example sustainable production projects - SSP)



* TA = Technical Assistance

APPENDIX 10: DECISION-MAKING FLOWCHART AND ORGANIGRAM

Organigram



APPENDIX 11: TERMS OF REFERENCE

Terms of Reference - Capacity Building Advisor/ Project Director (national position)

The Capacity Building Advisor/ Project Director will act as the head of the Project Management Unit (PMU) and will be responsible for overall project implementation and coordination with all concerned stakeholders and other related initiatives in the country or in the region to ensure adequate project implementation. S/he will lead also the design and implementation of capacity building activities for the watershed committees targeted by the project and for related actors involved in watershed management. Therefore, the Advisor will devote significant attention to the watershed committees and other key stakeholders, ensuring and supporting their active participation and the effectiveness of activities to build their capacity. S/he will provide overall technical guidance related to the project theme of integrating ecosystem services and biodiversity into land use planning at watershed scale. The Capacity Building Advisor/ Project Director will report on project implementation progress to the Project Steering Committee (PSC), composed of representatives from CONANP, IHN, COFOSECH, CONAGUA as implementing partners; CI as executing agency; and UNEP as implementing agency.

Main duties and responsibilities:

- Establish the PMU's internal working procedures and inter-institutional communication mechanisms.
- Ensure adequate compliance of project implementation with UNEP procedures.
- Prepare technically the meetings of the Project Steering Committee and of the Technical Advisory Committee. Act as Secretary to the meetings of the Project Steering Committee.
- Prepare the annual work plans and budgets based on the Project Document, ensuring adequate articulation between the activities of the three project components, and submit them for review by the Project Steering Committee.
- Supervise drafting of TORs for project activities, analyze and approve technical reports.
- Prepare project progress reports as required by UNEP/DGEF.
- Coordinate and update the project's M&E system and ensure adequate project M&E.
- Provide support to Mid-Term and Final External Evaluations as well as to field missions by UNEP staff.
- Carry out frequent field missions to the target watersheds and project sites in the Sierra Madre as part of the overall supervision of project implementation, especially capacity building of watershed committees, land users and other project stakeholders.
- Ensure adequate inter-institutional coordination and stakeholder participation mechanisms during project implementation.
- Promote and lead coordination and exchange of experience with other ES projects in the region and the country, especially with the CONAFOR PES initiatives, the UNEP-CONANP cooperation project in the Mixteca Region of Oaxaca (also GEF funded) and the Scolel´Te project for climate change mitigation, poverty alleviation and biodiversity conservation in Chiapas.
- Ensure adequate dissemination of project results and lessons learned.
- Prepare quarterly work plans and activity reports and submit them for review by the Project Steering Committee.

The Capacity Building Advisor/ Project Director and other PMU staff will be located in CI's office in Tuxtla Gutierrez, Chiapas, and will maintain close and continuous contact with the project implementing partners and other stakeholders. S/he will receive administrative support from CI staff, as part of CI's in-kind contributions.

Profile:

Postgraduate university studies in subjects related to social strategies for natural resources management. At least 10 years of experience in sustainable development project management, as well as significant direct experience related to the scope of the project in mainstreaming ES

and BD concerns in local and regional development policies, planning and implementation. Experience in environmental governance and capacity building issues, especially in Chiapas, is highly desirable. Experience in managing international public donor-funded projects highly preferred. Leadership as well as strong management and interpersonal skills; computer skills; high flexibility and capacity to work under pressure. Good language abilities in English (writing, reading, speaking).

Terms of Reference - Project Administrative and Technical Assistant (national position)

The Project Administrative and Technical Assistant will provide full-time support to the Capacity Building Advisor/ Project Director in carrying out day-to-day operational and administrative functions, particularly with regard to procurement, contracting of consultants, budget management, reporting and routine communications with partners and other stakeholders. In addition, this position will provide some technical support to the Project Director, particularly upon completion of the Institutional Advisor's work with the project. S/he will be based in the PMU office and will undertake occasional trips to the target watersheds and project sites in the Sierra Madre, as necessary, in the fulfilment of these functions.

Main duties and responsibilities:

- Under the guidance of the Project Director, provide logistical and information support for PSC, TAC and other meetings.
- Undertake routine communications and follow-up with project partners, watershed committee staff, other stakeholders and consultants.
- Provide information inputs for preparing TORs and reports, as required by the Project Director and the Institutional Advisor.
- Conduct preliminary review of technical reports and documents, provide occasional assistance in drafting regular progress reports, and perform other related support activities, as appropriate.
- Make travel and logistical arrangements for field-missions and meetings with actors within and outside the project region (for example, coordination meetings with the Mixteca and CONAFOR PES projects).
- Undertake basic administrative functions, including initiation and follow-up on procurement and contracting procedures, payment processing, monitoring budget compliance, and others in cooperation with other CI administrative and financial staff.

Profile:

University studies, preferably with degree. At least two years of experience in administrative and technical assistant functions, for example in development, BD conservation or watershed management projects. Strong communication skills, including good working knowledge of English (writing, reading, speaking); strong computer skills; pro-active problem-solving attitude. Experience and/or familiarity supporting donor-funded projects preferred.

APPENDIX 11: TERMS OF REFERENCE

Terms of Reference – Institutional Advisor (national position)

The Institutional Advisor will provide strategic advisory and technical support to the Capacity Building Advisor/ Project Director with regard to institutional capacity building and coordination, particularly focusing on the watershed committees and municipalities targeted by the project, but also on other relevant actors. This function will be executed on a part-time basis during the first year of the project.

Main duties and responsibilities:

- Support the Capacity Building Advisor/ Project Director in selecting (preparing criteria and terms of reference), supervising and evaluating the institutions and specialists that will execute (as contracted consultants or as partners in cooperation agreements) the various training and technical assistance activities for capacity-building of watershed committees, municipalities and other relevant institutional actors for watershed policies and planning.
- Prepare, and monitor progress of, cooperation agreements with partners.
- Support the Project Director in promoting inter-institutional coordination between key stakeholders and with other related initiatives in Chiapas and other regions of the country, preparing concept papers and meetings.
- Elaborate drafts of annual and quarterly working plans.
- Prepare drafts of annual and quarterly reports to the Project Steering Committee and UNEP.

Profile:

At least 15 years of experience in design, planning, management, monitoring and evaluation of socio-economic development programs and projects, particularly in the areas of sustainable regional and rural development policies, promoting social participation and governance. Experience in promoting eco-friendly production practices and projects. Proven ability in cooperating with governmental entities on the municipal, state and national levels and with non-governmental organizations (NGOs). Good knowledge of environmental, social and political conditions in the state of Chiapas. Good language abilities in English (writing, reading, speaking).

CONSERVATION
INTERNATIONAL

December 11, 2009

Ms. Maryam Niamir-Fuller
Director, Division of Global Environment Facility (GEF) Coordination
United Nations Environment Programme (UNEP)
P.O. Box 30552
Nairobi, Kenya

Reference: Full Size Proposal for Mainstreaming the Conservation of Ecosystem Services and Biodiversity at the Sub-Watershed Scale in Chiapas, Mexico

Dear Ms. Niamir-Fuller:

This is to confirm that Conservation International Foundation is fully committed to the successful implementation of the above-referenced proposed project in Chiapas, Mexico, and that we will provide the following co-financing contributions:

- 1,741,299 in cash contributions over the life of the project

CI will implement this project through a close partnership with several Mexican federal and state agencies, including the Comisión Nacional de Areas Naturales Protegidas (CONANP), the Comisión Forestal Sustentable del Estado de Chiapas (COFOSECH), and the Instituto de Historia Nacional (IHN), who are also providing important co-financing contributions to the project.

We look forward to working with UNEP and the participating institutions on this important initiative.

Sincerely,

Niels Crone
Chief Operating Officer

2011 Crystal Drive, Suite 500, Arlington, VA 22202 T (703) 341.2400 F (703) 553.0654
www.conservation.org newmember@conservation.org

OFICIO No. COFOSECH/DG/869/2009.
Tuxtla Gutiérrez, Chiapas; Diciembre 08 del 2009.

ASUNTO: Compromiso de financiamiento del proyecto "Integración de Esfuerzos para la Conservación de los Servicios Ecosistémicos y Biodiversidad a Escala de Micro-Cuenca en Chiapas, México"

MS. MARIAM NIAMIR-FULLER
DIRECTOR
DIVISION OF GLOBAL ENVIRONMENT FACILITY (GEF) COORDINATION
UNEP
P.O. BOX 3055
NAIROBI, KENYA.

Distinguida Dra. Niamir-Fuller:

Por este medio confirmo que la Comisión Forestal Sustentable, contribuirá en efectivo y en especie al proyecto "Integración de Esfuerzos para la Conservación de los Servicios Ecosistémicos y Biodiversidad a Escala de Micro-Cuenca en Chiapas, México" de la siguiente manera:

- En efectivo: 256,644 (Doscientos cincuenta y seis mil seiscientos cuarenta y cuatro dólares) por los tres años de duración del proyecto.
- En especie: 1´304,520 (Un millón trescientos cuatro mil quinientos veinte dólares), los cuales corresponden al salario del personal involucrado, así como al equipo de infraestructura que se pondrá a disposición para la ejecución de las actividades comprometidas durante el tiempo del proyecto.

Esto genera una aportación total nuestra de 1´561,164 (Un millón quinientos sesenta y un mil ciento sesenta y cuatro dólares), durante los tres años del proyecto. Con esta modesta participación, sumada a los esfuerzos de otras dependencias, órganos de gobierno, productores y organismos internacionales, estamos contribuyendo al financiamiento inicial del esquema que hemos acordado.
Es de nuestro interés que el proyecto en Chiapas consiga la participación organizada de los distintos actores que tienen responsabilidad en la conservación y manejo sustentable de los ecosistemas, como factor esencial del desarrollo humano. Tengo la certeza de que la implementación de las acciones convenidas, debidamente consensuadas con la población que vive en las áreas priorizadas, permitirá alcanzar los objetivos del proyecto delineado.

A T E N T A M E N T E

C. JORGE CONSTANTINO KANTER
DIRECTOR

C.c.p.- MVZ. José Ángel del Valle Molina.- Secretario del Campo.- Para su conocimiento.- Ciudad.
C.c.p.- Archivo/Minutario

GOBIERNO DEL ESTADO DE CHIAPAS
COMISION FORESTAL SUSTENTABLE DEL ESTADO DE CHIAPAS
09 DIC 2009
DESPACHADO
HORA
DIRECCION GENERAL

Dirección General

Oficio No. IHN/DG/ 000562 /09.

Tuxtla Gutiérrez, Chiapas;
27 de noviembre de 2009.

Ms. Maryam Niamir-Fuller
Director
Division of Global Environment Facility (GEF) Coordination
UNEP
P.O. Box 30552
Nairobi, Kenya

Asunto: Compromiso de financiamiento del proyecto "Integración de Esfuerzos para la Conservación de los Servicios Ecosistémicos y Biodiversidad a Escala de Micro-Cuenca en Chiapas, México"

Estimado Ms. Maryam:

Por este medio confirmo que el Instituto de Historia Natural del Estado de Chiapas, México, proveerá contribuciones en efectivo y en especie al proyecto "Integración de Esfuerzos para la Conservación de los Servicios Ecosistémicos y Biodiversidad a Escala de Micro-Cuenca en Chiapas, México" de la siguiente manera:

Tipo de Aportación	Año 2010 (USD $)	Año 2011 (USD $)	Año 2012 (USD $)
En efectivo	5,000.00	5,000.00	5,000.00
En especie	70,000.00	45,000.00	20,000.00
Total	**75,000.00**	**50,000.00**	**25,000.00**

Es de nuestro entendimiento que el proyecto de Chiapas, será implementado con alianzas sólidas a través de la activa participación de todas las agencias involucradas. Esperamos que nuestro compromiso contribuya con el apalancamiento necesario para este proyecto y sea ligado a los recursos que el GEF ha destinado a este proyecto.

Por último, esperamos continuar colaborando de manera cercana con UNEP y GEF

A t e n t a m e n t e

Recibí

INSTITUTO DE HISTORIA NATURAL
DIRECCION GENERAL
27 NOV 2009
DESPACHADO
HORA
Tuxtla Gutiérrez, Chiapas

Biól. Fr[illegible]lán Esquinca Cano
Director General

.c.c.p. Archivo.
B/FEC/jach

November 27, 2009

Ms. Maryam Niamir-Fuller
Director
Division of Global Environment Facility (GEF) Coordination
UNEP
P.O. Box 30552
Nairobi, Kenya

Subject: Statement of support to the project "Mainstreaming the conservation of ecosystem services and biodiversity at the micro-watershed scale in Chiapas, Mexico" project

Dear Ms. Niamir-Fuller,

I hereby state that the municipality of Tonalá, Chiapas supports the project "Mainstreaming the conservation of ecosystem services and biodiversity at the micro-watershed scale in Chiapas, Mexico". We are sure that this project is fundamental to the preservation of the services that forests in the Sierra Madre provide to the society (locally, regionally, and globally) while improving local livelihoods. Moreover, we see this project as a great opportunity to better coordinate multisectoral policies at the municipality, state and federal level. Therefore, we would be delighted to contribute and participate in it.

We hope that our commitment to this GEF partnership will contribute to the successful achievement of the project objectives.

Sincerely yours,

H. AYUNTAMIENTO CONSTITUCIONAL ESTADOS UNIDOS MEXICANOS 2008 - 2010
PRESIDENCIA
TONALA, CHIAPAS.

C.P. Hilario Francisco González Vázquez
Major of Tonalá, Chiapas

C.c.p. Archivo.

H. AYUNTAMIENTO MUNICIPAL
CONSTITUCIONAL
PRESIDENCIA MUNICIPAL
VILLAFLORES, CHIAPAS

H. AYUNTAMIENTO CONSTITUCIONAL
Villaflores
2008 - 2010 CHIAPAS

¡Un Gobierno de RESULTADOS!

VILLAFLORES, CHIAPAS, NOVIEMBRE 30 DEL 2009

OF. No 190

REF. PMVF190/09

EXP. COORD. PROG. PROY. ESPECIALES

ASUNTO: DECLARACION DE APOYO AL PROYECTO "INCORPORACION DE LA CONSERVACION DE LOS SERVICIOS DE LOS ECOSISTEMAS Y DE LA BIODIVERSIDAD EN LA ESCALA MICRO CUENCAS EN CHIAPAS, MEXICO"

SRA. MARYAM NIAMIR-FULLER
DIRECTOR DE DIVISIÓN DE MEDIO AMBIENTE
MUNDIAL DE LA COORDINACIÓN UNEP
PO BOX 30552
NAIROBI, KENYA

Estimada Sra. Niamir-Fuller,

Por la presente declaro que el municipio de Villaflores, Chiapas, apoya el proyecto denominado **"Incorporación de la conservación de los servicios de los ecosistemas y la biodiversidad en la escala micro-cuencas en Chiapas, México"**. Tenemos una larga tradición de apoyar las actividades de conservación del medio ambiente en la Sierra Madre y estaría encantado de colaborar y participar en este proyecto, que nos ayudará a comprender mejor el valor de los ecosistemas forestales, fortalecer las capacidades locales para desarrollar proyectos sostenibles, beneficiando a los medios de vida locales y contribuir a la mitigación del cambio climático.

Esperamos que nuestro compromiso con esta asociación con la "División de Medio Ambiente Mundial" contribuya a la consecución de los objetivos del proyecto.

ATENTAMENTE

H. AYUNTAMIENTO MUNICIPAL
CONSTITUCIONAL
VILLAFLORES, CHIAPAS.
2008 - 2010
PRESIDENCIA MUNICIPAL

LIC. ADULFO CHACON CASTILLO
PRESIDENTE MUNICIPAL CONSTITUCIONAL
VILLAFLORES, CHIAPAS, MEXICO.

C.c.p.- C. Profa. Yaneth Rodas Damián.-Sindico Municipal, Villaflores, Chis.- Para su Conocimiento
.- Archivo.-

"2008, Año de la Educación Física y el Deporte"

Oficio No. 347.A- 164/2008

SUBSECRETARÍA DE HACIENDA Y CRÉDITO PÚBLICO
UNIDAD DE ASUNTOS INTERNACIONALES DE HACIENDA
DIRECCIÓN GENERAL ADJUNTA DE AMÉRICA DEL NORTE, ASIA-PACÍFICO Y EL CARIBE

SECRETARÍA DE HACIENDA Y CRÉDITO PÚBLICO

SHCP

SR. RICARDO SÁNCHEZ SOSA
Director Regional para América Latina y el Caribe
Programa de las Naciones Unidas para el Medio Ambiente
ricardo.sanchez@pnuma.org
roberto.erath@pnuma.org
Oficina en México:
Blvd. de los Virreyes no. 155, Col. Lomas de Virreyes,
C.P. 11000, México, D.F.

México, D.F., a 11 de septiembre de 2008.

Asunto: Endoso al proyecto "Mainstreaming the Conservation of Ecosystem Services and Biodiversity at the Micro-watershed Scale in Chiapas, Mexico""

En mi carácter de Punto Focal para México del Fondo para el Medio Ambiente Mundial (GEF, por sus siglas en inglés), me permito confirmar a Usted que el citado proyecto propuesto: (a) es acorde con las prioridades nacionales del gobierno y con los compromisos de México bajo las convenciones globales correspondientes; y (b) ha sido analizado por los interesados, conforme con las políticas del GEF sobre participación pública.

La implementación del citado proyecto se realizará con el Programa de las Naciones Unidas para el Medio Ambiente (PNUMA) como agencia implementadora y la Comisión Nacional de Áreas Naturales Protegidas (CONANP), como agencia ejecutora, en coordinación con Conservations Internacional-México, la Comisión Forestal del Estado de Chiapas y el Instituto de Historia Natural y Ecología de Chiapas. El financiamiento total requerido del GEF para este proyecto es USD 1'710,500, el cual incluye USD 1'485,000 para la implementación del proyecto, USD 70,000 para la preparación del proyecto y USD 155,500 (10% de los gastos inherentes al proyecto) para la comisión por los servicios asociados al manejo del proyecto de la agencia implementadora. En ese sentido, el Gobierno de México no tiene inconveniente en la utilización de este monto dentro del Marco de Asignación de Recursos del GEF-4 para México, en el área focal Biodiversidad.

La Directora General Adjunta,

Claudia Grayeb Bayata

Claudia Grayeb Bayata

Ccp Lic. Roberto Cabral Bowling.- Director General Adjunto de Financiamiento Estratégico.- Secretaría de Medio Ambiente y Recursos Naturales.- Blvd. Adolfo Ruiz Cortínez no. 4209, piso 4, Ala "A", Col. Jardines de la Montaña, C.P. 14210, Tlalpan.- Presente.
Subdirección de Estadísticas y Proyectos Agropecuarios y Ambientales.- Presente.

SECRETARIA DE MEDIO AMBIENTE
Y RECURSOS NATURALES

COMISION NACIONAL DE AREAS NATURALES PROTEGIDAS
DIRECCION REGIONAL FRONTERA SUR, ISTMO Y PACÍFICO SUR

"2009, Año de la Reforma Liberal"

Palacio Federal 3er. Piso, 2ª. Ote. Nte. No. 227,
Col. Centro. Tuxtla Gutiérrez, Chiapas.
C.P. 29000
OFICIO No. DIR/REG/RFSIPS/ 452/09
Tuxtla Gutiérrez Chiapas 26 de noviembre de 2009

MS. MARYAM NIAMIR-FULLER
DIRECTOR
DIVISION OF GLOBAL ENVIRONMENT FACILITY (GEF) COORDINATION
UNEP
P.O. BOX 3055
NAIROBI, KENYA

Subject: Funding commitment to the project "Mainstreaming the conservation of ecosystem services and biodiversity at the micro-watershed scale in Chiapas, Mexico"

Dear Dr. Maryam Niamir-Fuller,

I hereby confirm that the National Commission of Natural Protected Areas will provide in-cash and in-kind co-financing contributions to support the project "Mainstreaming the conservation of ecosystem services and biodiversity at the micro-watershed scale in Chiapas, Mexico" project as follows:

Cash: $ 521,604.00 (Five hundred twenty-one thousand six hundred and four U.S. dollars) for each year of the project duration.

In kind: $ 295,000.00 (Two hundred ninety-five thousand U.S. dollars) per year, which correspond to the salary of the personnel to be involved, as well as the equipment and infrastructure that will be available to support the activities to be developedduring the project.

This will result in an annual contribution of the Commission of USD **$ 816,604.00** (approximately USD $2,449,812 over the three years of the project). It is our understanding that the Chiapas project will be implemented with strong partnerships through the active participation of all agencies involved. We hope that our commitment will contribute to achieve the expected leverage for this project, and linked to the resources GEF has allocated to this project.

Finally, we hope to continue working closely with UNEP and GEF, developing relevant projects to the Southern Border Region Isthmus and South Pacific CONANP region.

Sincerely,

BIOL. FRANCISCO JAVIER JIMÉNEZ GONZÁLEZ
REGIONAL DIRECTOR

C.c.p. Archivo

FJJG/CGV/amrd*****

SECRETARIA DE MEDIO AMBIENTE
Y RECURSOS NATURALES

COMISION NACIONAL DE AREAS NATURALES PROTEGIDAS
DIRECCION REGIONAL FRONTERA SUR, ISTMO Y PACÍFICO SUR

"2009, Año de la Reforma Liberal"

Palacio Federal 3er. Piso, 2ª. Ote. Nte. No. 227,
Col. Centro. Tuxtla Gutiérrez, Chiapas.
C.P. 29000
OFICIO No. DIR/REG/RFSIPS/ 452/09
Tuxtla Gutiérrez Chiapas 26 de noviembre de 2009

MS. MARYAM NIAMIR-FULLER
DIRECTOR
DIVISION OF GLOBAL ENVIRONMENT FACILITY (GEF) COORDINATION
UNEP
P.O. BOX 3055
NAIROBI, KENYA

Asunto: Compromiso de financiamiento del proyecto "Integración de Esfuerzos para la Conservación de los Servicios Ecosistémicos y Biodiversidad a Escala de Micro-Cuenca en Chiapas, México"

Estimada Dra. Maryam Niamir-Fuller,

Por este medio confirmo que la Comisión Nacional de Áreas Naturales Protegidas contribuirá en efectivo y en especie al proyecto "Integración de Esfuerzos para la Conservación de los Servicios Ecosistémicos y Biodiversidad a Escala de Micro-Cuenca en Chiapas, México" de la siguiente manera:

En efectivo: $ 521,604.00 (Quinientos veintiún mil seiscientos cuatro dólares) por cada año de la duración del proyecto.

En especie: $ 295,000.00 (Doscientos noventa y cinco mil dólares) por año, los cuales corresponden al salario del personal involucrado, así como al equipo e infraestructura que se pondrá a disposición para la ejecución de las actividades comprometidas durante el tiempo del proyecto.

Esto genera una aportación anual de la Comisión de **$ 816,604.00** dólares (aproximadamente $2,449,812 durante los tres años del proyecto). Es de nuestro entendimiento que el proyecto de Chiapas será implementado con alianzas sólidas a través de la activa participación de todas las agencias involucradas. Esperamos que nuestro compromiso contribuya con el apalancamiento necesario para este proyecto, y sea ligado a los recursos que el GEF ha destinado a este proyecto.

Por último, esperamos continuar colaborando de manera cercana con UNEP y GEF en proyectos relevantes para la Región Frontera Sur Istmo y Pacifico Sur de la CONANP.

A T E N T A M E N T E

BIOL. FRANCISCO JAVIER JIMÉNEZ GONZÁLEZ
DIRECTOR REGIONAL

C.c.p. Archivo

FJJG/CGV/amrd*****

APPENDIX 14: DRAFT PROCUREMENT PLAN

Project: Mainstreaming the conservation of ecosystem services and biodiversity at the micro-watershed scale in Chiapas, Mexico

Project components	Services to be procured	Estim. working months	Estim. cost to GEF (US$)
1. Development of the knowledge base for appraisal of ES	Consultancies	91	149,020
	Local Meetings and workshops		15,608
	Technical equipment for monitoring		35,132
	Printing		83,237
2. Integrating ES and BD concerns into land use policies, planning and promotion at the sub-watershed level	Consultancies	331	421,230
	Capacity Building Advisor/Project Coordinator	36	111,448
	Local Meetings and workshops		84,438
	Printing and mapping		11,693
3. Increasing access by land users to public and private PES mechanisms	Consultancies	120	241,011
	Local Meetings and workshops		68,772
	Printing		22,542
	Promotional activities for marketing		60,000
4. Project operation and administration	Mid Term and Final Evaluations, Auditing Fees and Indirect Costs		179,913
Total			**1,484,044**

I. Project General Information

1. Project Name: Mainstreaming the conservation of ecosystem services and biodiversity at the micro-watershed scale in Chiapas, Mexico
2. Project Type: FSP
3. Project ID (GEF): 3816
4. Project ID (IA):
5. Implementing Agency: UNEP
6. Country: Mexico

Name of reviewers completing tracking tool and completion dates:

	Name	Title	Agency
Work Program Inclusion	Francisco Javier Jimenez Yatziri Zepeda	PPG Coordination PPG Coordination	CONANP C.I.
Project Mid-term			
Final Evaluation/project completion			

7. Project duration: ***Planned*** 3 years ***Actual***

8. Lead Project Executing Agencies: CI. Other lead partners: CONANP, IHN, COFOSECH, CONAGUA

9. GEF Strategic Program:
- ☐ Strengthening the policy and regulatory framework for mainstreaming biodiversity (SP 4)
- ☐ Fostering markets for biodiversity goods and services (SP 5)

10. Production sectors and/or ecosystem services directly targeted by project:

10. a. Please identify the main production sectors involved in the project. Please put "**P**" for sectors that are primarily and directly targeted by the project, and "**S**" for those that are secondary or incidentally affected by the project.

Agriculture_____P____
Fisheries_____
Forestry_____P____
Tourism_____
Mining_____
Oil_____
Transportation_____
Other (please specify): Natural Non-Timber Products ____Palma Xate _____

II. Project Landscape/Seascape Coverage

11. a. What is the extent (in hectares) of the landscape or seascape where the project will directly or indirectly contribute to biodiversity conservation or sustainable use of its components? An example is provided in the table below.

Targets and Timeframe **Project Coverage**	**Foreseen at project start**	**Achievement at Mid-term Evaluation of Project**	**Achievement at Final Evaluation of Project**
Landscape/seascape[1] area directly[2] covered by the project (ha)	30,000 hectares		
Landscape/seascape area indirectly[3] covered by the project (ha)			

Explanation for indirect coverage numbers:
Integrated management of natural resources in the target watersheds will produce ecosystem services and goods in areas other than those of direct intervention.

---

11. b. Are there Protected Areas within the landscape/seascape covered by the project? If so, names these PAs, their IUCN or national PA category, and their extent in hectares.

	Name of Protected Areas	**IUCN and/or national category of PA**	**Extent in hectares of PA**
1.	El Triunfo	Biosphere Reserve	119,177
2.	La Sepultura	Biosphere Reserve	167,309
3.	La Encrucijada	Biosphere Reserve	144,868
4.	Volcán Tacaná	Biosphere Reserve	6,378
5.	La Frailescana	Area for the Protection of Natural Resources (APRN)	181,350
6.	Pico El Loro-Paxtal	Zone Subject to Ecological Conservation (State Park)	60,982
7.	El Gancho-Murillo	Zone Subject to Ecological Conservation (State Park)	7, 284
8.	El Cabildo-Amatal	Zone Subject to Ecological Conservation (State Park)	3,611

[1] For projects working in seascapes (large marine ecosystems, fisheries etc.) please provide coverage figures and include explanatory text as necessary if reporting in hectares is not applicable or feasible.
[2] Direct coverage refers to the area that is targeted by the project's site intervention. For example, a project may be mainstreaming biodiversity into floodplain management in a pilot area of 1,000 hectares that is part of a much larger floodplain of 10,000 hectares.
[3] Using the example in footnote 5 above, the same project may, for example, "indirectly" cover or influence the remaining 9,000 hectares of the floodplain through promoting learning exchanges and training at the project site as part of an awareness raising and capacity building strategy for the rest of the floodplain. Please explain the basis for extrapolation of indirect coverage when completing this part of the table.

11. c. Within the landscape/seascape covered by the project, is the project implementing payment for environmental service schemes? If so, please complete the table below. An example is provided.

Targets and Timeframe	**Foreseen at Project Start**		**Achievement at Mid-term Evaluation of Project**		**Achievement at Final Evaluation of Project**	
Coverage **Environmental Service**	**Extent in hectares**	**Payments[4] generated (US$)**	**Extent in hectares**	**Payments generated (US$)**	**Extent in hectares**	**Payments generated (US$)**
Water provision and quality	3,750	$ 33 per hectare/year				
Biodiversity conservation	1,200	$ 33 per hectare/year				
Agro-forestry practices	1,800	$ 33 per hectare/year				
	6,750					

III. Management Practices Applied

12.a. Within the scope and objectives of the project, please identify in the table below the management practices employed by project beneficiaries that integrate biodiversity considerations and the area of coverage of these management practices. Please also note if a certification system is being applied and identify the certification system being used. Note: this could range from farmers applying organic agricultural practices, forest management agencies managing forests per Forest Stewardship Council (FSC) guidelines or other forest certification schemes, artisanal fisherfolk practicing sustainable fisheries management, or industries satisfying other similar agreed international standards, etc. An example is provided in the table below.

Specific management practices that integrate BD	**Name of certification system being used (insert NA if no certification system is being applied)**	**Area of coverage foreseen at start of project**	**Achievement at Mid-term Evaluation of Project**	**Achievement at Final Evaluation of Project**

[4] Project funds will not be used for ES payments but will be building capacity and helping to increase access by land users to ES payments by government programs and private markets.

1. Organic agricultural practices (coffee and cocoa)	CERTIMEX MAYACERT	2,100 hectares		
2. Sustainable cattle practices (organic milk and beef)	CERTIMEX (using EU Organic Standard)	600 hectares		
3. Sustainable timber forestry (interior construction materials and furniture-grade wood)	SmartWood	400 hectares		
4. Sustainable non-timber forestry (palma xate	NA	100 hectares		
		3,200 hectares		

IV. Market Transformation

13. **For those projects that have identified market transformation as a project objective**, please describe the project's ability to integrate biodiversity considerations into the mainstream economy by measuring the market changes to which the project contributed.

The sectors and subsectors and measures of impact in the table below **are illustrative examples, only**. Please complete per the objectives and specifics of the project.

Name of the market that the project seeks to affect (sector and sub-sector)	Unit of measure of market impact	Market condition at the start of the project	Market condition at midterm evaluation of project	Market condition at final evaluation of the project
Sustainable agriculture (organic coffee and cocoa)	US$ of sales of certified coffee and cocoa per year	To be determined during baseline assessment		
Sustainable forestry (timber processing)	US$ of sales of processed wood per year	To be determined during baseline assessment		
Sustainable forestry	N° of leaves	To be		

(non-timber harvesting: palma xate)	bunches and N° of seedlings sold per year	determined during baseline assessment		

V. Policy and Regulatory frameworks

For those projects that have identified addressing policy, legislation, regulations, and their implementation as project objectives, please complete the following series of questions*:* 14a, 14b, 14c.

An example for a project that focused on the agriculture sector is provided in 14 a, b, and c.

14. a. Please complete this table at **CEO endorsement for each sector** that is a primary or a secondary focus of the project.
Please answer YES or NO to each statement under the sectors that are a focus of the project.

Sector **Statement: Please answer YES or NO for each sector that is a focus of the project**	**Agriculture**	**Fisheries**	**Forestry**	**Tourism**	**Natural Non Timber Products**
Biodiversity considerations are mentioned in sector policy	YES		YES		YES
Biodiversity considerations are mentioned in sector policy through specific legislation	YES		YES		YES
Regulations are in place to implement the legislation	YES		YES		YES
The regulations are under implementation	NO		NO		NO
The implementation of regulations is enforced	NO		NO		NO
Enforcement of regulations is monitored	NO		NO		NO

14. b . Please complete this table at **the project mid-term for each sector** that is a primary or a secondary focus of the project.

Please answer YES or NO to each statement under the sectors that are a focus of the project.

Sector **Statement: Please answer YES or NO for each sector that is a focus of the project**	**Agriculture**	**Fisheries**	**Forestry**	**Tourism**	**Natural Non Timber Products**
Biodiversity considerations are mentioned in sector policy					
Biodiversity considerations are mentioned in sector policy through specific legislation					
Regulations are in place to implement the legislation					
The regulations are under implementation					
The implementation of regulations is enforced					
Enforcement of regulations is monitored					

14. c. Please complete this table at **project closure for each sector** that is a primary or a secondary focus of the project.
Please answer YES or NO to each statement under the sectors that are a focus of the project.

Sector **Statement: Please answer YES or NO for each sector that is a focus of the project**	**Agriculture**	**Fisheries**	**Forestry**	**Tourism**	**Natural Non Timber Products**
Biodiversity considerations are mentioned in sector policy					
Biodiversity considerations are mentioned in sector policy through specific legislation					
Regulations are in place to implement the legislation					
The regulations are under implementation					
The implementation of regulations is enforced					
Enforcement of regulations is monitored					

All projects please complete this question at the project mid-term evaluation and at the final evaluation, if relevant:

14. d. Within the scope and objectives of the project, has the private sector undertaken **voluntary** measures to incorporate biodiversity considerations in production? If yes, please provide brief explanation and specifically mention the sectors involved.

An *example* of this could be a mining company minimizing the impacts on biodiversity by using low-impact exploration techniques and by developing plans for restoration of biodiversity after exploration as part of the site management plan.

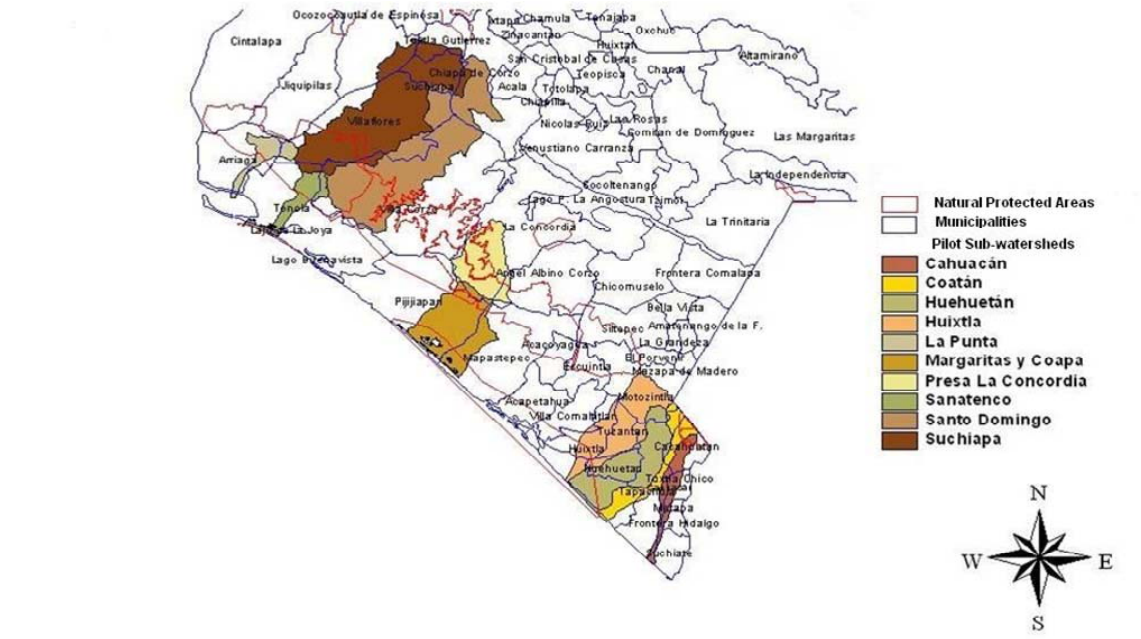
_____
_____
_____
_____
_____

VI. Other Impacts

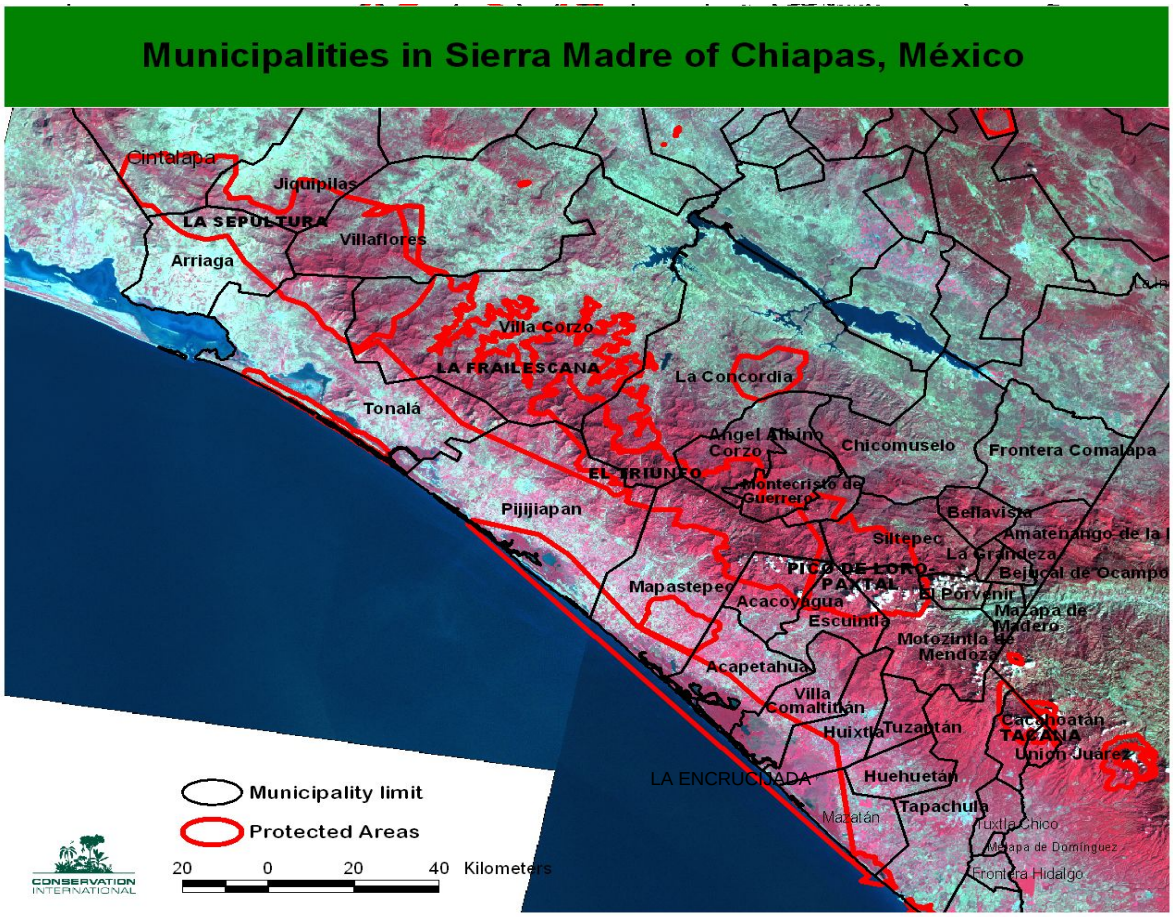
16. Please briefly summarize other impacts that the project has had on mainstreaming biodiversity that have not been recorded above.

_____
_____
_____
_____
_____

MAP 1: SUB-WATERSHEDS IN THE SIERRA-COSTA REGION OF CHIAPAS



MAP 2: MUNICIPALITIES AND PROTECTED AREAS IN THE SIERRA MADRE OF CHIAPAS



Síntesis y Revisión de los Esfuerzos Existentes y la Capacidad Institucional para el Monitoreo de Servicios Ecosistémicos y Biodiversidad en la Sierra Madre de Chiapas, México

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INTRODUCCION

La expansión de la frontera agrícola asociada al crecimiento poblacional ha causado la pérdida y fragmentación de la superficie forestal a nivel mundial. Esta problemática ambiental es especialmente importante en países tropicales en vías de desarrollo (Bray et al. 2008, Cayuela et al. 2006b, Cayuela et al. 2006d, De Jong et al. 1999, González-Espinosa et al. 2007). Uno de los aspectos más alarmantes de los patrones actuales de cambio de uso de suelo corresponde a las tasas de perdida de biodiversidad **(BD desde ahora en adelante)** (Cayuela et al. 2006b, Ochoa-Gaona and González-Espinosa 2000).

Los ecosistemas forestales, además de ser importantes refugios de BD, entregan importantes Servicios Ecosistémicos **(SE desde ahora en adelante)**, como la regulación a los eventos extremos, conservación de la fertilidad de los suelos, provisión de madera y leña y además tienen una importante influencia en el almacenamiento de carbono y en mitigar los efectos del cambio climático (Costanza et al. 1997, Daily 1997, De Groot et al. 2002).

Los esfuerzos y estrategias tradicionales de conservación a nivel mundial se han enfocado en la conservación de la BD, sin embargo, en las ultimas dos décadas el concepto de SE ha surgido con creciente aceptación, ya que entrega una visión humana de los ecosistemas (Daily 1997, Daily and Matson 2008, De Groot et al. 2002). Sitúa a los ecosistemas en el centro de la discusión, generando oportunidades para entender las consecuencias del proceso de toma de decisiones sobre el ambiente (Balvanera et al. 2001, Kremen 2005).

Los SE, han sido definidos como los componentes o procesos del ecosistema que contribuyen directamente a aumentar el bienestar humano debido a que son consumidos, disfrutados o que regulan las condiciones ambientales en las que los humanos viven

(Boyd and Banzhaf 2007, Daily 1997, Millenium Assessment 2003, Wallace 2008). La Evaluación de los Ecosistemas del Milenio (2003) clasifica a los SE en cuatro categorías: provisión (productos que se obtienen de los ecosistemas, por ej.:agua, alimentos, fibras, etc.), regulación (propiedades emergentes del ecosistema que regulan las condiciones ambientales en la que los humanos viven por ej.: regulación del clima, ciclos hidrológicos, calidad del agua, etc.), cultura (beneficios tangibles e intangibles, obtenidos de la vinculación del hombre con el ecosistema por ej.:recreación, belleza escénica, etc.) y soporte (procesos ecosistémicos básicos que mantienen la generación de todos los demás servicios, por ej.: formación del suelo, polinización, ciclaje de nutrientes, etc.).

La situación critica ambiental hace relevante contar con información base descriptiva de los ecosistemas en distintos períodos, con la finalidad de poder monitorear cambios en el tiempo tanto de la BD como de los SE. Los mapas son una herramienta útil para evaluar patrones espaciales de provisión, asistir los procesos de toma de decisión, abordar múltiples escalas y desarrollar estrategias de conservación de BD y SE (Daily and Matson 2008). Para que los planes de monitoreo y mapeo sean aplicables, las distintas instituciones con responsabilidad en el manejo y conservación de los recursos naturales deben tener la capacidad técnica para implementarlos. Es por esto que los planes de monitoreo y mapeo, debe ser desarrollado participativamente y en conjunto con los actores involucrados, ya que en caso contrario, estos no tendrán efecto en la toma de decisiones.

En este trabajo resulta conveniente utilizar un enfoque de cuenca para entender las interrelaciones entre los recursos naturales (clima-relieve-suelo-vegetación), así como la forma en que se organiza la población para apropiarse de ellos y su impacto en la cantidad, calidad y temporalidad del agua. Este enfoque nos da la posibilidad de

evaluar y explicar las externalidades resultantes de los diferentes usos del suelo (Cotler 2004).

El área de estudio, corresponde a la Sierra Madre de Chiapas, que origina un parte aguas paralelo a la costa, en la cual se tienen altitudes de hasta 3,000 msnm en la Sierra del Soconusco. En la zona fronteriza destaca el volcán Tacaná, con una altura de 4080 msnm, siendo límite internacional entre México y Guatemala. La Planicie Costera del Pacífico se localiza al sur de la Sierra Madre y se conforma por un paisaje plano. El territorio de la Costa de Chiapas se constituye por 21 municipios, entre los más importantes destacan por su extensión: Pijijiapan, Tonalá, Mapastepec y Tapachula. La población asentada, es aproximadamente de 900 mil habitantes, de los cuales el 51% es rural y el 49% restante urbano. Esta zona es de relevancia global debido a que cubre aproximadamente 1.8 millones de hectáreas y alberga áreas protegidas importantes: Reservas de la Biosfera: El Triunfo, La Sepultura y La Encrucijada, el Área Natural La Frailescana y la Reserva Estatal Pico del Loro. Estas áreas protegidas cubren una superficie importante del corredor biológico Mesoamericano de México, específicamente del corredor Montes Azules-El Triunfo (CBM-T), que funciona como conector ecológico entre las Reservas de la Biosfera Montes Azules, La Sepultura, Selva el Ocote y El Triunfo (3106ha) (Diaz-Gallegos et al. 2008).

El objetivo general de este estudio corresponde a desarrollar el conocimiento base para entender a los SE y sus interacciones con los usos de suelo entre actores claves a la escala de micro cuenca. Los objetivos específicos corresponden a: i) Identificar, revisar y compilar todos los esfuerzos pasados de mapeo y monitoreo de SE y BD en la región del proyecto y en otras partes del sur de México; ii) Identificar, recopilar y revisar los métodos para evaluar patrones de cambios de uso de suelo; iii) Revisar la capacidad institucional para la evaluación, mapeo y monitoreo de SE y BD;

iv) traducir la información de monitoreo en una aproximación metodológica difundible a los tomadores de decisión de las cuencas

METODOS: Revisión experiencias de Mapeo y Monitoreo de BD y SE

1) Identificar, revisar y compilar todos los esfuerzos pasados de mapeo y monitoreo de SE y BD en la región del proyecto y en otras partes del sur de México (y, si es posible, comparables también en partes de Mesoamérica, tales como Guatemala y Belice), incluyendo los métodos utilizados. Para SE, se hará hincapié en el potencial de carbono y servicios de las cuencas hidrográficas. El trabajo se llevará a cabo a través de revisiones de literatura y reuniones con las instituciones de investigación y otras partes interesadas clave (incluidas las instituciones académicas, organizaciones no gubernamentales, organismos gubernamentales, etc).

METODO: Para alcanzar este objetivo se hará una exhaustiva revisión bibliográfica, identificando indicadores para mapear y monitorear SE (SE) y BD (BD), haciendo énfasis en la relación o efecto esperado entre las variables indicadoras y los SE y BD. Esta revisión será ampliada por medio de plataformas de búsqueda de literatura, como la ISI web of science y Biological Abstracts, empleando filtros como México sur, Mesoamérica, SE y BD. Además se incluirá una búsqueda en las páginas de Internet de las instituciones con atribuciones en el manejo o conservación de recursos naturales en la región (Comisión Nacional del Agua, CONAGUA; Instituto Historia Natural, IHN; Colegio de la Frontera Sur, ECOSUR; Comisión de Áreas Naturales Protegidas, CONANP; Comisión Nacional Forestal, CONAFOR; etc.. Se identificaran fuentes de información no publicada de las instituciones y se programaran reuniones con los

actores involucrados para la obtención de la información. Toda la información compilada será sistematizada en una tabla síntesis conteniendo los SE o componentes de la BD abordados, indicadores de reconocimiento para el mapeo o monitoreo, breve descripción del procedimiento analítico empleado, el área especifica de estudio y la fuente bibliográfica.

RESULTADOS y DISCUSION: Revisión experiencias de Mapeo y Monitoreo de BD y SE

Se registraron 55 estudios, identificando la categoría de clasificación de la Evaluación de los Ecosistemas del Milenio (Millenium Assessment 2003), ya sea soporte, regulación, provisión o culturales; el componente de BD o SE abordado en el estudio; en términos generales el análisis realizado, indicador, área de estudio, insumos necesarios para llevar a cabo el estudio y hallazgos encontrados en el estudio. Para el caso de las categorías de la Evaluación de los Ecosistemas del Milenio, se identificaron SE de las cuatro categorías, sin embargo, la categoría de servicios culturales estuvo escasamente representado solo con dos estudios de conocimiento tradicional y uno de recreación (ver tabla 1).

Para el caso de los componentes de la BD los distintos estudios abordados se enfocaron principalmente en el componente arbóreo, avifauna, insectos, plantas de todas las formas de vida etc. Por lo general estos estudios aplicaron métodos de campo, para el caso de árboles y plantas, se aplicaron parcelas de muestreo para el estudio de la composición y estructura de la vegetación, empleando índices conocidos de BD como indicadores (Cayuela et al. 2006a, Cayuela et al. 2006b, Diemont and Martin 2009, González-Espinosa et al. 2009, Gonzalez-Espinosa et al. 2004, Potvin et al. 2005, Ramírez-Marcial et al. 2001). Algunos de los estudios revisados combinaron el trabajo

de campo, con evaluaciones espaciales empleando insumos como imágenes de satélite y bases cartográficas (modelos digitales de elevación de terreno en base a la topografía, mapas climáticos, de cobertura y uso de suelo, etc.), con la finalidad de extrapolar en el espacio los datos de campo para generar mapas de BD (Cayuela et al. 2006a, Cayuela et al. 2006b, Cayuela et al. 2006c, Cayuela et al. 2006d, González-Espinosa et al. 2007, González-Espinosa et al. 2009, Gonzalez-Espinosa et al. 2004).Para el caso de estudios de BD de animales e insectos, los métodos por lo general se basaron en trabajo de campo empleando transectos observacionales, colecta de individuos, registro de ejemplares de museo entre otros (Arellano et al. 2008, Cruz-Lara et al. 2004, Diaz-Ruiz et al. 2006, Espinoza Medinilla et al. 1998, Estrada et al. 2006, Kosoy et al. 2008, Macip-Rios and Munoz-Alonso 2008, Mas and Dietsch 2004a, Mas and Dietsch 2003, Perfecto et al. 2005, Philpott et al. 2006, Ramirez-Albores 2006, Tejeda-Cruz and Sutherland 2005). Cabe resaltar que en la región del Soconusco se concentra una gran cantidad de estudios en los que se comparan los distintos niveles de BD, para varios sistemas de manejo dedicados a la producción de café (Moguel and Toledo 1999). Este tipo de sistemas agroforestales ha sido atractivo para los ecólogos a nivel mundial principalmente porque existe un gradiente de complejidad bien definida permitiendo realizar estudios controlados de los efectos de complejidad ambiental en procesos ecosistémicos específicos y en BD (Estrada et al. 2005, Estrada et al. 2006, Mas and Dietsch 2004a, Mas and Dietsch 2003, Mas and Dietsch 2004b, Perfecto et al. 2005, Perfecto et al. 2004, Philpott et al. 2006, Philpott et al. 2008). Este gradiente esta conformado por cinco sistemas de producción de café, dos tradicionales donde el café se produce bajo la sombra de la vegetación original, uno intermedio donde la sombra la proveen árboles no nativos, y dos "modernos" (monocultivos con y sin sombra) (Moguel and Toledo 1999).

Para el caso de los SE de regulación, los SE almacenes de C, flujos de C y almacenes de C, y calidad de agua fueron los mas representados. La diferencia entre almacenes y flujos de C radica en que el primero son SE estáticos (masas boscosas en pie mas el componente de biomasa subterráneo por ejemplo), mientras el SE flujos de C involucra la variable temporalidad y tasas de secuestro. Para el caso de los almacenes y flujos de C, la mayoría de los estudios realiza inventarios de campo, los cuales consisten en establecer parcelas de muestreo representando proporcionalmente los tipos de cobertura presentes en el territorio, y en estas parcelas se mide el Diámetro a la Altura del pecho de los árboles y la densidad de la madera y mediante ecuaciones alométricas se calcula la biomasa aérea (asumiendo que el C es entre un 48 y 50% de la biomasa aérea (Hughes et al. 1999)), para el componente herbáceo se extrae la vegetación en pequeños cuadrantes para luego ser secada y pesada en laboratorio y para el componente subterráneo se extraen muestras de suelo (Balvanera et al. 2005, Cairns et al. 1995, Coomes et al. 2008, Corbera et al. 2009, De Jong et al. 1999, De Jong et al. 2000a, De Jong et al. 2000b, Kirby and Potvin 2007, Kosoy et al. 2008, Martínez et al. In Press, Mendoza-Vega et al. 2003, Roncal-Garcia et al. 2008, Sánchez-Azofeifa et al. 2009). Algunos de estos estudios evaluaron los almacenes de C a nivel espacial, otorgándole a los tipos de cobertura una cantidad de C asociada según la medición en campo por tipo de vegetación (de Jong and Montoya 1994, De Jong et al. 1999, De Jong et al. 2000a, De Jong et al. 2000b). Para el caso de la calidad de agua, los estudios consistieron en medir la concentración de contaminantes en distintos puntos de la cuenca (parte baja, media y alta) (Siu et al. 2007). Para el caso del SE regulación de perturbaciones, especialmente por tormentas y huracanes (Huracan Stan del año 2005), se revisaron varios trabajos que evaluan la vulnerabilidad de los sistemas agroforestales y forestales de distinta intensidad de manejo, específicamente para evaluar cómo

contribuyen aspectos topográficos y de paisaje (pendiente, exposición al viento, distancia a los ríos, aspectos geológicos, geomorfológicos e hidrológicos), contribuyen al área y frecuencia de derrumbes en la zona. En estos estudios se ha concluido que la reducción de la complejidad estructural de la vegetación (por ejemplo, sistemas de producción intensiva) esta directamente relacionada al aumento de áreas afectadas por derrumbes (Phillot et al. 2008, Vásquez et al. 2008, Restrepo & Álvarez 2006). Estos estudios proponen métodos de para elaborar mapas de riesgo, identificando elementos indicadores de las cuencas (como por ejemplo variables topográficas como exposición, pendiente, radiación etc.) que influyen en la vulnerabilidad al impacto de huracanes (Vásquez et al. 2006).

Para el caso de los SE de provisión los que destacan son los Productos Forestales No Maderables (PFNM), principalmente para 5 especies de palma empleadas en la industria ornamental. Principalmente estos trabajos comparan la estructura poblacional y la tasa de producción de hojas de especies de palmas útiles, en diferentes etapas de un ciclo de cultivo y se cuantifica la demanda doméstica (Endress et al. 2006, Lopez-Feldman and Wilen 2008, Pulido and Caballero 2006, Ticktin 2005, Trauernicht and Ticktin 2005). Para el caso del SE cantidad de agua, se calculó cantidad total de agua disponible en una cuenca como la diferencia de precipitación y evapotranspiración para microcuencas y luego se espacializó empleando la cartografía de las microcuencas (Saldaña 2008). El SE producción de café, como ya se menciono, en los estudios de comparación de diversidad para los distintos sistemas de manejo, sin embargo, se incluyeron estudios de evaluación ecológica y comparación de los criterios usados por los principales programas de certificación para el café de sombra (Bray et al. 2002, Mas and Dietsch 2004a) y estudios que analizan la participación de comunidades que se benefician de pagos para servicios de BD y secuestro de C y lo contrasta con

comunidades vecinas que no reciben pagos (Corbera et al. 2007, Corbera et al. 2009, Kosoy et al. 2008, Perfecto et al. 2005, Soto-Pinto et al. 2000). Estos estudios muestran que los programas de pago de SE han sido percibidos positivamente por las comunidades rurales y han contribuido a aumentar los ingresos domésticos y mejorar las prácticas agricolas y las habilidades organizacionales (Corbera et al. 2007, Corbera et al. 2009).

Considerando la totalidad de estudios revisados solo el 30%, involucra al componente espacial en su evaluación, casi todos son estudios puntuales y comparativos. Además de este 30% muy pocos estudios espaciales se han llevado a cabo en la Sierra Madrea de Chiapas, la mayoría de los estudios se concentra en la zona de los Altos de Chiapas y los investigadores que han liderado la parte del mapeo se concentra en el Colegio de la Frontera Sur o ECOSUR. A continuación en la tabla 1 se resaltan los SE componentes de BD considerados como prioritarios, por ser los mas estudiados y considerando los SE que tienen mercado en el esquema de PSA de la CONAFOR. Se incorporó la producción de café, por el potencial ecológico de este sistema agroforestal (café de sombra diversificado), al mantener condiciones similares al bosque natural.

Tabla 1: Los SE y los componentes de la BD identificados en la revisión.

Categoria MA	Componente BD o SE	Nro de estudios	% Estudios
Soporte	BD (general)	1	1
	BD arboles	6	7
	BD aves	5	6
	BD insectos	1	1
	BD lagartijas	1	1
	BD mamíferos	2	2
	BD mariposas	4	5
	BD murciélagos	1	1
	BD peces	1	1
	BD plantas	2	2
	BD primates	1	1
	Fertilidad de suelos	1	1
	Servicios derivados de cuenca (mantención la integridad del ecosistema)	1	1
Regulacion	Almacenes de Carbono	7	9
	Calidad de agua	2	2
	Control erosión	1	1
	Control perturbaciones (fuego)	2	2
	Control perturbaciones (tormentas, huracán)	4	4
	Control de plagas	3	4
	Flujos de Carbono	8	10
	Polinización	1	1
	Regulación de los ciclos hidrológicos	1	1
Provisión	Bioprospección	1	1
	Especies vegetales utiles	2	2
	PFNM Sabal yapa PFNM palma Xate PFNM Chamaedorea radicalis PFNM Chamaedorea hooperiana PFNM Aechmea magdalenae	5	6
	Polinización cultivos	1	1
	Producción de alimentos	1	1
	Producción de azúcar	1	1
	Producción de café	13	16
	Producción de maiz	1	1
	Cantidad de agua	3	4
Cultural	Conocimiento tradicional	2	2
	Recreación	1	1

METODOS: Revisión de metodologías de cambio de uso de suelo

2. Identificar, recopilar y revisar los métodos utilizados en otros lugares en el sur de México y partes de Mesoamérica comparables para mapear y monitorear SE y BD de una manera integral y cuantificar las relaciones entre métodos o patrones de estimación de cambios de uso de suelo y la provisión de SE y BD; evaluar la aplicabilidad de estos métodos a las condiciones de la región del proyecto.

METODO: Revisión bibliográfica exhaustiva de los métodos empleados para evaluar los efectos de los patrones de uso de suelo en la región y sus efectos en la BD y en cambios de provisión de SE. En esta revisión se distinguirán los elementos para mapear los cambios de uso de suelo y se identificaran los insumos requeridos para obtener mapas de uso de suelo. Con esta búsqueda se elaborará una matriz en la cual las filas corresponderán a los principales cambios de uso de suelo de la región y las columnas los SE o componentes de la BD que se ven afectados por estos cambios, en cada celda de la matriz se evaluara el efecto positivo, negativo o sin efecto de la actividad de cambio de uso de suelo sobre el SE o componente de la BD.

RESULTADOS y DISCUSION: Revisión de metodologías de cambio de uso de suelo

I. Revisión patrones de uso de suelo en la región

Se revisaron 14 estudios relevantes de patrones de cambio de uso de suelo en la región. Los insumos empleados fueron por lo general imágenes de satélite de tipo Landsat para diferentes años, ortofotos, mapas de cobertura y uso de suelo y el Inventario Nacional Forestal, mapas topográficos de la INEGI, modelos de elevación

digital de terreno, cartografía de suelos, clima y fotografías aéreas (Arredondo-Leon et al. 2008, Bray et al. 2008, Cayuela et al. 2006d, De Jong et al. 2000a, Diaz-Gallegos et al. 2008, Escalante et al. 2007, Figueroa and Sanchez-Cordero 2008, Ochoa-Gaona and González-Espinosa 2000, Sivrikaya et al. 2007). Solo un estudio empleo parcelas de campo para la medición de carbono (De Jong et al. 2000a), sin embargo, varios estudios emplearon puntos de verificación en campo, con la finalidad de validar la información espacial (Cayuela et al. 2006b, Escalante et al. 2007, Ochoa-Gaona and González-Espinosa 2000). Por lo general la forma de proceder es en primer lugar clasificar las imágenes de satélite en tipos de cobertura, procurando usar la misma clasificación para las distintas fechas y luego se calcula la superficie de cambio por tipo de cobertura. La tasa de deforestación luego se calcula con formulas matemáticas como por ejemplo la de Dirzo y García (Dirzo and García 1992)

$$r=1-[Ai-(Af-Ai)]^{1/t}$$

Donde Ai es la superficie inicial, Af la superficie del ultimo año y t el numero de años que se esta realizando la evaluación. Las escalas variaron dependiendo del área de estudio, de cuencas de 2000 km2, en las que se trabaja a estala 1:70000 a escalas regionales del estado de Chiapas de 1:250000. Algunos hallazgos importantes de los estudios para el caso de la Sierra Madre corresponde al de Diaz gallegos et al. (2008), que evaluando los niveles de deforestación en el corredor biológico Mesoamericano, encontró que la conversión de bosques a pastizales se presentó en forma más acentuada en el corredor Montes Azules-El Triunfo, afectando 14% de su superficie, entre los años 80's y el 2000. La deforestación por agricultura de temporal se distribuyó en el 5% del corredor y significó el 4% de cambio en el corredor del Triunfo (126000ha). Otro estudio sobre la efectividad de las áreas protegidas de evitar la deforestación encontró que las Reserva de la Biósfera el Triunfo, Sepultura y Encrucijada presentaron una

superficie de transformación de 11,13 y 30% respectivamente, entre el año 1993 y 2002 (Figueroa and Sanchez-Cordero 2008). Los estudios realizados por Conservation International (2009) muestran que entre el 2000 y 2007, la zona de la Sierra Madre de Chiapas presenta una deforestacion total de 1.6% en comparación a zonas como la Lacandona que han sufrido una deforestación total de 9.4%.

II. Identificación de los usos productivos mas importantes de la región

Uso agrícola intensivo: En la región los cultivos más importantes son el café, plátano, maíz, soya, caña de azúcar, palma africana, mango y cacao. El cultivo de café y plátano en la región, son eje de la economía debido a su uso intensivo de mano de obra, equivalente a unos 600 -1,200 jornales anuales, dependiendo del tipo de explotación. Los productores de café son aproximadamente 5,000 y la superficie de cultivo es cercana a las 70,000 hectáreas (Comisión Nacional del Agua 2006).

Producción de Café

A continuación se definen de acuerdo a la clasificación de Moguel & Toledo (1999) los cinco principales sistemas de producción de café en la zona del Soconusco de la Sierra madre. *El sistema rustico tradicional,* mantiene las condiciones originales del bosque y solo sustituye el estrato mas bajo del bosque manteniendo la complejidad estructural (tres estratos, sin agroquímicos). *El policultivo tradicional,* es una plantación de café de sombra, en el que se introduce el café bajo la cobertura original de bosque, pero a diferencia del rustico las plantas de café crecen junto una alta diversidad de otras plantas útiles formando un exuberante "jardín de café" (sin uso de agroquímicos). *El policultivo comercial,* remueve el bosque original y lo sustituye por especies arbóreas de sombra apropiadas para el cultivo de café o que tengan valor comercial (como por ejemplo muchas leguminosas) (usa agroquímicos frecuentemente y la producción es directa para

mercado). *El monocultivo de sombra,* se remueve el bosque original para plantar café como único cultivo y se emplea solo una leguminosa para proveer sombra (el uso de agroquímicos es obligatorio). *El monocultivo sin sombra,* es igual que el anterior pero sin sombra (altos insumos agroquímicos, uso de maquinaria y pierde el carácter agroforestal).

Uso Pecuario: La actividad ganadera tiene reconocimiento y prestigio debido a su elevada calidad en la producción de bovinos. Los inventarios ganaderos de la Secretaría de Agricultura, Ganadería y Desarrollo Rural mostraron en 1994 la existencia de aproximadamente 824 mil cabezas de bovinos; 252 mil cabezas de porcinos, 19% del hato estatal; y 41 mil cabezas de ovinos (Comisión Nacional del Agua 2006).

Uso Agroindustrial: En la región costera se tienen registradas 16 agroindustrias, localizadas en su mayoría en los municipios de Tapachula, Huehuetán, Acapetahua, Huixtla y en menor medida en Pijijiapan y Arriaga. Sobresalen en la utilización del agua y su posterior descarga con alto contenido de contaminantes las extractoras y refinadoras de palma africana, el frigorífico de la costa y el ingenio azucarero Belisario Domínguez (Comisión Nacional del Agua 2006).

III. Matriz los usos productivos vs. SE y componentes de BD

La matriz se empleó para representar de manera cualitativa el impacto de las distintas actividades productivas sobre los SE y componentes de la BD identificados en la etapa anterior. Al aplicar el análisis cualitativo del efecto esperado de los usos sobre los SE, para el caso del uso agrícola intensivo, monocultivo de café sin sombra, uso pecuario y agroindustria, el efecto de estas actividades es similar sobre los SE y componentes de la BD. El único SE que se vería favorecido seria la producción agrícola o ganadera (productos comerciales agrícolas o pecuarios). En este caso seria la

producción de café ya que en el objetivo anterior no se seleccionaron otros productos agrícolas. Los componentes de la BD presentan un efecto negativo por la perdida de hábitat y el alto uso de agroquímicos. Los almacenes y flujos de carbono responden negativamente por la eliminación del carbono almacenado en los estratos de vegetación y el carbono almacenado en el suelo. La calidad de agua se ve afectada negativamente por la descarga directa de aguas residuales a los cauces con altas concentraciones de contaminantes por la aplicación de agroquímicos, pesticidas, desechos pecuarios y residuos de la agroindustria. Los PFNM responden negativamente ya que estos forman parte de comunidades vegetales del estrato medio del bosque y la cantidad de agua se ve afectada negativamente por los altos insumos de agua necesarios para la producción.

En contraste el sistema rustico y el policultivo tradicional favorece a la mayoría de los SE y componentes de la BD, ya que en estos sistemas se mantiene la complejidad estructural similar a los bosques originales. Los estudios revisados en las etapas anteriores demuestran con datos cuantitativos que estos sistemas presentan niveles de diversidad similares a los ecosistemas forestales (Cruz-Lara et al. 2004, Estrada et al. 2006, Gordon et al. 2009, Perfecto et al. 2003, Perfecto et al. 2005, Philpott et al. 2006, Philpott et al. 2008, Soto-Pinto et al. 2000, Williams-Guillen et al. 2008). Al mantener los estratos de vegetación original se mantienen los reservorios de carbono; al no emplear agroquímicos no hay efecto negativo en la calidad del agua y al mantener la complejidad estructural del ecosistema forestal, aumenta la superficie disponible para la condensación de agua y por consiguiente aumenta el caudal de los ríos (Manson 2004). Para el caso de los PFNM, en el sistema rustico, es incierto el efecto de estos servicios ya que estos forman parte del estrato medio del bosque, y para los sistemas agroforestales este es el sistema que se remueve para plantar café. Para el caso del sistema policultivo tradicional, los PFNM responden positivamente ya que estos

sistemas se manejan conservando y cultivando una alta diversidad de especies vegetales útiles (medicinas, alimento, material de producción, etc.) (Moguel and Toledo 1999).

Para el caso del policultivo comercial y monocultivo de sombra, al emplear agroquímicos y al eliminar la vegetación original, hay pérdidas de BD. Sin embargo, al emplear una cobertura arbórea de sombra exótica, si existen flujos y almacenes de carbono, claro que en menor cantidad ya que el cambio de uso de suelo implica el uso de maquinaria y por lo tanto la remoción del carbono almacenado en el suelo. La calidad de agua se ve afectada negativamente por el uso de agroquímicos; los PFNM también ya que la producción se concentra solo en el cultivo comercial del café; la producción de café es positiva y la cantidad de agua negativa ya que se emplean altas dosis de agroquímicos.

Tabla 2: Matriz de SE y componentes de BD, vs los principales usos de la Sierra Madre.

Usos		**Componente BD o SE**											
		BD árboles	BD aves	Almacenes de C	Calidad de agua	Flujos de C	PFNM Sabal yapa	PFNM palma Xate	PFNM Chamaedorea radicalis	PFNM Chamaedorea hooperiana	PFNM Aechmea magdalenae	Producción de café	Cantidad de agua
A		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↑	↓
Café	**R**	↑	↑	↑	↑	↑	↓↑	↓↑	↓↑	↓↑	↑	↑	↑
	PT	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
	PC	↓	↓	↑	↓	↑	↓	↓	↓	↓	↓	↑	↓↑
	MS	↓	↓	↑	↓	↑	↓	↓	↓	↓	↓	↑	↓
	M	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↑	↓
P		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
At		↓	↓	↓	↓	↓	↑	↑	↑	↑	↑	↓	↓

A: agrícola intensivo; R: rustico tradicional; PT: policultivo tradicional; PC: policultivo comercial; MS: monocultivo de sombra; M: monocultivo sin sombra; P: Pecuario; At: Agroindustrial. ↑: efecto positivo; ↓: efecto negativo; ↓↑: efecto incierto.

METODOS: Revisión de la capacidad institucional.

3. Revisar la capacidad institucional para la evaluación, mapeo y monitoreo de SE y BD, en la región del proyecto entre el gobierno y las instituciones no gubernamentales; desarrollar un mapa institucional de las capacidades y las actividades e identificar las complementariedades, superposiciones y vacíos institucionales. Elaborar recomendaciones para hacer frente a los vacíos y las superposiciones.

METODO: Para evaluar la aplicabilidad de los métodos revisados en los objetivos anteriores a las condiciones de la región, se identificaran las instituciones y actores claves con responsabilidad ambiental en la región del proyecto (ver Figura 1). Se definirán sus atribuciones específicas identificando responsabilidades comunes y vacíos en sus funciones. En esta etapa se revisaran las leyes y políticas públicas por las cuales las instituciones se rigen. Se identificaran instituciones gubernamentales o no gubernamentales que podrían apoyar el proceso de monitoreo de SE y BD en la región. En esta etapa se determinaran aquellos actores claves que serán entrevistados para evaluar su capacidad técnica y de infraestructura en la aplicación de este tipo de metodologías. Finalmente se construirá un mapa conceptual de las instituciones que podrían estar involucradas en la elaboración de planes de mapeo y monitoreo de SE y BD.

RESULTADOS Y DISCUSION: Revisión de la capacidad institucional.

I. Marco Legal

- Ley de aguas Nacionales y su reglamento (Publicada en el Diario Oficial de la Federación el 1° de diciembre de 1992).

Esta la ley establece (ARTÍCULO 13) que por medio de la Comisión Nacional del agua, se integraran consejos de cuenca en México con el fin de concertar políticas a nivel federal, estatal y municipal. Específicamente para formular y ejecutar programas y acciones para la mejor administración de las aguas, el desarrollo de la infraestructura hidráulica y de los servicios respectivos y la preservación de los recursos de la cuenca. Para nuestra área de estudio el consejo de cuenca corresponde al **"Consejo de Cuenca de la Costa de Chiapas".**

- Ley de Desarrollo Rural Sustentable y su reglamento (Publicada en el Diario Oficial de la Federación el 7 de diciembre de 2001)

Esta ley establece la instalación de Comités estatales para el manejo de microcuencas, para fomentar el desarrollo rural con enfoque territorial. El fundamento es el empleo de la microcuenca, subcuenca y cuenca como los espacios toma de decisiones en participación conjunta entre autoridades, habitantes y los productores. Los comités de cuencas que forman parte de la Sierra Madre y que pertenecen al "Consejo de Cuenca de la Costa de Chiapas", corresponden a: Cuenca del Río Zanatenco, Cuenca del Río Lagartero, Cuenca del Río Coatán y Cuenca del Río Coapa.

- Ley General de Desarrollo Forestal Sustentable y su reglamento (Publicada en el Diario Oficial de la Federación el 25 de febrero de 2003).

Esta ley regula y fomenta la protección, restauración, producción, ordenación, cultivo, manejo y aprovechamiento de los recursos forestales; asimismo asume competencias que en materia forestal le corresponda. Uno de los objetivos de esta ley es el manejo

integrado de cuencas; además de desarrollar los bienes y SE y proteger, mantener y aumentar la BD que brindan los recursos forestales

- Ley General del Equilibrio Ecológico y la Protección al Ambiente y su reglamento (Publicada en el Diario Oficial de la Federación el 28 de enero de 1988)

Regula la preservación y restauración del equilibrio ecológico, así como la protección de la BD y del ambiente en el territorio nacional y en las zonas sobre las que la Nación ejerce su soberanía y jurisdicción.

- Ley General de Vida Silvestre y su reglamento (Publicada en el Diario Oficial de la Federación el 3 de julio de 2000)

Su objeto es establecer la concurrencia del Gobierno Federal, de los gobiernos de los Estados y de los Municipios, en el ámbito de sus respectivas competencias, relativa a la conservación y aprovechamiento sustentable de la vida silvestre y su hábitat en el territorio de la República Mexicana y en las zonas en donde la Nación ejerce su jurisdicción.

- Ley Forestal y su reglamento (Publicada en el Diario Oficial de la Federación el 9 de diciembre de 1992)

Tiene por objeto regular y fomentar la conservación, protección, restauración, aprovechamiento, manejo, cultivo y producción de los recursos forestales del país, a fin de propiciar el desarrollo sustentable.

- Norma Oficial Mexicana NOM-059-SEMARNAT-2001 (Publicada en el Diario Oficial de la Federación el 16 de mayo de 1994)

Determina las especies de flora y fauna terrestres y acuáticas en peligro de extinción y establece especificaciones para su protección; se determinan las especies de flora y fauna terrestre y acuática en peligro de extinción, amenazada, raras y las sujetas a protección especial.

II. Identificación general de las Instituciones

Instituciones gubernamentales federales

- Comisión Nacional de Áreas Naturales Protegidas (CONANP)
- Comisión Nacional Forestal (CONAFOR)
- Comisión Nacional del Agua (CONAGUA)
- Secretaría de Medio Ambiente y , Recursos Naturales y Pesca (SEMARNATP)
- Instituto Nacional de Ecología (INE)
- Procuraduría Federal de Protección al Ambiente (PROFEPA)
- Secretaría de Agricultura, Ganadería, y Desarrollo Rural, Pesca y Alimentación (SAGARPA)
- Fideicomiso de Riesgo Compartido (FIRCO)
- Fideicomisos Instituidos en Relación con las Actividades Agricultura agropecuarias, Forestales y Pesqueras de México (FIRA)
- Banco Nacional de Crédito Rural (BANRURAL)
- Secretaría de Comercio y Fomento y Comercio Industrial (SECOFI)
- Secretaría de la Reforma Agraria (SRA)
- Procuraduría Agraria (PA)

- Registro Agrario Nacional (RAN)
- Instituto Nacional de Estadística, Geografía e Informática (INEGI)
- Instituto Mexicano de la Tecnología del Agua (IMTA)
- Secretaría de Desarrollo Social (SEDESOL)
- Procuraduría General de la República (PGR)
- Secretaría de Educación Pública (SEP)
- Consejo Nacional de Fomento Educativo (CONAFE)
- Instituto Nacional de Antropología e Historia (INAH)
- Secretaría de Turismo (SECTUR)

b) Instituciones estatales y regionales

- Instituto de Historia Natural (IHN)
- Secretaria de Medio Ambiente y Vivienda (SEMAVI)
- Comisión Forestal Sustentable del Estado de Chiapas (COFOSECH)
- Comisión Estatal de Aguas y Saneamiento (CEAS)
- Comité para la Planeación y el Desarrollo (COPLADE)
- Secretaría de Ecología, Recursos Naturales y Pesca (SERNyP)
- Secretaría de Agricultura y Ganadería (SAG)
- Consejo Estatal del Café (CONCAFE)
- Secretaría de Fomento Económico (SFE)
- Secretaría de Desarrollo Agrario (SDA)
- Registro Público de la Propiedad y el Comercio (RPPyC)
- H. Ayuntamientos Municipales
- Procuraduría de Justicia del Estado (PJE)
- Secretaría de Educación (SE)

- Secretaría de Salud (SS)
- Secretaría de Desarrollo Turístico (SEDETUR)
- Secretaría de Desarrollo Urbano, Comunicaciones y Obras Públicas (SDUCOP)

c) Centros académicos y de investigación

- El Colegio de la Frontera Sur (ECOSUR)
- Comisión Nacional para el Conocimiento y Uso de la BD (CONABIO)
- Universidad Autónoma de Chiapas (UNACH)
- Universidad de Ciencias y Artes de Chiapas (UNICACH)
- Consejo Nacional de Ciencia y Tecnología (CONACyT)
- Instituto Nacional de Investigaciones Forestales y Agropecuarias (INIFAP)
- Instituto de Historia Natural (IHN)
- Centro de Estudios de Investigación y Desarrollo para la Producción Hortícola y de Plantas Agroindustriales de Chiapas (CEIDPHPACH)
- Instituto Nacional de Antropología e Historia (INAH)
- Consejo Estatal para la Cultura y las Artes (CONECULTA)

d) Organizaciones No Gubernamentales

- Conservation International (CI)
- The Nature Concervancy (TNC)
- Sociedad Cooperativa AMBIO
- PRONATURA Chiapas

e) Organizaciones sociales

- Uniones de ejidos de cada municipio

- Asociaciones ganaderas locales (municipales) y regionales
- Asociaciones de la propiedad rural (municipales)
- Organizaciones campesinas (ISMAM, Follaje Sierra Morena, etc.)
- Grupos voluntarios de protección ambiental
- Ejidos, colonias y comunidades.

III. Actores claves

Comités de cuenca

Las posibilidades de manejar integralmente una cuenca son inversamente proporcionales a su complejidad y a su tamaño. Esto significa que a al bajar en la escala de complejidad y tamaño de la cuenca, aumenta la integralidad y capacidad de la intervención de los manejadores (Cotler 2004). Es por esto que las microcuencas son los espacios de toma de decisiones ideales en las que debiese haber una participación conjunta entre los distintos actores. Los tomadores de decisión directa para el caso de la Sierra Madre la constituyen los comités de cuencas que componen el consejo de cuenca de la Costa de Chiapas. El Comité de Cuenca del Río Zanatenco, se creó el 2000 en donde el Presidente Municipal de Tonalá cumple el rol de Coordinador del Comité de Cuenca; el Gerente Regional Frontera Sur de la CONAGUA, como Secretario Técnico; también incorpora a representantes de los usos del agua, así como de las dependencias estatales y federales relacionadas al fomento de las actividades productivas y cuidado del medio ambiente. El año 2003, se creó el Comité de Cuenca del Río Lagartero en el Municipio de Arriaga; el Comité de Cuenca del Río Coapa, en el municipio de Pijijiapan; y en el 2005, el Comité de Cuenca del Río Coatán en el Municipio de Tapachula. Todas estas organizaciones de cuenca, están trabajando activamente con la participación de las dependencias gubernamentales, ONG, usuarios del agua y

autoridades municipales, en proyectos y acciones que están beneficiando tanto a los habitantes como a los ecosistemas.

Instituciones clave

A nivel federal, las instituciones claves son la CONAGUA, la CONANP, la CONAFOR y SAGARPA. La CONAGUA, es una institución federal clave, ya que a través de esta institución se forman los consejos y comités de cuenca. La CONANP es otra institución relevante ya que uno de sus objetivos es la conservación y el manejo de los recursos naturales. En la zona de estudio hay tres Reservas de la Biosfera: El Triunfo, La Sepultura y La Encrucijada; se encuentra el Área Natural La Frailescana y la Reserva Estatal Pico del Loro, por lo que el papel de la CONANP es clave para el monitoreo y mapeo de la BD y los SE. La CONAFOR a través del programa ProÁrbol (la política destinada a la conservación y restauración de los bosques), otorga apoyo a comunidades, ejidos, asociaciones regionales de silvicultores y a propietarios de terrenos forestales, para llevar a cabo los distintos conceptos de apoyos; dentro de estos apoyos esta el esquema de Pago por SE (PSA). La CONAFOR además esta a cargo de la secretaria ejecutiva del comité estatal para el manejo sustentable de microcuencas. La SAGARPA tiene como uno de sus objetivos el manejo de los recursos naturales y además esta a cargo de la secretaria técnica del comité estatal para el manejo sustentable de microcuencas.

A nivel estatal, las instituciones claves son el IHN, la COFOSECH y la SEMAVI. El IHN ha tenido una participación activa en proyectos de conservación y restauración ambiental en varias cuencas de la Sierra Madre y en sus objetivos centrales esta la conservación de los recursos naturales y el patrimonio natural. La SEMAVI hasta el 2008 tenía como competencia legal asesorar a los comités de cuenca en los temas de conservación y manejo ambiental. La COFOSECH tiene a cargo la consolidación del

comité estatal para el manejo sustentable de microcuencas. Otras instituciones no gubernamentales como Pronatura, CI, Ambio y TNC e instituciones académicas (ECOSUR principalmente) cumplen un rol fundamental en apoyar y elaborar proyectos de conservación y asesorar con capacidades técnicas a los comités y muchas veces desarrollan investigación valiosa en la zona de estudio referente a la conservación y manejo de la BD y los SA.

Diagrama 1. Mapa conceptual de los instrumentos legales clave, instituciones claves que apoyan a los tomadores de decisión directa (comités de cuenca) en el proceso de toma de decisiones.

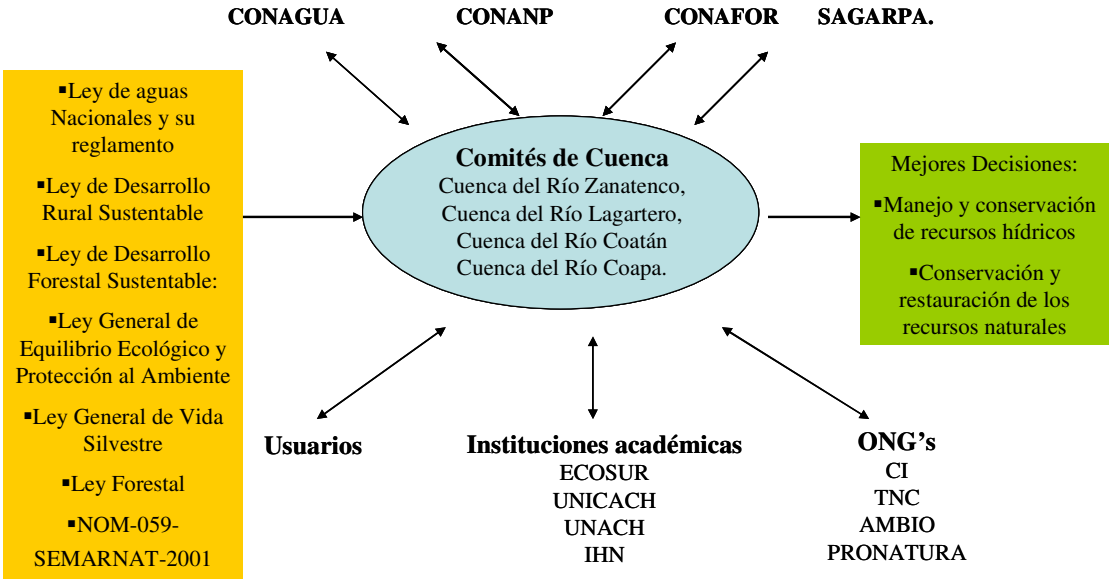


Figura 1. Instituciones y actores claves con responsabilidad ambiental en la región del proyecto

IV. Evaluación de la capacidad institucional

Para evaluar la capacidad institucional se elaboro un cuestionario en base a la selección de SE identificada en el objetivo uno y a los insumos y capacidades técnicas detectadas en los objetivos uno y dos (ver ANEXO II). De manera general en este

cuestionario se les pregunto cual eran los SE y las problemáticas ambientales prioritarias que como institución consideran; cuales son las fortalezas y debilidades que como institución enfrentan para llevar a cabo estudios de monitoreo y mapeo de BD y SE, y finalmente preguntas sobre las capacidades técnicas y de infraestructura para llevar a cabo el mapeo y monitoreo. Por la premura del tiempo se identificaron tres actores claves: El Director General del SEMAVI, Lic. Alejandro Callejas; Director General del IHN, Biol. Froilán Esquinca Cano, Director de la Reserva de la Biosfera la Sepultura Biol. Víctor Negrete y un representante del Director de la Reserva de la Biosfera la Encrucijada Biol. Omar Gabriel Gordillo (encargado del departamento de monitoreo).

Los resultados de la aplicación de la entrevista con respecto a los temas prioritarios abordados por las instituciones, muestran que estas dan mayor prioridad a la conservación de la BD, a la provisión de agua limpia y al mantenimiento de los almacenes de carbono, otorgando menos prioridad a la producción de alimentos. Para el caso de las problemáticas ambientales las principales amenazas consideradas son el cambio de uso de suelo, las altas tasas de perdida de BD y la contaminación del agua.

Con respecto a las fortalezas de las instituciones, el SEMAVI cuenta con personal y recursos específicamente destinados a atender temas de SE y mencionan que tienen buena relación con otros actores sociales involucrados en temáticas ambientales como CI, Pronatura, TNC, ECOSUR, etc. El IHN tiene conocimiento científico acumulado, capital humano, colecciones de ejemplares científicos y una visión de ecosistemas. La CONANP cuenta con procesos de planificación basados en problemáticas ambientales, cuenta con planes de manejo y programas de monitoreo, un área de vinculación con instituciones académicas, presencia institucional en el área de estudio (reservas de la biosfera), cuenta con una variedad de proyectos en desarrollo y

experiencia local en el área. Las debilidades institucionales para abordar temáticas de BD y SE son similares entre las instituciones, principalmente hay falta de personal y presupuesto para infraestructura y equipo especializado y existe una carencia de articulación interinstitucional. Los temas urgentes a atender en las instituciones son principalmente la capacitación de profesionales para las temáticas de BD y SE, desarrollar mecanismos de transmisión de la información desde las instituciones hacia otros actores locales claves como los comités de cuenca y desarrollar mecanismos de vinculación con otras instituciones, fortalecer el tema del manejo integrado de cuencas, evaluar la posibilidad de buscar nuevas alternativas de conservación y desarrollar aproximaciones para incluir la parte socioeconómica en los proyectos de conservación.

En la evaluación de las capacidades técnicas todas las instituciones cuentan con protocolos y planes de monitoreo para evaluar la BD. En el caso de la CONANP encrucijada se han enfocado en la BD animal específicamente en jaguares, cocodrilos, caimanes, mono araña y aves. Todas las instituciones, a excepción de la reserva de la biosfera Sepultura, realizan monitoreo continuo de la calidad de agua. El SEMAVI cuenta con laboratorio propio para evaluar la calidad de agua, el IHN envía sus muestras a laboratorios externos (instituciones académicas) y la CONANP Encrucijada cuenta con equipo propio para realizar análisis bacteriológico y físico químico del agua. Todas las instituciones mencionan la falta de infraestructura y equipo para realizar trabajo de campo y la falta de personal de campo. Existe un desbalance entre las mismas reservas ya que por ejemplo, la Encrucijada cuenta con 19 profesionales de campo mientras que la Sepultura sólo cuenta con uno. Todas las instituciones cuentan con profesionales capacitados para el manejo de los sistemas de información geográfica y análisis de percepción remota, por lo que tienen acceso a imágenes de satélite principalmente de tipo Landsat y a ortofotos. A su vez, las instituciones trabajan desde la escala de parcela

a la escala regional (1:250000), sin embargo, se menciona que la tendencia es a trabajar con cartografía a escala regional.

METODOS: Propuesta metodológica para la incorporación de SE en la toma de decisiones.

4. Identificar y analizar las metodologías utilizadas en Chiapas y en otros lugares de la región para traducir la información de monitoreo en decisiones para el manejo de cuencas. Discutir qué métodos o elementos podrían ser utilizados por los comités de cuencas en la región del proyecto, qué modificaciones serían necesarias, y qué metodologías o elementos de la misma deben ser creados por el proyecto. Formular recomendaciones para la incorporación de los datos de monitoreo en el proceso de toma de decisiones de los comités de cuencas.

La ultima etapa de este proyecto será elaborar una propuesta para traducir la información técnica recopilada para monitorear SE y BD a los tomadores de decisión que en este caso son los comités de cuencas. Esta propuesta metodológica contendrá los pasos a seguir y los insumos necesarios, para que los comités de cuenca puedan implementar planes de mapeo y monitoreo de SE. Se desarrollara un documento dirigido a los comités de cuenca con los lineamientos y recomendaciones para la implementación de estos planes, con el fin ultimo de presentar un marco conceptual que vincule el rol de los SE y la BD en la toma de decisiones, para que se formulen mejores acciones relacionadas al uso del suelo, agua y otros componentes del capital natural de la Sierra Madre de Chiapas.

RESULTADOS Y DISCUSION: Propuesta metodológica para la incorporación de SE en la toma de decisiones.

Propuesta metodológica para la incorporación de SE en la toma de decisiones[1](WRI 2008):

1. El primer paso corresponde a identificar los SE prioritarios a escala de cuenca. En este ejercicio (como se realizo en este estudio, en base a bibliografía) se deben identificar los SE mas importantes para las comunidades, que proveen los paisajes de la cuenca y determinar si la toma de decisiones depende de los servicios o los impactara. La decisión depende del SE, por lo que se debe evaluar si este servicio permite que se den las condiciones necesarias para que una decisión sea efectiva. Por ejemplo, decisiones que involucran a los cultivos agrícolas dependen de servicios de polinización, y agua. La decisión impacta a los SE, si las acciones asociadas con la decisión alteran la cantidad o calidad de un servicio. Por ejemplo, la agricultura intensiva puede afectar la calidad del agua.

2. El segundo paso corresponde al Mapeo y monitoreo de SE propiamente tal.

2. a. Para el caso del **monitoreo**, luego de la identificación se debe discriminar cuales servicios serán monitoreados comunitariamente y cuales por organizaciones especializadas técnicas (instituciones gubernamentales o académicas). Esto es debido a que servicios como por ejemplo, la calidad de agua dependen de un monitoreo riguroso, con el envío inmediato de las muestras a laboratorio. Sin embargo, servicios como almacenes de carbono o monitoreo de la cantidad de agua pueden ser llevados a cabo directamente por actores de la comunidad, quienes pueden registrar los datos. Siempre

[1] Modificado de la Guía para tomadores de decisión diseñada por el World Resources Institute, para integrar a los SE en la toma de decisiones.

el monitoreo debe ser asesorado por instituciones que reciban, almacenen y analicen dicha información. Para el caso del monitoreo se recomiendan tres sub-etapas, primero determinar sitios de monitoreo que representen la variabilidad ambiental de la cuenca para que estos sean representativos; segundo elaborar conjuntamente protocolos aceptados por los miembros del comité o emplear protocolos que ya se estén usando por las instituciones, el único requisito en este caso seria que una vez decidido el protocolo este sea siempre el mismo para que la información sea comparable entre los comités. Finalmente el tercer paso es el monitoreo propiamente tal, que se debe realizar dándole un seguimiento en el tiempo.

2. b. Para el caso del mapeo de SE se propone que este a cargo de las instituciones las que tienen la capacidad técnica para llevar a cabo estos análisis. En primer lugar el mapeo debe ser retroalimentado con los datos del monitoreo para poder generar datos cuantitativos y a su vez el mapeo debe retroalimentar el proceso de monitoreo (por ejemplo el mapeo es relevante en la selección de puntos o en la identificación de puntos clave a monitorear). El mapeo cuenta de tres pasos generales; el primero corresponde a la elaboración de metodologías comunes. Este paso es trascendental ya que por ejemplo para el caso de los estudios de cambio de uso de suelo seria recomendable que se empleen los mismas formulas para calcular tasas de deforestación para que los datos sean comparables y se puedan agregar para calcular estimaciones a escala de la Sierra madre (los 4 comités). Luego el segundo y tercer paso corresponde a los insumos, los que corresponden a las imágenes de satélite y las cartografías de suelos, vegetación, etc. A si mismo otro insumo relevante corresponde a los datos de campo provenientes del monitoreo, para que finalmente las instituciones puedan trabajar en los análisis espaciales y en la obtención de información cuantitativa a escala de la Sierra Madre.

3. La información se estará generando en la etapa anterior y se le estará dando un seguimiento. El tercer paso seria entonces conducir un análisis de las tendencias y condiciones de los SE relevantes. Enfocando el análisis en preguntarse cuales son los cambios mas importantes que estén afectando a los SE y qué umbrales o cuales cambios irreversibles se han observado en el tiempo en estos SE. Este análisis es similar a la matriz desarrollada en el Segundo objetivo de este trabajo, claro que en esta etapa, se propone completarla de manera participativa entre los distintos actores.

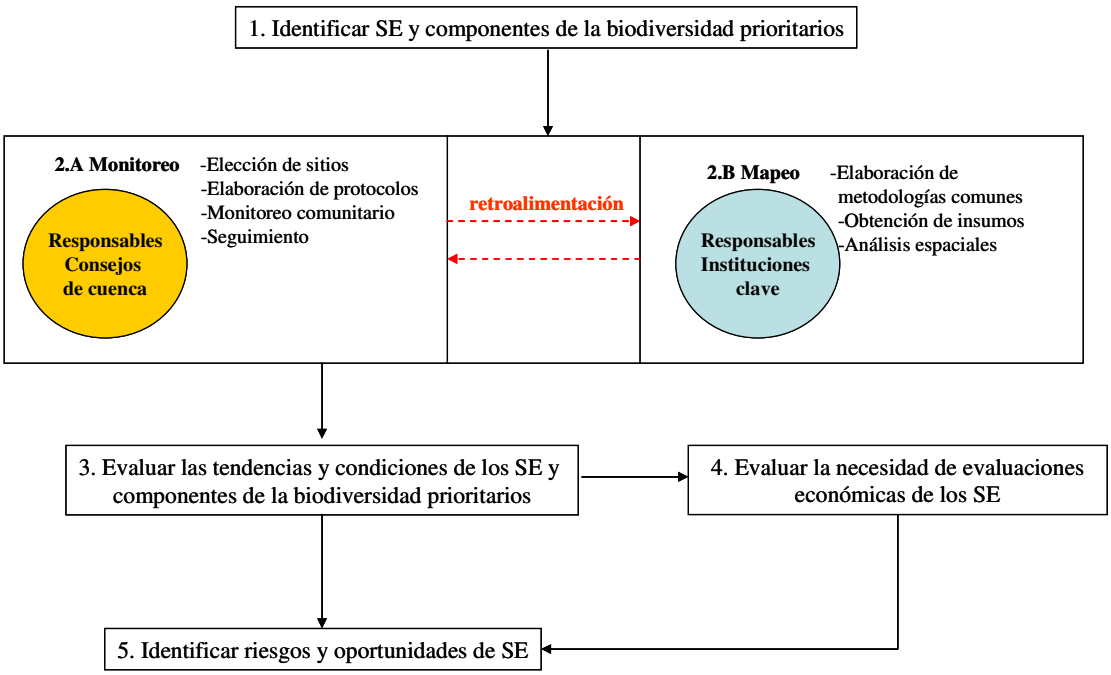
4. El cuarto paso corresponde a evaluar la necesidad de desarrollar una evaluación económica para los SE. La justificación de realizar una evaluación económica puede ser para comunicar el valor de los SE enfatizando su contribución económica para alcanzar metas comunitarias; para comparar el costo efectividad de las inversiones; para evaluar los impactos de la toma de decisiones sobre los ecosistemas o para construir mercados para los SE, con la finalidad de mejorar la calidad de vida de las comunidades.

5. El quinto paso es identificar riesgos y oportunidades, con la finalidad de identificar SE que no fueron reconocidos en la primera etapa, identificar usuarios que estén compitiendo por servicios limitados o si existen sustitutos para estos servicios y si existen impactos que no fueron evaluados y que otras comunidades dependen para alcanzar su bienestar.

Finalmente este conjunto de pasos no debe ser visto de manera lineal, si es necesario los tomadores de decisión deben volver a la etapa uno para reconocer otros servicios importantes o volver al monitoreo y mapeo para reajustarlo según los objetivos

conjuntos de los comités de cuenca. A continuación se muestra un diagrama de los cinco pasos recomendados para desarrollar mapeo y monitoreo de SE en las cuencas de la Sierra Madre.

Diagrama 2. Propuesta para traducir la información técnica recopilada para monitorear SE y BD a los tomadores de decisión



CONCLUSIONES

i. **Existen una extensa literatura que muestra esfuerzos pasados de mapeo y monitoreo de SE y BD en la región del proyecto y en otras partes de México**

i. **Se identificaron ocho principales cambios de uso de suelo en la región del proyecto, los cuales afectan directamente a los diferentes componentes de la biodiversidad y los servicios**

i. **Existen un marco legal vigente y diversas instituciones federales, regionales y locales capaces de realizar las actividades de evaluación, mapeo y monitoreo de SE y BD**

i. **Se propone una aproximación metodológica de monitoreo para que sea difundida a los tomadores de decisión de las cuencas**

RECOMENDACIONES

De las revisiones realizadas en este estudio se observa claramente la necesidad de desarrollar líneas de investigación enfocadas al estudio de los patrones de cambio de uso de suelo en la región de la Sierra Madre. En el estado de Chiapas los estudios de tasas de deforestación de bosque se han concentrado en las zonas de los Altos de Chiapas, en comunidades de Pino-Encino, habiendo muy poca investigación en la parte de la Costa y Sierra. Esto se debe en parte a la alta nubosidad de la zona, lo que dificulta el análisis de percepción remota por el alto porcentaje de superficie cubierto por nubes,

por lo que seria conveniente realizar estudios conjuntos de análisis espacial y estudio de campo a través de parcelas permanentes de monitoreo, con tal de obtener datos mas reales de los patrones de cambio de SE.

Para poder evaluar los patrones espaciales de los SE y BD en la Sierra Madre se requiere entonces generar mejores mapas, identificando las variables ambientales que están determinando su distribución y estableciendo indicadores que nos aproximen a la cuantificación. Esta labor es fundamental para asistir los procesos de toma de decisiones y requiere de un extraordinario esfuerzo interdisciplinario. Las variables biofísicas como la altitud, tipos de suelo, tipos de vegetación, exposición, índices espectrales de vegetación (NDVI e NDII), pendiente y variables climáticas (precipitación y evapotranspiración), que se emplean como capas cartográficas, pueden ser empleadas como indicadores de la distribución espacial de los SE. Para este tipo de estudios se recomienda combinar la información obtenida en campo a escala de parcela, y luego extrapolarla a partir de modelos, empleando información biofísica obtenida a escala mayor de los Sistemas de Información Geográfica y de la Percepción Remota. Otro método conocido empleado para mapear SE de manera participativa corresponde a la evaluación multicriterio, en el que se combina el conocimiento de expertos o conocimiento local, con información de múltiples variables biofísicas para asignar un valor de SE a unidades territoriales.

Otro punto importante de mencionar corresponde a la alta concentración de estudios ecológicos en la zona del Soconusco, con respecto a la comparación de niveles de BD en el gradiente de sistemas de manejo destinados a la producción de café. Aprovechando esta investigación se recomienda ampliarla para el estudio de SE provistos por estos sistemas agroforestalas. Sería interesante por ejemplo, desarrollar estudios para cuantificar los almacenes de carbono en estos sistemas de manejo o SE de

polinización, control de plagas, fertilidad de los suelos y control de la erosión, comparando los cambios en la provisión de los servicios a lo largo del gradiente de complejidad ambiental de estos sistemas.

Otro vacío importante detectado en este estudio corresponde a la falta de datos cuantitativos con respecto a la relación del bosque con servicios de calidad y cantidad de agua. Datos de la Comisión Nacional del Agua, dan cuenta, del rol del bosque de niebla en el Triunfo, en el servicio de provisión de agua, sin embargo existe una carencia de estudios de este tipo. El estado de Chiapas es la región con mayor disponibildad de agua en el país, por lo que es fundamental en la provisión de energía dentro y fuera del estado, por lo que es urgente el desarrollo de investigación de las relaciones bosque-agua.

Los SE culturales casi no fueron objeto de estudio en las revisiones realizadas (a excepción del conocimiento tradicional para el aprovechamiento de productos forestales no maderables). Por la diversidad cultural del estado y el enorme potencial de la región, es importante promover el estudio de SE culturales como belleza escénica, recreación, herencia cultural, etc.

El estudio desarrollado da cuenta de una basta investigación en la región, sin embargo, la mayoría de los estudios son puntuales a escala de parcela enfocados a zonas específicas. Es por tanto relevante pasar de la escala puntual de parcela a estudios a escala de paisaje y regional. Asimismo, En la revisión bibliográfica realizada la mayoría de los estudios que involucraron análisis espaciales, trabajaron a escaña 1:250000, por lo que en este tipo de trabajos también es importante abordar múltiples escalas.

Se debe tener en cuenta que los esfuerzos de mapeo de SE deben de ir en paralelo al mapeo de biodiversidad, para priorizar zonas de concordancia espacial de estas dos variables. Esta labor es critica ya que si se establecen zonas prioritarias de conservación

de SE o se diseñan esquemas de pago por SE, sólo se fomentará la conservación de la biodiversidad y de los múltiples servicios derivados de esta si se considera esta concordancia espacial.

En este estudio se realizó una evaluación cualitativa de los impactos de las actividades de producción sobre los SE. Es necesario realizar este tipo de evaluaciones pero de forma ponderativa o cuantitativa si es posible, para mostrar a los tomadores de decisión con datos concretos, los múltiples beneficios que se obtienen de los agroecosistemas o sistemas de producción diversificada.

Al aplicar las entrevistas, los resultados muestran que hay diversos esfuerzos de mapeo y monitoreo que se han estado aplicando por las instituciones, sin embargo, muchas de estas no están publicadas. Es importante realizar un catastro de todos los esfuerzos que se han realizado institucionalmente para abordar el tema de BD y SE, para identificar las áreas mas y menos abordadas y ya que los esfuerzos son múltiples es muy importante fortalecer la articulación interinstitucional, existen esfuerzos y hay profesionales, pero estos no están trabajando integralmente. Es importante también desarrollar mecanismos para transmitir la información desde la ciencia y las instituciones a los tomadores de decisión.

En este estudio se propuso una aproximación metodológica para incorporar a los SE y a los componentes de la BD en la toma de decisiones. El propósito de esta metodología es ayudar a los tomadores de decisión a conciliar las necesidades de desarrollo con la protección ambiental con la meta final de fortalecer las estrategias sociales y económicas.

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ANEXO I

Tabla de revisión bibliográfica de los esfuerzos de mapeo y monitoreo de componentes de BD y SE.

Tablas revisión objetivo 1

Fuente	Categoría MA	componente BD o SE	Indicador	Área de estudio	Escala	Insumos
Arellano et al. 2008	Soporte	BD de insectos tropicales	abundancia de individuos de Canthon cyanellus cyanellus	263ha paisaje Vicente Hernández	1:75000	Ortofotos
Balvanera et al. 2005	Regulación	Almacenes de carbono	Carbono contenido en árboles en pie (MgC/ha)	Reserva de la Biosfera Montes Azules 331,200 has		Trabajo de campo se calcula la biomasa aérea arbórea (DAP y densidad de la madera)
Bray et al. 2002	Provisión	Producción de café	producción de café orgánico	México		Revisión de experiencias de producción de café orgánico en México
De Jong 2000a	Regulación	Flujos de Carbono	MgC/ha	Tierras altas de Chiapas	1:250000	Imágenes satélite Landsat multitemporales e Inventario de biomasa aérea (ecuaciones alométricas empleando DAP y altura de árboles para leñosas y extracción de biomasa)
Brush & Perales 2007	Provisión	Producción de maíz	riqueza de variedades de maíz	Comunidades por toda la región de Chiapas	1:250000	Colecta de datos de maíz
Cayuela et al. 2006b	Soporte	BD de árboles	alpha de Fisher como medida de diversidad	Central Highlands of Chiapas, Mexico, and extends over ca. 3500 km2	1:50000	Imágenes satélite Landsat
Cayuela et al. 2006a	Soporte	BD de árboles	Diversidad α (dentro de la parcela) y β (entre parcelas)	Tierras altas de Chiapas 3500 km3	1:50000	Trabajo de campo en fragmentos, imágenes Landsat, mapas climáticos, topográficos, caminos y densidad poblacional.
Coomes et al. 2008	Regulación	Flujos de Carbono	Cambio neto de C (tons C)	Comunidad Ipeti-Emberá (78°30′–78°34′ W, 8°55′–9°00′ N), 3198 ha		talleres, encuestas de hogares y granjas / inventarios forestales

Continuación tabla 1

Fuente	Categoría MA	componente BD o SE	Indicador	Área de estudio	Escala	Insumos
Corbera et al. 2009	Regulación	Flujos de Carbono	Precio por ton de C (50-98 Mx$)	San Bartolomé Loxicha en Oaxaca, Ejido Orilla del Monte en Veracruz, Ejido Niños Héroes en Tabasco y El ejido El Cajón en Puebla		Focus group para documentar la percepción de actores al pago de bonos de carbono y entrevistas a actores locales.
Kosoy et al. 2008	Provisión Regulación Soporte	Producción de café Flujos de Carbono BD	Disponibilidad a participar en esquemas de PSA	Cuatro pares de ejidos participantes y no participantes en la región Lacandona		Entrevistas con oficiales de gobierno estatal y federal, ONG's etc. para colectar información del diseño del PSA. A nivel de ejido focus groups y encuestas.
Corbera E. et al. 2007	Regulación	Almacenes de carbono	implementación de proyectos de Carbono	Ejido mestizo Yaluma-Villahermosa,16°20′N 92°05′O. EjidoTzotzil Rincón Chamula		grupos de discusión, entrevistas, observaciones de campo
Cruz-Lara et al. 2004	Soporte	BD de mamíferos	riqueza, diversidad, abundancias relativas y similitud de especies	Comunidad loma bonita de una superficie de 441 km2, 16°11'58"N y 91°18'45"O		salidas de campo en época seca y lluviosa, para la captura e identificación de mamíferos
De Jong et al. 1999	Regulación	Flujos de Carbono	Ton C/ha	Altos de Chiapas, altitud 1500–2900 m representando 34 municipios y 607 500 ha	1:250,000	Carta de Uso del Suelo y Vegetación. Fotos aéreas (INEGI). Mapas del Inventario nacional forestal. Mapas topográficos. Inventario de biomasa aérea
De Jong et al. 2000b	Soporte	Flujos de Carbono	Flujos en US $ por Megagramo de C	Altos de Chiapas,altitud 1500–2900 m representando 34 municipios y 607 500 ha	1:250,000	Mapas de cobertura (imágenes satélites Landsat), fotos aéreas y encuestas. Perfiles de ingreso y gasto
Díaz-Ruiz et al. 2006	Soporte	BD de peces	índices de diversidad de peces	Sistema lagunar costero Carretas-Pereyra (15°23'N, 93°06'O) de 37km2 y Chantuto-Panzacola(15°09'N, 92°45'O) de 180km2		campañas de muestreo para la recolección de peces

Continuación tabla 1

Fuente	Categoría MA	componente BD o SE	Indicador	Área de estudio	Escala	Insumos
Diemont & Martin 2009	Soporte Provisión Cultural	BD de plantas Fertilidad de suelos Especies vegetales útiles Conocimiento tradicional	Tipo de uso de plantas, Índice de diversidad de Shannon, dominancia de especies, contenido de MO. N total, P disponible, contenido de nematodos	Lacanja Chansayab , 16°56'60" N y 91°16'60" W altitud de 500 m		muestreo de comunidades de plantas y suelo, entrevistas para determinar el uso de plantas
Endress et al. 2006	Provisión	PFNM (Chamaedorea radicalis)	número de hojas, longitud de la hoja y la producción de fruta o inflorescencia	Reserva de la Biosfera el Cielo, Tamaulipas, México.		Trabajo de campo y tratamientos de extracción de hojas en parcelas
Estrada et al. 2005	Provisión	BD de primates	presencia de primates	Tuxtlas (México), Lachuá (Guatemala), 3 localidades de Costa Rica (Pacífico central, Cañas, Río Central)		Trabajo de campo (monitoreo de primates)
Fernández Ugalde 2003	Provisión	Bioprospección con fines farmacéuticos	sistema de derechos de propiedad de la información	Chiapas		Revisión de literatura
Hellier et al. 1999	Provisión Cultural	Especies vegetales útiles Conocimiento tradicional	Conocimiento indígena	Ejido Juznajab 3800 ha (16°25'N y 92° 05'W), y ejido Muquenal 480 ha (17° 10'.N y 92°10' W)	1:50000	Mapas participativos, transectos, cuestionarios, ejercicios de comparación de coberturas, ejercicios de comparación de abundancia de especies útiles y discusión conjunta.
Kirby & Potvin 2007	Regulación	Almacenes de carbono	Mg C /ha	Ipetı´-Embera´ in eastern Panama Province, Panama		Inventario de campo (Para C aéreo ecuaciones alométricas empleando DAP y densidad de madera, y subterráneo muestras de suelo)
López-Feldman & Wilen 2008	Provisión	PFNM (palma Xate)	Un PFNM especifico (palma Xate)	Selva Lacandona		Entrevistas a familias

Continuación tabla 1

Fuente	Categoría MA	componente BD o SE	Indicador	Área de estudio	Escala	Insumos
Martínez et al. In Press	Regulación	Calidad de agua	Conductividad, solidos suspendidos totales. Alcalinidad, nitratos, cloro, calcio, sodio, magnesio y potasio	Cuenca Antigua (19°05'–19°34'N y 96°06'–97°16'W) 2623 km2.	1:70000	Imágenes Landsat multitemporales, inventarios de vegetación
		Almacenes de carbono				
		Flujos de Carbono				
		Regulación del ciclo hidrológico				
		Control de plagas	Valor total de SE y productos provistos por diferentes tipos de ecosistemas			
		Polinización				
		Control de la erosión				
	Provisión	Provisión de agua				
		Producción de alimentos				
	Cultural	Recreación				
Mas & Dietsch 2004	Soporte	BD de mariposas	Diversidad de mariposas frugívoras y de aves	Sierra Madre en el Soconusco, Chiapas		Trabajo de campo (observación y conteo de aves y trampeo de mariposas)
		BD de aves				
	Provisión	Producción de café				
Mendoza-Vega et al. 2003	Regulación	Almacenes de carbono	Mg C/ha,	Altos de Chiapas, 92°–93°Wand 16°30'–17°N		Muestreo de carbono en suelo.
Perfecto et al. 2005	Soporte	BD de aves	Riqueza de especies de aves, de hormigas forrajeras y de mariposas.	Región de Soconusco		Muestreo en campo hormigas mariposas a lo largo de un gradiente de coberturas arbóreas
		BD de mariposas				
		BD de hormigas forrajeras				
	Provisión	Producción de café				

Continuación tabla 1

Fuente	Categoría MA	componente BD o SE	Indicador	Área de estudio	Escala	Insumos
Perfecto et al. 2003	Soporte	BD de aves BD de mariposas BD de hormigas forrajeras	Riqueza de especies de aves, de hormigas forrajeras y de mariposas.	Región del Soconusco (finca Belén, Hamburgo, Irlanda, Bélgica)		Muestreo en campo hormigas mariposas, aves y vegetación a lo largo de un gradiente de coberturas arbóreas
	Provisión	Producción de café				
Philpott et al. 2006	Soporte	BD de hormigas forrajeras	índices de riqueza de hormigas forrajeras y alpha de fisher, índice de Simpson y Shannon	Soconusco, Chiapas		Muestreo en campo de hormigas y vegetación
	Regulación	Control de plagas				
	Provisión	Producción de café				
Pohlan et al. 2005	Provisión	Producción de azúcar	fertilidad del suelo, crecimiento y rendimiento de la caña de azúcar, y en el comportamiento de las arvenses y plagas	Huixtla, 15° 08'N y 92° 09' O		Diseño experimental mediante tratamientos
Potvin et al. 2005	Soporte	BD de plantas	Diversidad florística, índice de jaccard (coeficiente de similitud)	Tierra Colorada, San Lorenzo, San Fernando 16 y San Miguel		Análisis discriminante empleando variables socioeconómicas, análisis de correspondencia (estadística multivariada)
	Provisión	Producción de café				
Pulido & Caballero 2006	Provisión	PFNM (Sabal yappa hacer techos)	tasa de producción de hojas de Sabal yapa	X-Maben ejido, Municipalidad de Felipe Carrillo Puerto, Quintana Roo,		conteo de inviduos Sabal yapa en un ciclo de cultivos

Continuación tabla 1

Fuente	Categoría MA	componente BD o SE	Indicador	Área de estudio	Escala	Insumos
Ramírez-Albores 2006	Soporte	BD de aves	riqueza de aves	Reserva de la BiosferaMontes Azules (16°30´ y 17°00´ N; 91°00´ y 90°30´W; 331200 ha)		colecta de datos en campo
Ramírez-Marcial et al. 2001	Soporte	BD de árboles	riqueza de especies, área basal y densidad de tallos	Municipalidad pueblo nuevo de Solistahuacán, (17°08'-17°15'N y 92°52'-93°00'W) 740 km2		colecta de datos en campo
Roman-Cuesta et al. 2003	Regulación	Control de perturbaciones (fuego)	Superficie de área quemada	Estado de Chiapas (14°32' a 17°59' N; 90°22' a 94°14' W; elevación de, 0-4093m)	1:250000	datos de incendios SEMARNAP , mapas de vegetación y topografía INEGI, variables socioeconómicas SIMBAD
Sánchez-Azofeifa et al. 2009	Regulación	Almacenes de carbono	Toneladas de C			imágenes satelite Spot, Landsat, Aster, Modis, NOAA etc.
Soto-Pinto et al. 2000	Provisión	Producción de café	gramos de café limpio por planta	Municipalidad de Chilón, Chiapas, México.		Cuestionario (factores socioeconómicos y tecnológicos), estructura arbórea cafetales y fotos hemisféricas (% cobertura)
Ticktin 2005	Provisión	PFNM (Bromelia cosechada para fibra *Aechmea magdalenae*)	Numero de poblaciones	Santa Marta, en la zona buffer Tuxtlas Biosphere Reserve		entrevistas, visitas guiadas a poblaciones
Trauernicht & Ticktin 2005	Provisión	PFNM (Chamaedorea hooperiana Hodel, de uso ornamental)	clases de tamaño, riqueza y diversidad, área basal, densidad de tallos	La zona buffer de la Reserva de la Biosfera de los Tuxtlas		Trabajo de campo comparando plantaciones con poblaciones no manejadas
Cairns et al. 1995	Regulación	Flujos de Carbono	Flujo de C neto anual(MgC/ha/año)y C total(MgC/ha)	Distribución del Bosque Tropical Siempreverde en México	1:250000	Mapas de tipos de cobertura y uso de suelo de la secretaria de agricultura y recursos hidráulicos

Continuación tabla 1

Fuente	Categoría MA	componente BD o SE	Indicador	Área de estudio	Escala	Insumos
Espinoza Medinilla et al. 1998	Soporte	BD de mamíferos	Riqueza de especies e índice de similitud de especies de Szymkiewicz-Simpson,	La Reserva de la Biosfera El Triunfo 15°09' lO"y 15°57' 02" N y 92°34' 04"Y93° 12'42" W		Trabajo de campo de colecta ejemplares, huellas y restos; base de datos de ejemplares de museo
Estrada C. G. et al. 2006	Soporte	BD de murciélagos	Riqueza, diversidad alfa y beta de murciélagos	Fincas del Soconusco		Trabajo de campo, captura de murciélagos y transectos de vegetación.
	Provisión	Producción de café				
Fernández & García 2006	Soporte	Servicios derivados de cuencas (agua, carbono, protección de inundaciones, etc.)	capas cartográficas biofísicas (topografía, suelos, hidrología, vegetación, clima)	La cuenca del Río Coapa, municipio de Pijijiapan (15° 45' 16" y 15° 42' 15"N, 93° 16' 42" y 93° 09' 40" O) 40,521.82 hectáreas	1:25000	datos climatológicos, datos agua superficiales, información censal (censo agropecuario INEGI), inventarios flora y fauna (SAGARPA), curvas de nivel (INEGI)
González-Espinosa et al. 2004	Soporte	BD de árboles	riqueza de especies, alfa de Fisher, índice de Simpson	Estado de Chiapas	1:250000	colecciones de herbario, cartografía clima, edafología, topografía
González-Espinosa et al. 2009	Soporte	BD de árboles	Riqueza de árboles e Índice de Simpson	Altos de Chiapas	1:250000	Modelo de elevación digital de terreno, cartografía clima, edafología, topografía
Macip-Rios & Munoz-Alonso 2008	Soporte	BD de lagartijas	Diversidad (índice de Shannon e índice de equidad de Shannon), abundancia y riqueza de especies	Mapastepec, Municipio Costa de Chiapas, región de Soconusco (15°40'26" y14°15'12"N; 93°06'05" y 92°39'12"O)		Trabajo de campo, cuantificación de micro hábitats y colecta de lagartijas
	Provisión	Producción de café				
Mas & Dietsch 2003	Soporte	BD de mariposas	índice de manejo en base a la estructura de la vegetación	Región de Soconusco, municipios de Tapachula y Huixtla		Trabajo de campo, colecta mariposas y muestreo e la vegetación
	Provisión	Producción de café				
Ochoa-Gaona & González-Espinosa 2000	Soporte	BD de árboles	nro total de especies leñosas	Altos de Chiapas	1:250000	Inventarios florísticos e imágenes satélite

Continuación tabla 1

Fuente	Categoría MA	componente BD o SE	Indicador	Área de estudio	Escala	Insumos
Román-Cuesta & Martínez-Vilalta 2006	Regulación	Control de perturbaciones (fuego)	incidencia de fuego	Áreas protegidas del estado de Chiapas	1:250000	capa cartográfica de áreas protegidas, base de datos de GPS de incendios CONAFOR, cartografía de vegetación (Inventario Nacional Forestal 2000), cartografía de caminos y carreteras, imágenes satélite
Roncal-García et al. 2008	Regulación	Almacenes de carbono	MgC/ha	Cuatro localidades del municipio de Chilón, Chiapas (17º3'21" y 17º8'29,7"N y entre 92º4'41,8" y 92º8'32"O).		Entrevistas, trabajo de campo aplicando métodos destructivos y fórmulas alométricas.
Segura et al. 2004	Regulación	Control de plagas	Herbívoros percibidos	Región de Soconusco, Chiapas		Encuesta, los talleres de diagnóstico y muestreo de campo.
Siu et al. 2007	Provisión	Producción de café	concentración de Pb, Cu, Cd, Mn, Zn, Fe, Ni, As, el pH, conductividad, turbidez, oxígeno disuelto, cloruros, dureza, P, No total y nitratos en el agua	Región de Soconusco, Chiapas		muestras de agua, una antes del ingreso, una en el proceso y una en la descarga
	Regulación	Calidad de agua				
Tejeda-Cruz & Sutherland 2005	Soporte	BD de aves	Riqueza y composición de especies de aves	Reserva de la Biósfera El Triunfo, 15°09' 10" N, 15°57'02 "N, y 92°34' 04" W, 93°12' 2 " W		Muestreo de aves por puntos d conteo en el bosque y en los claros (mínimo 10m de largo).
	Regulación	Control de perturbaciones (Tormentas)				
Vergara & Badano 2009	Provisión	Polinización de cultivos	Riqueza , índice de diversidad de Shannon e índice de dominancia de especies polinizadoras	Área central del estado de Veracruz (19°12'22"–27'29"N, 96°53'04"–59'17")W		Datos observacionales y experimentales
		Producción de café				
Saldaña 2008	Provisión	Cantidad de agua	Precipitación menos evapotranspiración por subcuenca (m3)	Cuenca Río Cuixmala, Jalisco (1890km2)	1:70000	Mapa climatológico, mapa subcuencas, mapa topográfico, mapa cobertura y uso de suelo
Manson 2004	Provisión	Cantidad de agua	m3 de agua captada	Reserva de la Biósfera El Triunfo, 15°09' 10" N, 15°57'02 "N, y 92°34' 04" W, 93°12' 2 " W		Datos de la Comisión Nacional de Agua

ANEXO II

Entrevistas realizada a actores claves de instituciones de gobierno.

Entrevista capacidad institucional para monitorear y mapear SE y BD

Por favor responder las siguientes preguntas.

Fecha _____
Nombre Completo:_____
Nombre de la Institución:_____
Cargo dentro de la institución: _____

I. General

1. En orden de prioridades siendo 1 la mayor prioridad y 9 la menor prioridad, numere cada uno de los SE

_____Conservación de la BD
_____Mantención de los almacenes de carbono
_____Agua (calidad y cantidad)
_____Fertilidad de los suelos
_____Control de la erosión
_____Control de perturbaciones (amortiguación a eventos extremos)
_____Conservación del patrimonio cultural (conocimiento tradicional)
_____Producción de alimentos
_____Provisión de Productos Forestales No Maderables

2. ¿Cuales son las principales problemáticas ambientales que se presentan en la zona?

_____Cambio de uso de suelo
_____Perdidas de BD
_____Cambio climático
_____Bajos niveles de productividad de los suelos
_____Contaminación de las aguas (superficiales y subterráneas)

II. Institución

3. ¿Cuales son las áreas de trabajo que involucran a su institución dentro del área de BD y SE?
a._____
b._____
c._____

4. Mencione tres fortalezas de su institución para atender en el tema de BD y SE
a._____
b._____
c._____

5. Mencione tres debilidades de su institución para atender en el tema de BD y SE

a._____
b._____
c._____

6. Mencione tres temas que considera necesarios atender para fortalecer la capacidad técnica institucional en el tema de SE y BD
a._____
b._____
c._____

III. Capacidades Técnicas

Monitoreo

7. Han desarrollado en su institución protocolos de muestreo de vegetación

Si____ No___

8. Han desarrollado en su institución protocolos de muestreo de calidad de agua

Si____ No___

9. Han desarrollado en su institución protocolos de muestreo de BD

Si____ No___

10. Han desarrollado en su institución planes de monitoreo de vegetación

Si____ No___

11. Han desarrollado en su institución planes de monitoreo de calidad de agua

Si____ No___

12. Han desarrollado en su institución planes de monitoreo de BD

Si____ No___

13. En su institución hay profesionales capacitados para realizar colecta de datos en campo para el estudio de la vegetación

Si____ No___

14. En su institución hay profesionales capacitados para realizar colecta de datos en campo para el estudio de la calidad del agua

Si____ No___

15. En su institución hay profesionales capacitados para realizar colecta de datos en campo para el estudio de la BD

Si____ No___

16. En su institución, existe la infraestructura adecuada para la toma de datos de campo (camionetas, GPS, cintas diametricas, densiometros, etc.).

Si____ No___

Mapeo

17. En su institución hay profesionales capacitados para el manejo de sistemas de información geográfica y percepción remota

Si____ No___

18. En su institución hay acceso a ortofotos e imágenes de satélite

Si____ No___

19. En su institución hay acceso a cartografía digital (suelo, topografía, mapas climáticos, cobertura de vegetación, etc.)

Si____ No___

20. Cual es la escala a la que normalmente se trabaja en la institución

_____1:250000 a 1:100000
_____1:100000 a 1: 50000
_____Parcela (puntual)

INFORME FINAL

"Política y Gobernabilidad de Cuencas en la Sierra Madre de Chiapas, México"

AGOSTO 2009

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SECCIÓN 1

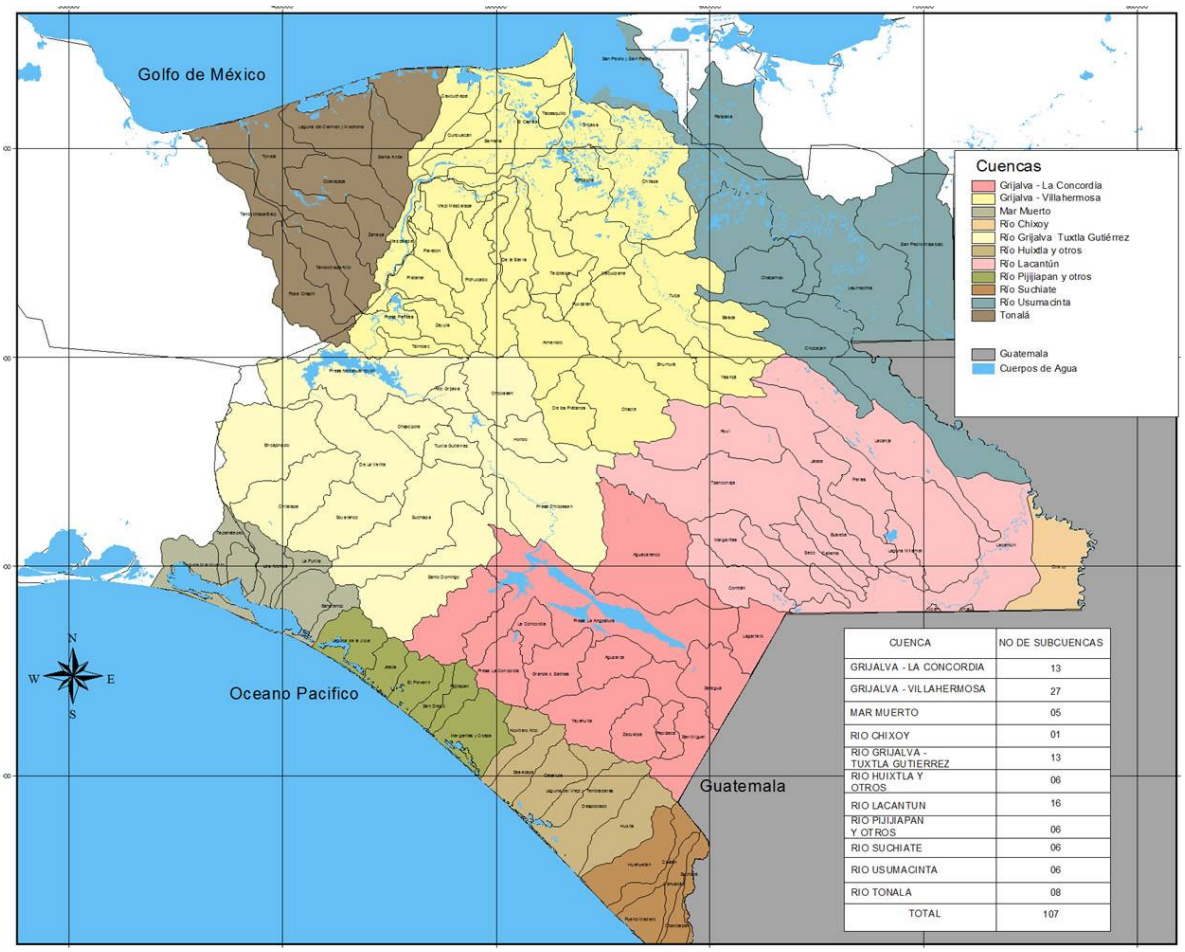
Consejos y Comités de Cuencas en la Sierra Madre y Costa de Chiapas, México

1.1 Introducción

La Sierra Madre de Chiapas (Figura 1) corre paralela a la Llanura Costera del Pacífico, en ella se registran las mayores altitudes del estado de Chiapas, siendo el volcán Tacaná con 4,093 metros de altitud, la máxima elevación. Está constituida por un complejo metamórfico en su núcleo, y por rocas tanto volcánicas como sedimentarias. El clima varia con la altitud: cálido subhúmedo con lluvias en verano por debajo de los 800 metros; semicálido húmedo entre los 1,000 y 1,800 metros; templado húmedo con lluvias todo el año por arriba de los 2,000 metros. Uno de los sitios más lluviosos del país se encuentra aquí, registrando casi 5,000 mm de precipitación anual. Los suelos son delgados y escasos, debido a lo accidentado del relieve y a lo pronunciado de las pendientes. De la Sierra bajan varios ríos y arroyos de caudal rápido llevando consigo gran cantidad de sedimentos para posteriormente depositarlo en la llanura del pacífico. Como consecuencia de la variación del clima y de la llanura, existe una gran diversidad en la vegetación. En orden ascendente encontramos: selva mediana, selva alta, bosque de encinos, bosques de niebla y bosques de pinos.

Entre los ríos de la vertiente del pacífico de Norte a Sur se encuentran: Tapanatepec, Las Arenas, Lagartero, Tiltepec, Zanatenco, Horcones, Pedregal, Jesús, San Diego, Urbina, Pijijipan, Coapa, Margaritas, Novillero, San Nicolás, Cacaluta, Cintalapa, Vado Ancho, Huixtla, Despoblado, Huehuetán, Coatán, Cahoacán, Cozoloapan y Suchiate.

Con respecto a los ríos de la vertiente del Golfo de México de Norte a Sur, se encuentran: Río Negro, Río Cintalapa, Río Soyatenco, Río El Tablón y Suchiapa, Río Los Amates-Pando-Santo Domingo, Río Ningunillo, Río El Plan, Río Cuxtepec, Río Jaltenango-Palestina, Río Yayahuita, Río Honduras-de Maíz Blanco-Vega y Río Grijalva.



CUENCA	NO DE SUBCUENCAS
GRIJALVA - LA CONCORDIA	13
GRIJALVA - VILLAHERMOSA	27
MAR MUERTO	05
RIO CHIXOY	01
RIO GRIJALVA - TUXTLA GUTIERREZ	13
RIO HUIXTLA Y OTROS	06
RIO LACANTUN	16
RIO PIJIJIAPAN Y OTROS	06
RIO SUCHIATE	06
RIO USUMACINTA	06
RIO TONALA	08
TOTAL	107

Figura 1.Localización Sierra Madre de Chiapas dentro de la Cuencas y Subcuencas de la Región Frontera Sur.

1.2 Consejo de Cuenca

Para facilitar la coordinación de las políticas y programas hidráulicos entre los tres niveles de gobierno existentes en México: Federal, Estatal y Municipal y para propiciar la concertación de objetivos, metas, estrategias, políticas, programas, proyectos y acciones, entre la autoridad federal del agua y los usuarios del agua debidamente acreditados y grupos y organizaciones diversas de la sociedad, la Ley de Aguas Nacionales contempla y ordena el establecimiento de Consejos de Cuenca. (Art. 13 de la Ley de Aguas Nacionales, L.A.N.)

Para operativizar sus acciones, los Consejos de Cuenca cuentan con organizaciones auxiliares al nivel de subcuenca, microcuenca y acuífero, denominadas respectivamente

Comisiones de Cuenca, Comités de Cuenca y Comités Técnicos de Aguas Subterráneas. A estos últimos también se les denomina genéricamente "COTAS". Todas éstas son organizaciones jerárquicamente subordinadas a los Consejos de Cuenca y se apoyan en la facultad que la propia Ley otorga a la Comisión Nacional del Agua para promover la organización de los usuarios por regiones, estados, cuencas y acuíferos, a fin de participar en la programación hidráulica. (Art. 14 de la L.A.N.)

Para instrumentar la política hidráulica de gestión integral al nivel de cuenca y facilitar y alentar la participación activa de los usuarios del agua y la presencia amplia y plural de la sociedad, se han vinculado las figuras asociativas de Consejo, Comisión y Comité a territorios de macrocuenca, subcuenca y microcuenca.

Específicamente, el territorio de influencia de un Consejo es una cuenca de primer orden, también denominada macrocuenca o un conjunto de pequeñas cuencas que se agrupan para definir y hacer viable su organización inicial y su posterior consolidación y desarrollo.

Los Consejos de Cuenca son órganos colegiados de integración mixta, funcionan como la instancia de coordinación y concertación, apoyo, consulta y asesoría, entre "la Comisión", incluyendo el Organismo de Cuenca que corresponda, las dependencias y entidades de las instancias federal, estatal o municipal, así como los representantes de los usuarios de agua y de las organizaciones de la sociedad, de la respectiva cuenca hidrológica o región hidrológica. Su objetivo fundamental es formular y ejecutar programas y acciones para la mejor administración del agua, el desarrollo de la infraestructura hidráulica y de los servicios respectivos, y la preservación de los recursos de la cuenca.

Los objetivos de los Consejos de Cuencas son: a) Ordenar y regular la explotación, uso y aprovechamiento de las aguas superficiales, subterráneas y residuales de la cuenca acorde con su responsabilidad, b) Impulsar programas de uso eficiente del agua en zonas agrícolas, urbanas e industriales, c) Promover programas para el saneamiento de los cuerpos de agua y corrientes, y d) Propiciar el desarrollo equilibrado de cuenca con base en el aprovechamiento sustentable del agua y la participación directa de los representantes de los usuarios y de la sociedad en los programas hidráulicos.

Tienen como atribuciones: a) Contribuir a restablecer y/o mantener el equilibrio entre disponibilidad y aprovechamiento de los recursos hídricos, en las cuencas y acuíferos de su jurisdicción, b) Participar en la definición de objetivos generales y criterios para la formulación de los programas de gestión del agua de la cuenca, en armonía con los criterios de la programación hídrica nacional, c) Promover la coordinación y complementación de las inversiones que efectúen los gobiernos estatales y municipales para la ejecución de las acciones previstas en la programación hídrica, y d) Contribuir al

saneamiento de las cuencas, acuíferos y cuerpos receptores de aguas residuales para prevenir, detener o corregir su contaminación.

Los Consejos y Comités de cuencas creados por la CONAGUA en Chiapas se listan en la Tabla 1.

Tabla 1. Consejos y Comités de Cuencas creados por la CONAGUA en Chiapas.

ORGANISMOS DE CUENCA	MUNICIPIOS	FECHA CREACIÓN
1. Consejo de cuenca de la Costa de Chiapas (Chiapas) (a)	**Ene del 2000**	
1.1. Comité de cuenca del Río Zanatenco	Tonalá	Jul del 2002
1.2. Comité de cuenca del Río Lagartero	Arriaga	Sep del 2003
1.3. Comité de cuenca del Río Coapa	Pijijiapan	Oct del 2003
1.4. Comité de cuenca del Río Coatán	Tapachula	Ago del 2005
2. Consejo de cuenca de los ríos Grijalva y Usumacinta (Tabasco y Chiapas)	**Agos del 2000**	
2.1. Comité de cuenca del Río Sabinal	Tuxtla Gutiérrez, San Fernando y Berriozabal	Mar del 2003
2.2. Comité de cuenca del Río Cuxtepeques	La Concordia	May del 2003
2.3. Comité de cuenca Lagunas de Montebello	Comitán, Independencia y la Trinitaria	May del 2003
2.4. Comité de cuenca Lagunas de Catazajá	Playas de Catazajá	May del 2003
2.5 Comité de cuenca Valle de Jovel	San Cristóbal Las Casas	Jun del 2007

(a) El territorio del Consejo de Cuenca de la Costa de Chiapas abarca 24 cuencas hidrológicas, correspondientes a igual número de ríos, cuyas superficies conforman un espacio natural de gestión integral del agua.

El Consejo de Cuenca de la Costa de Chiapas se integra de acuerdo con el Reglamento de la Ley de Aguas Nacionales de la siguiente manera:

- El Director General de la Comisión Nacional del Agua, quien lo preside con voz y voto de calidad en caso de empate.

- El titular del Gobierno del Estado de Chiapas, quién participa como consejero gubernamental con voz y voto.

- Un representante de los usuarios de las cuencas por cada uno de los usos identificados: agrícola, pecuario, agroindustrial, público urbano, y acuacultura, quienes participan como Consejeros usuarios, con voz y voto. Por la importancia que reviste el uso agrícola, este uso está representado por dos consejeros usuarios, con voz y voto.

- Como invitados con voz, pero sin derecho a voto están representadas también otras organizaciones de la sociedad como universidades, institutos de investigación, organizaciones no gubernamentales, presidentes municipales y organismos y entidades diversas, tanto del sector público y privado.

- La estructura del Consejo de Cuenca comprende una Secretaría Técnica cuyas funciones y tareas serán desempeñadas por el titular de la Gerencia Regional Frontera Sur, que es el encargado de suministrar toda la información técnica requerida para las deliberaciones del Consejo, llevar las actas de sus sesiones y otras tareas propias de su función. El Secretario del Consejo, tiene voz pero no voto.

- El Consejo de Cuenca, cuenta con un Grupo de Seguimiento y Evaluación a través del cual desarrolla sus propuestas y acciones previamente consensuadas entre sus integrantes. Este Grupo, está constituido por representantes gubernamentales y de las organizaciones de usuarios, estos últimos provenientes de los Comités Regionales y Estatales por uso integrados a la Asamblea de Usuarios del Consejo de Cuenca.

Se complementa el Grupo con invitados representantes de instituciones de educación superior e investigación, así como de organismos y entidades diversas de los sectores público y privado.

1.2.1 Consejo de Cuenca de la Costa de Chiapas

El territorio del Consejo de Cuenca de la Costa de Chiapas se constituye por 20 municipios chiapanecos y tres del estado de Oaxaca (Tapanatepec, Chauites e Ixhuatán), que comprenden una superficie de 11,012 km^2. Tiene una longitud de 360 Km y 90 Km en su mayor anchura y el declive hacia el mar es violento, dejando una faja de tierra de 30 Km de anchura media, cruzado transversalmente por numerosos ríos de cauces pequeños de corto desarrollo.

La población asentada en la Costa de Chiapas es de aproximadamente de 1 millón 203 mil habitantes, de los cuales el 52% es rural y el 48% restante es urbana. Se identifican los siguientes usos del recurso hídrico: agrícola, pecuario, uso público urbano, agroindustrial y acuacultura.
El Consejo de Cuenca de la Costa de Chiapas, se constituyó el 26 de enero del 2000 en la ciudad de Tapachula, Chiapas, en cumplimiento al acuerdo de creación dispuesto por el Consejo Técnico de la CONAGUA en sesión celebrada el día 25 de noviembre de 1997. El Consejo de Cuenca ha sesionado en tres ocasiones desde su creación y su Grupo de Seguimiento y Evaluación ha sesionado en 24 ocasiones, siendo la más reciente la realizada a finales de 2008.

El consejo de cuenca cuenta con cuatro órganos auxiliares constituidos, de los ríos Lagartero en el municipio de Arriaga, Zanatenco en el municipio de Tonalá, Coapa en el municipio de Pijijiapan y Coatán en el municipio de Tapachula.

En la Costa de Chiapas, se encuentra en proceso de promoción e instalación tres Comités de Cuenca por acuerdo del Grupo de Seguimiento de Evaluación, los cuales son: a) el Comité de Cuenca del Río Cahoacán, en los municipios de Tapachula, Suchiate, Tuxtla Chico, Cacahoatán y Frontera Hidalgo; b) Huehuetán y c) Huixtla. Los dos últimos en los municipios del mismo nombre.
A mediano plazo se pretende continuar con el proceso de promoción e instalación de otros Comités de Cuenca, tales como: El Comité de Cuenca del Río Tiltepec, en el municipio de Tonalá, Chiapas; el Comité de Cuenca del Río San Diego, en el municipio de Pijijiapan, Chiapas; el Comité de Cuenca del Río Tapanatepec, en municipio del mismo nombre y de Acuites, Oaxaca.

El Consejo de Cuenca de la Costa de Chiapas está constituido con la siguiente estructura:

Presidente: Ing. José Luis Luege Tamargo, Director General de la Comisión Nacional del Agua.
Secretario Técnico: Ing. José Raúl Saavedra Horita, Director General del Organismo de Cuenca Frontera Sur.
Vocal Gubernamental por el Estado de Chiapas: Lic. Juan Sabines Guerrero, Gobernador Constitucional del Estado de Chiapas.
Vocal del Uso Agrícola: Dra. Martha Noemí Zapata Pérez e Ing. Francisco Santillán Landazuri.
Vocal del Uso Pecuario: Lic. José Alfonso Choy Hernández
Vocal del Uso Público Urbano: Ing. José Alfredo Águila Beristaín
Vocal del Uso Agroindustrial: Ing. Vicente López Rueda
Vocal de Uso en Acuacultura: Sr. Augusto Rivera Montes

1.2.2 Consejo de Cuenca de los Ríos Grijalva y Usumacinta

La superficie total del territorio del Consejo de Cuenca de los Ríos Grijalva y Usumacinta es de aproximadamente 91,345 km2. Se constituye con 117 municipios, los cuales se distribuyen de la siguiente manera: 99 en Chiapas; 17 en Tabasco y uno en Campeche.

La población asentada en el territorio del Consejo de Cuenca es aproximadamente de 4.8 millones de habitantes. El 60.4% de la población se encuentra en Chiapas; el 39.5% en Tabasco, y solamente el 0.1 % en Campeche. El 45% del total vive en localidades urbanas y el 55% restante en comunidades rurales.

Se identifican cinco usos del recurso: agrícola, público urbano, industrial, pecuario y en generación de energía eléctrica.
El Consejo de Cuenca de los Ríos Grijalva y Usumacinta se constituyó el 11 de agosto del 2000 en la ciudad de Villahermosa, Tabasco, en cumplimiento al acuerdo de creación dispuesto por el Consejo Técnico de la CONAGUA en sesión celebrada el día 28 de marzo del 2000. La segunda sesión y última fue el 30 de noviembre de 2006. El Grupo de Seguimiento y Evaluación de este Consejo de Cuenca ha sesionado en trece ocasiones.

Los órganos auxiliares constituidos en este Consejo de Cuenca de los Ríos Grijalva y Usumacinta en el área del proyecto, es el Comité de Cuenca del Río Cuxtepec, en el municipio de La Concordia, Chiapas; y la Comisión de Cuenca Cañón del Sumidero en lo que corresponde a la Cuenca de los Suchiapa y Santo Domingo, en los municipios de Villaflores, Villacorzo, Suchiapa y Chiapa de Corzo.

La Comisión de Cuenca Cañón del Sumidero se constituyó el 15 de diciembre de 2008 en los cuales participan representantes de los usuarios de las aguas nacionales, de las organizaciones de la sociedad y de los tres órdenes de gobierno, con el objetivo de atender la problemática de los desechos sólidos que presenta el cañón del sumidero, así como la problemática en general que los integrantes determinen. Actualmente no ha sesionado esta Comisión de Cuenca. Otro Comité de Cuenca que se encuentra en proceso de promoción e instalación es el Comité de Cuenca del Río Cintalapa.

El Consejo de Cuenca de los Ríos Grijalva y Usumacinta está constituido de la siguiente manera:

Presidente: Ing. José Luis Luege Tamargo, Director General de la Comisión Nacional del Agua.
Secretario Técnico: Ing. José Raúl Saavedra Horita, Director General del Organismo de Cuenca Frontera Sur.
Vocal Gubernamental por el Estado de Chiapas: Lic. Juan Sabines Guerrero, Gobernador Constitucional del Estado de Chiapas.
Vocal Gubernamental por el Estado de Tabasco: Quim. Andrés Granier Melo
Vocal del Uso Agrícola: MVZ Miguel de Jesús Trinidad López García
Vocal del Uso Pecuario: Ing. Guillermo de Jesús Moguer Gómez
Vocal del Uso Público Urbano: Ing. Juan Carlos Rodríguez Guillen
Vocal del Uso Industrial: Ing. Luis Jardón Urrieta
Vocal de Uso en Generación de Energía Eléctrica: Ing. José Calderón Elizalde

1.3 Comités de Cuenca de la Sierra Madre y Costa de Chiapas

Los Comités de Cuenca establecidos en la región del proyecto por orden cronológico son: El comité de Cuenca del Río Zanatenco en el municipio de Tonalá, Chiapas, establecido el 23 de agosto de 2002; el Comité de Cuenca del Río Lagartero, en el municipio de Arriaga, Chiapas, establecido el 11 de septiembre de 2003; el Comité de Cuenca del Río Coapa, en el municipio de Pijijiapan, Chiapas, establecido el 15 de octubre de 2003; el Comité de Cuenca del Río Cuxtepec, en el municipio de La Concordia, Chiapas, establecido el 2 de mayo de 2003; y el Comité de Cuenca del Río Coatán, establecido el 31 de agosto de 2005.

La estructura organizativa obedece a lo que estipula las Reglas de Operación y Funcionamiento de los Consejos de Cuenca y sus órganos auxiliares, la cual señala que los Comités de Cuenca se conformarán de la siguiente manera:

I.- Por un Coordinador y Secretario Técnico designados por el Director General, quienes tendrán voz y voto de calidad.

II.- Un representante por cada uno de los gobiernos estatales comprendidos dentro del ámbito del Comité de Cuenca, quienes fungirán como vocales gubernamentales con derecho a voz y voto, quienes podrán nombrar a suplentes para los casos de ausencia.

III.- Hasta tres representantes de los usuarios de la cuenca por cada tipo de uso que se haga del recurso, quienes fungirán como vocales usuarios y tendrán derecho a voz y voto.

IV.- Invitados que podrán ser titulares de las dependencias y entidades del gobierno federal, estatal y municipal que tengan su sede en el territorio en que se instale el Comité de Cuenca, así como las instituciones, organizaciones no gubernamentales y representantes de diversas agrupaciones de la sociedad, quienes contarán con voz.

Una estructura representativa de un comité típico de la Sierra Madre es la siguiente:

- Coordinador: El Presidente municipal
- Secretario Técnico: La CONAGUA
- Vocal por el Estado: IHN o Instituto Estatal del Agua
- Representante CONANP: Director de la Reserva involucrada.
- Invitados: Universidades, ONG´s, organizaciones sociales y productivas, otras instituciones de los tres niveles de gobierno.
- Vocales: representantes de los usuarios del agua

Actualmente, de acuerdo a la Ley de Aguas Nacionales publicada en el 2004, en lo referente a invitados del punto anterior, se está aplicando supletoriamente dicha Ley para que los representantes elegidos sean integrantes con derecho a voz y voto dentro de los Comités de Cuenca que se establezcan.

A diferencia de los Comités Técnicos de Agua Subterránea (COTAS) creados también por la CONAGUA que tienen figura jurídica de Asociaciones Civiles, los Comités de Cuencas se constituyen solo con actas simples suscritas por los integrantes (ver Anexo 1).

Cada uno de los cinco Comités de Cuenca instalados en el área de proyecto, cuentan con oficinas, mobiliario y equipo de cómputo para cumplir con sus funciones, a las cuales se les denomina Gerencias Operativas, a cargo de un profesionista especializado en la materia a quien se le denomina Gerente Operativo de la Cuenca, y éste se apoya con un equipo multidisciplinario de profesionales y técnicos de acuerdo a las necesidades de la cuenca. Todos los gastos operativos, de adquisición de mobiliario, honorarios y gasto corriente se comparten a partes iguales con los H. Ayuntamientos involucrados en la cuenca de que se trate, mediante aportación federal y municipal, las cuales se formalizan a través de convenios de coordinación y se vigila su aplicación a través de la comisión técnica de evaluación y seguimiento, integrado por representantes de los municipios en donde se encuentra el Comité de Cuenca, de la CONAGUA y del Gobierno del Estado de Chiapas. Para la correcta operación de este órgano se tienen instrumentos para tal fin, como lo es el reglamento interno, los clasificadores de gastos tanto federal, estatal como municipal y los propios convenios de coordinación signados.
La estructura de los Comités de Cuencas de los Ríos Cuxtepec, Zanatenco, Lagartero, Coapa y Coatán se presenta en el Anexo 2. Así también, en dicho anexo se presenta a manera de ejemplo el organigrama del Comité de Cuenca del Río Lagartero.

Para ejemplificar algunos tipos de actividades que se realizan en la cuencas, se citan a continuación actividades de la Cuenca del Río Cuxtepec: 1) Reuniones ordinarias y extraordinarias de trabajo del comité de cuenca para el seguimiento de los avances de los acuerdos, plan de trabajo del gerente y proyectos que se implementan en la región, 2) Reuniones de planeación estratégica del Grupo de Trabajo Interinstitucional de la Subcuenca del Río Cuxtepec (grupo integrado desde el 2004, donde participan los tres órdenes de gobierno y organizaciones de la sociedad civil), 3) Cursos de capacitación e intercambio de experiencias en el ámbito productivo, conservación de suelos, manejo de residuos sólidos y educación ambiental, 4) Transferencia de tecnología en conservación de suelos, 5) Implementación de proyectos de conservación y restauración de suelos (reforestación en áreas degradadas; barreras vivas; presas de piedra acomodada, presas mixtas: estacas y costales, gaviones); establecimiento de módulos de lombricultura, enriquecimiento de acahuales, establecimiento de plantaciones dendroenergéticas, establecimiento de módulos agroforestales con limón persa, naranja, guayaba pera y

durazno; estufas ahorradoras de leña; viveros comunitarios: con palma camedor, árboles de sombra para café y pino; incendios forestales; planes de negocio en café orgánico; protocolización de la organización social en el plan de la Libertad y proyecto de relleno sanitario tipo D.

Adicionalmente, en esta misma cuenca se pueden citar, entre otros estudios, los siguientes: 1) Diagnóstico de la problemática de la cuenca con la Metodología ZOOP (CONAGUA, 2001); 2) Plan de manejo integral de la parte alta y medio de la subcuenca del Río Cuxtepeques (Chapingo-CFE-SEMARNAT, 2004); 3) Plan estratégico de la Gerencia de la Cuenca (CONAGUA, 2006); 4) Diagnóstico y proyecto ejecutivo del Relleno Sanitario Tipo D, Col. Benito Juárez (CONAGUA, 2006); 5) Planes rectores de producción y conservación de las microcuencas: El Plan, Cuxtepeques y el Negrito; 6) Estudio para la Delimitación de Áreas de Riesgos e Impactos de los Fenómenos Hidrometereológicos, como elementos básicos para la elaboración de un plan de acciones para contingencias ambientales en las cuencas del Río Cuxtepeques (SEMARNAT, 2007); 7) Plan de restauración en la cuenca (PRONATURA Sur-Fondo de Conservación el Triunfo, 2008) y, 8) Caracterización y Diagnóstico en Tramos de los Ríos Prusia, El Plan, Cuxtepeques, Negrito y El Rosario en la Reserva de la Biosfera “El Triunfo y su zona de influencia, Chiapas, México.

Los Comités de Cuenca establecidos que operan en el área de estudio, presentan éxitos y dificultades que son característicos de su estructura, apoyo institucional, continuidad, colaboración interinstitucional, participación social, entre otros factores que inciden de manera favorable o desfavorable.

A manera de ilustración a continuación se presentan los éxitos en la Cuenca del Río Cuxtepec: 1) Buena aceptación de la estrategia de manejo de cuencas por parte de los usuarios; 2) Consolidación del grupo multidisciplinario (GTI) para dar seguimiento de los acuerdos del comité y apoyo al comité de cuenca y la gerencia para mejorar la toma de decisiones, 3) Presencia del gerente operativo de cuenca para dar seguimiento a los acuerdos y acciones en general para la implementación de la estrategia de cuencas; 4) El fortalecimiento de la gerencia operativa con los recursos de la CONAGUA, lo que permite su permanencia; 5) La permanencia del interés de los usuarios y el seguimiento puntual de las problemática y proyectos con impacto en la cuenca; 6) La gestión de recursos CFE-SEMARNAT-INIFAP en la microcuenca el Naranjo; 7) Participación social con la consolidación de una sociedad cooperativa del Vivero de Plan de la Libertad (plan de negocio); 8) Establecimiento del relleno sanitario en el Ejido Benito Juárez; y 9) Ordenamiento territorial de obras en la microcuenca El Naranjo, entre otros.

Así mismo, se enumeran, a continuación, algunas de las dificultades que se presentan en dicha Cuenca: 1) La permanencia de la gerencia operativa para el seguimiento de las acciones; 2) Homologación de una metodología de planeación para la instrumentación y definición de acciones en la cuenca de manera coordinada, con impacto y visión de desarrollo regional, 3) Las políticas del gobierno (i.e., fomento productivo) contrarias a las estrategias que se implementan en la cuenca; 4) Apropiación por parte de los usuarios de la estrategia del manejo integrado de cuencas y su importancia en todos los ámbitos por falta de un esquema de difusión de la estrategia; 5) Técnicos deficientes en el conocimiento de la estrategia debido a la falta de capacitación; 6) Continuidad de la estrategia de cuencas por cambios de autoridades municipales, la cual debería fortalecerse a través de legislación que ayude a crear a nivel municipal una estructura para garantizar la continuidad, y 7) el desfasamiento de los recursos para la operación de la gerencia debido a trámites administrativos ineficientes y fuera de tiempo.

En el Anexo 3 se presentan, también a manera de ilustración, los antecedentes, ubicación, funciones de la gerencia operativa, organigrama y características de la Cuenca del Río Coatán.

Las actividades que realizan los Comités de Cuenca establecidos en el área del proyecto obedecen principalmente a lo que establece los Planes de Gestión para cada Cuenca. El Comité de Cuenca del Río Coapa cuenta con su Plan de Gestión elaborado en el 2007, del cual el gerente operativo elabora su programa anual, y en las sesiones ordinarias y extraordinarias del propio Comité de Cuenca se van analizando y evaluando sus avances o problemática presentada. De manera similar la Cuenca de Cuxtepec cuenta con un plan de trabajo de la gerencia. En la siguiente actividad se abordarán los temas que se relacionan con el contexto institucional, legal y político, dentro de los que operan las cuencas.

SECCIÓN 2

Contexto Político, Jurídico e Institucional de los Comités de Cuencas

2.1 Contexto político, jurídico e institucional

Para describir y analizar el contexto político, jurídico e institucional en la que operan los Comités de Cuenca, es necesario tomar en consideración los siguientes aspectos.

En los Estados Unidos Mexicanos, la autoridad única en materia de aguas nacionales es la denominada Comisión Nacional del Agua, cuya definición en la Ley de Aguas Nacionales es: Órgano Administrativo Desconcentrado de la Secretaría de Medio Ambiente y Recursos Naturales, con funciones de Derecho Público en materia de gestión de las aguas nacionales y sus bienes públicos inherentes, con autonomía técnica, ejecutiva, administrativa, presupuestal, y de gestión, para la consecución de su objeto, la realización de sus funciones y la emisión de los actos de autoridad que conforme a la Ley de Aguas Nacionales corresponde tanto a ésta como a los órganos de autoridad que la misma Ley señala.

En el Anexo 4, se definen algunos conceptos contemplados en la Ley de Aguas Nacionales relacionados a las cuencas, y que son importantes de precisar para tener mayores elementos de análisis.

El contexto político en el cual se desarrollan los Comités de Cuenca, por su mandato legal, no puede ser desligado del liderazgo institucional de la CONAGUA en la materia. Las dependencias que se involucran por la necesidad irremplazable de encontrar una contraparte estatal, invariablemente son las dependencias relacionadas con la conservación y el cuidado de los recursos naturales.

En cuanto a los Comités de Desarrollo Rural Sustentable, Comités de Desarrollo Municipal, Regional o Estatal entre otros, que tengan relevancia con respecto a la conservación de la biodiversidad y los servicios ecosistémicos en las cuencas de estudio, debe señalarse que en las sesiones ordinarias y extraordinarias de los comités de cuenca instalados en la región de estudio, se busca y se convoca a que participen todos los representantes en las diversas agrupaciones tanto de la sociedad como gubernamentales que tengan que ver con la conservación y el cuidado del medio ambiente; es decir que en el territorio de la cuenca de los ríos los cuales se trabaja a través de los Comités de Cuenca, tienen cabida

todas aquellas propuestas y acciones que involucran la fracción que significa la superficie de la cuenca en un contexto municipal, estatal o nacional. Hasta la fecha no ha sido posible convocar a todos los actores que tienen que estar sentados en las sesiones de los comités de cuenca; debido a que nos entrampamos con la continuidad de estos.

2.2 Sinergias y obstáculos entre las diferentes estructuras institucionales que operan en las microcuencas.

Existe **sinergia** en las diversas instituciones que realizan actividades relacionadas con el manejo de cuencas, la cual se manifiesta en la participación en las diversas reuniones a que son convocadas.

El mecanismo más efectivo de coordinación son los convenios legales debido a que es un instrumento formal que define claramente derechos y obligaciones de las partes que lo suscriben. Dentro de estos mecanismos destacan el convenio entre el INIFAP y SEMARNAT, CFE, IHNyE y la CONAGUA (véase el Anexo 5 para el glosario de siglas) para coordinar acciones y recursos para el manejo de cuencas (nótese el caso específico de la Cuenca de Cuxtepec). Así también el FIRCO tenía suscrito convenios de coordinación con 13 municipios en el marco del extinto Programa Nacional de Microcuencas.

Los convenios tiene las siguientes ventajas: a) al formalizar legalmente una alianza institucional existe mayor garantía de que se cumplan los compromisos establecidos entre las partes, b) cuando los recursos económicos de dos o más dependencias se ejecutan en una sola instancia administrativa, se simplifica la toma de decisiones y los recursos se erogan de acuerdo a las necesidades de los planes de manejo, y C) se puede planificar con horizontes de mediano y largo plazo cuando los convenios se suscriben por varios años.

Con excepción de los convenios legales, en la mayoría de los casos la colaboración inter-institucional entre una o más dependencia es informal y no representa ningún compromiso serio de coordinación o de integración de esfuerzos (Tabla 2).

Tabla 2. Nivel de Alianzas Institucionales para el Manejo de Cuencas.

DEPENDENCIAS	FIRCO	CONAZA	SEMARNAT	IHNyE	SDR	INIFAP	CONANP	CONAFOR	CONAGUA	MUNICIPIOS
FIRCO		X	X	X	X				X	(X)
CONAZA	X		X		X				X	X
SEMARNAT	X	X		X	X	(X)	X	X	(X)	X
IHNyE	X		X		X	X	X	X	X	X

SDR	X	X	X	X		X	X		X	
INIFAP			(X)	(X)	X				(X)	
CONANP			X	X	X			X	(X)	X
CONAGUA	X	X	X	X	X	(X)	(X)			X
CONAFOR			X	X				(X)	(X)	
MUNICIPIOS	(X)	X	X	X			X		(X)	
SAGARPA		X		X						
CFE			(X)			(X)				
TNC (USAID)			X				X			
CATIE					(X)	X				
PRONATURA							X			
IDESMAC							X			
C. I.			X		X		X	X	X	
NAWCC							X			
FWI							X			
TOTAL	**6**	**6**	**12**	**9**	**9**	**6**	**11**	**5**	**10**	**6**

(X)= Alianzas institucionales a través de convenios

Cabe señalar que dependencias que aparentemente mantienen sinergia también señalan que sus obstáculos limitantes operativos es principalmente la falta de coordinación institucional y vinculación con los municipios. Lo anterior permite deducir que las sinergias interinstitucionales señaladas son superficiales y de tipo político, ya que la buena relación no se manifiesta en una integración efectiva para atender en forma conjunta a las microcuencas.

En cuanto a los **obstáculos** para alcanzar una eficiente operación institucional resaltan los siguientes:

a) Falta de integración efectiva de las instituciones

Es el factor limitante más importante. Como evidencia de este problema resalta la falta de cooperación en el manejo y control de la información, la pulverización en la planeación y aplicación de los recursos, la falta de una política estatal para determinar las cuencas que son prioritarias atender, débil e inestable participación de los municipios, falta de compromiso en las mismas dependencias para cumplir con los acuerdos de las reuniones e intereses institucionales difíciles de integrar en una cuenca.

b) La falta de continuidad de las acciones

Como causas se señalan:

- Los cambios en los tres niveles gobiernos con mayores estragos en el cambio de presidentes municipales.

- La presupuestación anual y llegada extemporánea de los recursos. Todos los años la operación inicia en el segundo semestre del año y finaliza el 31 de diciembre del mismo año. Es necesario un mecanismo efectivo para operar y administrar los recursos oportunos y con visión de largo plazo.

- Falta un mecanismo para garantizar la permanente participación de las presidencias municipales con visión de largo plazo, ya que en la actualidad su participación es incierta y depende de la voluntad de quien sea el presidente municipal en turno, lo cual genera inestabilidad cada tres años. En muchos casos el cambio de autoridades municipales incluye el relevo de las gerencias técnicas de los Comités de Cuencas, en las cuales hay una inversión en capacitación y experiencia ganada en el manejo de cuencas.

c) Desconocimiento de los conceptos y principios del enfoque sistémico del manejo de cuencas

Se observa en forma generalizada un desconocimiento de los conceptos básicos de la gestión integrada de cuencas a nivel de funcionarios, técnicos de las gerencias y autoridades municipales.

Es generalizada la confusión entre lo que significa trabajar en una cuenca con hacer una manejo integrado del la misma, así como, la ausencia en todos los niveles de un pensamiento sistémico, holístico e integral para aprovechar los recursos naturales.

Por ejemplo, la mayoría de las personas que viven en una cuenca describen las tareas que realizan todos los días, no el propósito de la cuenca de la cual forman parte. La mayoría se ven dentro del "sistema cuenca" sobre el cual no ejercen ninguna influencia. Se concentran únicamente en su actividad productiva (agricultura, ganadería, forestal, pesca, industria, etc.,) y no sienten mayor responsabilidad por los resultados que se generan cuando interactúan todas las partes. Más aún, cuando los resultados son decepcionantes (contaminación, inundaciones, erosión de suelos, etc.), resulta difícil saber porqué. Sólo se puede suponer que algo está fallando.

d) Ausencia de desarrollo de capacidades

También se detectó que no existe un programa para el desarrollo de capacidades sobre manejo integral y sostenible de los recursos naturales con el enfoque de cuencas.

e) Débil aplicación del marco legal y falta de empoderamiento social

Otros obstáculos existentes son: la débil aplicación del marco legal y la falta de empoderamiento social de las acciones por parte de los pobladores de las cuencas.

Y si se toma en cuenta las siguientes prescripciones legales:

1) Con respecto al soporte jurídico, los comités de cuencas han sido establecidos y están operando en el marco de la LAN Art. 13 y 13 BIS.

2) Con respecto al uso del suelo, la Ley General de Desarrollo Rural Sustentable en su Art. 7º. Enuncia que "el Estado, promoverá…. para realizar servicios a la producción así como a través de apoyos directos a los productores, que les permitan realizar las inversiones necesarias para incrementar la eficiencia de sus unidades de producción, mejorar sus ingresos y fortalecer su competitividad", y

3) Con respecto a la Planeación y Coordinación de la política para el Desarrollo Rural Sustentable, en su Título Segundo, Art 13, Fracción V, que dice "A través de los Distritos de Desarrollo Rural, se promoverá la formulación de programas a nivel municipal y regional o de cuencas, con la participación de las autoridades, los habitantes y los productores en ellos ubicados", y que dichos programas deberán ser congruentes con los Programas Sectoriales y el Plan Nacional de Desarrollo (Título Tercero, Capítulo I. Articulo 32, Fracción III).

Se podría proponer:

1) Fortalecimiento de la participación de los usuarios de la cuenca en los Consejos Distritales de los municipios para la toma y aprobación de proyectos en el marco de la cuenca,

2) Fortalecimiento de la capacitación a nivel de las instituciones que participan en los consejos distritales y estatales para que conozcan las estrategias del manejo integral de cuencas y exista coordinación de órganos de administración (i.e., Comités de Desarrollo Rural Sustentable, Comités de Desarrollo Municipal,

Regional o Estatal) conforme a un plan y metodología de planeación de las cuencas., además de la

3) Incorporación de lineamientos ecológicos dentro de los proyectos y obras que aprueban (fomento productivo, infraestructura) para mitigar el impacto y mejorar la conservación de los recursos naturales (servicios ambientales) y que tengan impacto en la cuestión económica.

SECCIÓN 3

Causantes y Variables de Cuencas sin Estructura Formal

3.1 Algunas causantes y variables de la no estructura formal de comités de algunas microcuencas

Las microcuencas que no cuentan con una estructura formal de Comités de cuenca, ha sido por la estrategia de trabajo aplicada en este caso por el Organismo de Cuenca Frontera Sur de la CONAGUA en coordinación con las instancias estatales y municipales relacionadas con la promoción e instalación de Comités de Cuenca en el Estado de Chiapas.

Es decir, que la experiencia en Chiapas de instalar Comités de Cuencas inició a partir del 2002 con la instalación del Comité de Cuenca del Río Zanatenco, con el objetivo de desarrollar acciones y actividades muy particularizadas al entorno político y social de la región; para ir replicando los posibles éxitos en otras microcuencas que se tuviera el interés de trabajar, de tal manera que las dependencias involucradas con el desarrollo y consolidación de estas organizaciones de cuenca tienen clara la política de no instalar Comités de cuenca por instalar nada mas, sino que garantizar la creación de nuevos Comités buscando sean constituidos con los elementos de éxitos de otros antecesores para que sean auténticas organizaciones de cuenca dedicadas a la conservación, restauración, aprovechamiento y protección de los recursos naturales.

Una limitante que se ha observado a raíz de la primera experiencia del 2002 ha sido la continuidad tanto de personal capacitado como de las acciones que se desarrolla para el beneficio de la cuenca, propiciado principalmente por los cambios trianuales que se dan en la administración pública municipal, ya que el coordinador quien preside el desarrollo y consolidación de los Comités de Cuencas existentes en la región son los presidentes municipales.

Otra opción para solventar esta problemática es que la coordinación esté a cargo de un representante relevante de la sociedad que sea integrante del Comité de Cuenca, lo que podría provocar a la vez, que no tuviera mucho eco de las acciones que realiza en pro de la cuenca por parte de las áreas internas y del propio presidente municipal en donde se encuentra operando el Comité de Cuenca.

3.2 Microcuencas sin comités formales pero con incidencia institucional

Adicionalmente a los consejos, comisiones y comités de cuencas establecidos por la CONAGUA, está constituido el Comité Estatal de Manejo de Microcuencas (CEMICRO) integrado por dependencias involucradas en el tema de cuencas y coordinado por la Comisión Forestal Sustentable del Estado de Chiapas (COFOSECH).

El FIRCO en el marco del extinto Programa Nacional de Microcuencas creó oficinas municipales para realizar las acciones, de las cuales quizás aún estén activas las de los municipios de Cintalapa, Villaflores, Villacorzo, La Trinitaria, Escuintla y Cacahoatán, las cuales operan en forma independiente a los comités de cuencas creados por la CONAGUA.

En el Anexo 6 se presenta la ubicación por municipios de cada uno de los comités y grupos de trabajo que se han constituido en las 66 microcuencas en donde se reportan acciones de por lo menos una institución que reportó actividades en comités de cuencas con estructuras formales y no formales.

Las oficinas en estos municipios son denominadas direcciones de microcuencas y dependen administrativamente del gasto corriente de cada municipio. Basan su funcionamiento en los planes rectores de producción y conservación elaboradas por el FIRCO, enfocadas principalmente a la conservación del suelo y el agua.

SECCIÓN 4

Metodologías de Planeación, Reglamentaciones y Lineamientos de Consejos y Comités de Cuencas

4.1 Metodologías

Existe una gran diversidad de procedimientos metodológicos empleados por las dependencias para trabajar con el enfoque de manejo de cuencas en Chiapas. Se reportan como herramientas metodológicas las siguientes:

Conservación Internacional utiliza una metodología que considera una etapa ecocéntrica, referida al ordenamiento ecológico y una etapa antropocéntrica para la cual se apoya con la metodología utilizada por el FIRCO. Reporta los mayores problemas durante su implementación en la fase antropocéntrica.

La CONANP al inicio, utilizó herramientas metodológicas extraídas de la "Planeación para la Conservación de Sitios", diseñadas por The Nature Conservancy para parques nacionales. Esas herramientas incluyen: definición y priorización de objetos de conservación, identificación de amenazas y fuentes de presión a los objetos de conservación, análisis de actores y priorización de acciones. Posteriormente, en la cuenca Cuxtepec, se integró a un esfuerzo ya iniciado, donde se abordaron las siguientes herramientas: Metodología ZOPP de la GTZ, diseño de un plan de manejo de la cuenca y conformación de la gerencia de cuenca.

Los problemas para la implementación de la metodología radicaron en que todas las herramientas de "Planeación para la Conservación de Sitios" han sido difíciles, ya que no están diseñadas específicamente con el enfoque de cuencas, de tal modo que después de varios años, no se han logrado avances.

La SEMARNAT utiliza la metodología del Manual de Ordenamiento Ecológico del Territorio, ésta ha sido modificada por el Instituto Nacional de Ecología (INE), para agilizar los resultados, aunque las bases siguen siendo las mismas. De acuerdo al Reglamento de la Ley General de Equilibrio Ecológico y Protección al Ambiente en materia de Ordenamiento Ecológico, se siguen las siguientes etapas: descriptiva, diagnóstico, propositiva y gestión.

Las mayores dificultades con la metodología se presentan en las presidencias municipales, por su limitada participación, involucramiento, intereses políticos, responsabilidad,

acompañada de una falta de cultura y conocimientos de diversos tipos (gerenciales, ambientales, administrativos) para implantar un manejo integral de cuencas.

La metodología empleada por El FIRCO considera las siguientes etapas: 1.- Concertación con los ayuntamientos. 2.- Rectoría de los ayuntamientos. 3.- Asambleas comunitarias. 4.- Diagnósticos participativos. 5.- Análisis de la problemática. 6.- Propuesta de alternativas. 7.- Presentación de propuestas y selección de alternativas. 8.- Elaboración del plan rector de producción y conservación y presentación ante las instituciones. 9.- Gestión institucional de proyectos específicos identificados. 10.- Puesta en marcha. 11.- Asesoría técnica y seguimiento. Los mayores problemas con la metodología, se presentan en la inestable rectoría de las autoridades municipales debido a los cambio de alcaldes cada tres años que interrumpen la continuidad de las acciones.

La CONAGUA emplea una metodología que considera: diagnóstico, planificación, elaboración de planes y programas, ejecución y evaluación de programas. Reporta que las principales limitantes, se presentan en la ejecución y la evaluación de acciones.

El INIFAP utiliza una metodología que considera: diagnóstico biofísico, investigación, promoción y organización comunitaria, implementación de acciones, capacitación y seguimiento y evaluación. Reporta sus principales problemas en la organización comunitaria y en la evaluación de efectos.

Aunque en general se presenta una ligera tendencia hacia la metodología del Ordenamiento Ecológico Territorial, es evidente que cada institución ha diseñado su propia metodología de acuerdo a su interés particular y ha

priorizado sus propias cuencas de trabajo para aplicarla. Esta es una de las principales debilidades encontradas en las experiencias del trabajo de cuencas en el estado de Chiapas.

Es importante resaltar el hecho de que todas las dependencias señalan tener sus principales problemas en los procesos de ejecución, gestión y evaluación de acciones, porque justamente, es aquí donde se requiere la integración entre ellas.

Con excepción de la CONAGUA, ninguna de las dependencias indicó como parte de su metodología, la creación previa de los organismos de cuenca que señala el Artículo 13 de la Ley de Aguas Nacionales.

La delegación estatal de SEMARNAT en el año 2003 realizó un taller de trabajo cuyo objetivo fue homologar las metodologías en el Manejo Integral de Cuencas en el Estado. De los resultados de este taller se pretendía elaborar una guía que aún no se ha publicado.

4.2 Reglamentaciones y lineamientos

Consejos de cuencas: Tienen claramente definidas sus funciones en la Ley de Aguas Nacionales, pero no existe una evaluación de su funcionamiento con base a los lineamientos establecidos en la ley. Presentan débil vinculación con los Comités de Cuencas, y por lo tanto, muy poco involucramiento para resolver sus problemas operativos.

Comités de cuencas: No tienen definidos claramente sus funciones específicas en la Ley de Aguas Nacionales ya que solo los refieren como organismos auxiliares de los consejos de cuencas. Existen actas simples de creación de cada comité y se elaboran actas por cada reunión de trabajo que realizan. No cuentan con estatutos para regular la toma de decisiones entre sus integrantes, así como para evaluar el cumplimiento de sus objetivos con base a indicadores de cuencas establecidos en una línea base.

4.3 Métodos analíticos y las herramientas para la toma de decisiones para la planeación integral del uso del suelo

La delegación estatal de la SEMARNAT está impulsando en el marco de la Ley General de Equilibrio Ecológico y la Protección al Ambiente (art. 3) el Programa de Ordenamiento Ecológico del Territorio (POET) como un proceso de planeación dirigido a evaluar y programar el uso del suelo y el manejo de los recursos naturales para preservar y restaurar el equilibrio ecológico y proteger al ambiente. Para tal fin en octubre del 2004 suscribió con la SEDESOL un convenio de coordinación del cual se derivaron las siguientes tareas: la conformación de un comité estatal de ordenamiento ecológico, establecer las líneas estratégicas del modelo de ordenamiento ecológico del territorio y la bitácora ambiental. El convenio fue actualizado en el 2008 y entrará en vigencia el 2012.

En el marco del manejo de cuencas el POET se ha aplicado en las siguientes cuencas o subcuencas:

- Cuenca del río Coapa en el municipio de Pijijiapan decretado el 07 de enero del 2004 y en proceso de actualización.

- Subcuenca del río Zanatenco en el municipio de Tonalá decretado el 31 de marzo del 2004 y en proceso de actualización.

- Cuenca del río Lagartero en el municipio de Arriaga que se encuentra en proceso de revisión para su decreto.

- Cuencas del río Sabinal en los municipios de Tuxtla Gutiérrez, San Fernando, Ocozocoautla y Berriozabal que se encuentra en proceso de revisión para su decreto.

4.4 Otros instrumentos de planeación

Existen otras herramientas analíticas que se aplican por criterios institucionales para orientar técnicamente sus acciones en las cuencas, como son: los planes de conservación de sitios, los planes, de manejo de cuencas, planes de gestión de cuencas, los mapas de erosión de suelos para ubicar las prácticas y obras de conservación y la zonificación de áreas para restauración, entre otras.

Dentro de los instrumentos de planeación que se aplican para el desarrollo y consolidación de los cinco Comités de Cuenca existentes en la región de estudio son los denominados Planes de Gestión.

El Comité de Cuenca del Río Coapa y Río Lagartero, cuentan con este instrumento de gestión actualizado y que se aplica a las tareas ordinarias de dichos Comités.

El Comité de Cuenca del Río Zanatenco, fue el primero en contratar la elaboración de su Plan de Gestión elaborado por la Universidad Autónoma Chapingo, siendo uno de los primeros instrumentos de gestión al nivel nacional; observándose que fue elaborado bajo un concepto agroforestal, lo que propició que a la fecha se esté actualizando para tener un instrumento más integral.

El Comité de Cuenca del Río Cuxtepec contrató la elaboración de su Plan de Gestión únicamente de la Subcuenca Alta; actualmente se está elaborando la complementación de su plan de gestión en lo que corresponde a la Subcuenca Media y Baja.

El Comité de Cuenca del Río Coatán actualmente está en proceso de revisión y análisis que está siendo elaborado por un consultor especialista en la materia. Se está en espera del Plan de Gestión Integral de la Cuenca, del lado mexicano y del lado guatemalteco, también se está llevando a cabo el Plan de Gestión, con buenas intenciones de participar a nivel binacional. Está también elaborándose el Plan de Playas Limpias del Municipio.

Cada uno de los Comités de Cuenca antes mencionados debería de contar con su reglamento interno, así como de los manuales de organización y procedimientos, los cuales por la evolución misma y normal que han venido aconteciendo en ellos no ha permitido llegar a cumplir con esta reglamentaciones, sin embargo se están tomando medidas para que estos instrumentos sean integrados en el corto plazo.

Todos los Comités de Cuencas instalados cuentan con acta constitutiva, en la cual se plasma el motivo, objetivos, integrantes y lineamentos generales para su desarrollo y consolidación (ver Anexo 1, como ejemplo de acta constitutiva de un comité de cuenca).

4.5 Consideraciones adicionales

Aunque la LAN tiene prevista la conformación de los Comités de Cuencas, la ley no tiene prevista elementos para integrar los Planes de Manejo Integral de Cuencas con base a una metodología homogénea, lo que no permite tener una uniformidad como instrumento de planeación en las cuencas constituidas.

Los enfoques pueden variar de acuerdo al organismo que lo elabore, a su experiencia, perfil y formación, por lo que es importante homologar en Chiapas un marco metodológico para las cuencas. Quizá deba haber un espacio dentro del reglamento de la ley para la elaboración de los planes de manejo por cuencas.

SECCIÓN 5

Operación y Funcionalidad de Cuencas: Estudio de Caso "Cuenca del Río Coatán".

5.1 Comités de cuencas funcionando eficientemente

Los Comités de Cuenca que están funcionando de manera eficiente en orden de importancia son: el Comité de Cuenca del Río Coapa, el Comité de Cuenca del Río Cuxtepec, el Comité de Cuenca del Río Lagartero, el Comité de Cuenca del Río Zanatenco y el Comité de Cuenca del Río Coatán.

Algunas consideraciones generales al respecto son:

- Como fue señalado las metodologías son diversas y no son definidas por los comités de cuencas sino por las instituciones que realizan acciones en las cuencas. Independientemente de la metodología, todas tienen problemas en la fase de implementación. La diversidad de metodologías es uno de los principales problemas del manejo de cuencas.

- Se sugiere rescatar la guía metodológica programada por la delegación estatal de SEMARNAT en el año 2003 cuando se realizó el taller de trabajo con el objetivo de homologar las metodologías en el Manejo Integral de Cuencas en el Estado.

5.2 Comités de cuencas con problemas de operación

Los comités de cuenca creados no son funcionales debido a lo siguiente:

- Al no contar con estatutos para la toma de decisiones predomina la decisión de los que tienen el poder político o el control de los recursos económicos.

- Falta capacitación con el enfoque de manejo de cuencas a sus integrantes, especialmente a los pobladores.

- No tienen facultades para la captación y administración de recursos, lo cual es un serio limitante para la implementación de un esquema de pago por servicios ecosistémicos.

- No están vinculados con los otros espacios de toma de decisiones del gobierno como los COPLADEM y los Consejos de Desarrollo Rural Sustentable, por lo que es común encontrar en una cuenca proyectos con objetivos contradictorios o duplicidades de esfuerzos.

- Falta de continuidad de las acciones por el cambio frecuente de sus integrantes y del personal técnico de las gerencias técnicas, especialmente en las presidencias municipales. Por ejemplo para el caso específico del Comité de Cuenca del Río Zanatenco, las condiciones que impiden el funcionamiento adecuado actualmente es el poco involucramiento de su coordinador quién es el presidente municipal, en este caso de Tonalá, Chiapas.

- Tienen poca vinculación y apoyo por parte de los consejos de cuencas para resolver sus problemas operativos.

- No cuentan con empoderamiento social por parte de los pobladores de las cuencas.

- No hay planeación de acciones ni evaluación de resultados con base indicadores definidos a partir de una línea base con principio de cuencas, a pesar de que en algunas cuencas existen planes de manejo.

En el caso de las cuencas Zanatenco y Lagartero, son cuencas con avances muy importantes en fechas pasadas y que actualmente presentan problemas en su funcionamiento, principalmente por los cambios institucionales del municipio (cambio de estructura) y visión del personal de las cuencas (así como su seguimiento por parte de la autoridad federal-CONAGUA).

5.3 Metodología a detalle del Comité de Cuenca del Río Coapa

La Cuenca del Río Coapa, fue seleccionada como una de las cuencas hidrográficas del Proyecto LWA Cuencas Costeras de Chiapas, como resultado de un ejercicio de Planificación de Conservación de Sitio realizado por TNC (The Nature Conservancy) y sus socios en la región. Esta cuenca fue objeto de varios estudios biológicos, productivos, socioeconómicos y de biodiversidad, tanto en forma individual como componente de las cuencas costeras de Chiapas o del conjunto de cuencas del Municipio de Pijijiapan. Dichos estudios abarcaron diversos aspectos puntuales de la cuenca, incluyendo un ordenamiento ecológico territorial; sin embargo, ninguno de ellos correspondió a un Plan de Manejo de Cuencas con una visión integradora, enfocada en el manejo y conservación de los recursos del territorio.

La metodología propone un proceso que transcurre en cuatro etapas: 1) Análisis de la cuenca (análisis de la situación actual), 2) Modelo de la cuenca (definición del estado ideal al que se quiere llegar), 3) Modelo de manejo (definición de las estrategias de intervención) y, 4) Plan de Manejo (articulación del trabajo de las organizaciones). El procedimiento aplicado en esta cuenca fue: 1) Taller de Intercambio de Experiencias en Manejo de Cuencas en Chiapas, 2) Taller de Análisis y Modelo de la Cuenca del Río Coapa, Chiapas, México, 3) Plan de Gestión de la Cuenca del Río Coapa, Chiapas, México, y 4) Tarjeta de Evaluación de Cuencas Hidrográficas (TECH) y su Aplicación Piloto a la Cuenca del Río Coapa, Pijijiapan, Chiapas. Puede observarse que es una metodología que parte de lo general a lo particular. A continuación se especifican las características y contenidos más importantes de cada etapa.

5.3.1 Taller de Intercambio de Experiencias en Manejo de Cuencas en Chiapas

Los objetivos de este taller fueron: a) identificar los elementos indispensables de un proyecto de manejo de cuencas que permitan su continuidad y éxito en el largo plazo, con base en las experiencias que actualmente se desarrollan en Chiapas, b) identificar las lecciones aprendidas (lo que ha funcionado y lo que no ha funcionado, los elementos indispensables) de los proyectos de manejo de cuencas en Chiapas, y a partir de esto, emitir recomendaciones para mejorar los actuales procesos de manejo de cuencas en el largo plazo, y c) identificar los elementos fundamentales para desarrollar un modelo de manejo de cuencas y una tarjeta de evaluación (scorecard) para cuencas, basado en las lecciones aprendidas generadas por las experiencias en manejo de cuencas en Chiapas.

La agenda del taller consistió en tres días de trabajo en noviembre de 2004, en la que participaron 35 personas de instituciones gubernamentales, no gubernamentales y de la sociedad civil.

Se hicieron presentaciones relacionadas con experiencias de manejo de otras cuencas (Usumacinta, Lagartero, Cuxtepeques, Tacaná); así como de la propia. También se presentaron los fundamentos legales de los organismos de cuenca y dentro de los productos obtenidos del taller se mencionaron las lecciones aprendidas, se hicieron recomendaciones de trabajo, se realizó un análisis de usuarios y se establecieron los criterios de definición de la cuenca modelo (GICCCH, 2004).

5.3.2 Taller de Análisis y Modelo de la Cuenca del Río Coapa, Chiapas, México

El proceso entra en su segunda fase en la que se definió el Modelo de Manejo de la Cuenca. Se realizó un taller en la que participaron 12 personas a nivel gerencial, de instituciones de gobierno y no gubernamentales. La agenda se organizó en dos días de trabajo en el mes de junio de 2006. El primero estuvo dedicado al tema del Análisis de la Cuenca del Río Coapa y el segundo al Modelo de la propia cuenca, a través de sesiones plenarias. Una de las limitaciones encontradas en esta fase, fue la insuficiente información sobre las comunidades, acordándose completar dicha información por su papel relevante en el desarrollo de la metodología escogida.

Se procedió a realizar el análisis de la cuenca incluyendo análisis morfológicos y de clima; así como, hipótesis de funcionamiento hidrológico y de paisajes manejados. Se efectuaron también análisis socioeconómicos y un integrado (socio ambiental) que incluye la determinación de paisajes manejados, análisis de la cuenca por paisajes manejados en función del uso de sus recursos naturales, naturalidad y de su biodiversidad.

Con respecto al modelo de cuenca se hizo un planteamiento con respecto a la situación ideal a nivel general de la cuenca y de los diferentes paisajes manejados. Así como de la situación actual y estrategias de cambio con respecto al estado del sistema hidrográfico, de la conectividad de los ecosistemas, del buen gobierno de la cuenca, del estado de la biodiversidad por paisaje, de las alternativas de uso productivo de recursos naturales por paisaje y del desarrollo integral de las comunidades. También se definieron cuáles serían las próximas acciones a realizar (GICCCH, 2006a).

5.3.3 Plan de Gestión de la Cuenca del Río Coapa, Chiapas, México

La preparación del Plan de Manejo de la cuenca del río Coapa, es un paso más en el proceso de manejo y conservación de la biodiversidad de la región, por iniciativa de grupos institucionales y no gubernamentales. Estas organizaciones formalizaron un esfuerzo conjunto bajo el nombre de Comité Pigua, y como tal, entre el 2002 y 2003 realizaron un proceso de planificación a gran escala para la región de las cuencas costeras de Chiapas, esfuerzo que culminó con la elaboración del Plan de Conservación para el Sitio Plataforma Cuencas Costeras de Chiapas. Entre otras tareas, se destaca un esfuerzo preliminar para desarrollar el plan de manejo piloto para la cuenca del río Coapa.

En esta fase de elaboración del plan de manejo, se inició con un análisis de la cuenca comunitario a nivel ejidal; se continuó con la presentación del Modelo de la cuenca, es decir del estado ideal que se pretende alcanzar, y se culminó con el plan de manejo (GICCCH, 2006b), el cual define la orientación estratégica del manejo que se propone

aplicar a esta cuenca. La aproximación metodológica se sustenta en el enfoque de planificación territorial basada en paisajes manejados.

La primera parte consiste en el análisis de la cuenca del río Coapa que consisten en una introducción, localización y descripción biofísica (relieve, clima, hidrografía, vegetación y zonas bioclimáticas y grandes paisajes); así como, la descripción socioeconómica con la caracterización general de los aspectos de población, educación, salud y saneamiento, vivienda, comunicaciones y transportes, actividades productivas, tenencia de la tierra, diagnóstico de las comunidades, capital humano, social, político, natural, financiero y construido; y motivaciones de la población. Esta parte finaliza con un análisis específico de la cuenca que incluye los paisajes de la cuenca; agua, sistema hidrográfico y paisajes asociados al agua; biodiversidad y conectividad ecológica; uso de los recursos naturales; naturalidad; análisis de actores y gobierno de la cuenca.

La segunda parte el modelo de cuenca con una introducción, la situación ideal a alcanzar en la cuenca del río Coapa, situación actual y estrategias de cambio; estado del sistema hidrográfico y de la biodiversidad por paisaje; conectividad ecológica; principales alternativas de uso productivo de los paisajes; desarrollo integral de las comunidades y buen gobierno de la cuenca.

Finalmente, la tercera parte es el plan de gestión en sí, que incluye los conceptos iniciales; naturales; instrumentos derivados y principales usos del plan de gestión. Así como, los objetivos estratégicos y criterios de éxito; líneas estratégicas de acción y sus principales gestores; información complementaria para instituciones y organizaciones; alternativas productivas principales para cada paisaje; y finalmente los actores claves del manejo de recursos naturales en cada paisaje.

Es importante mencionar, que adicionalmente a estos tres componentes, el plan de gestión contiene información complementaria relacionada al diagnóstico detallado de seis comunidades, mapas de los paisajes manejados en los ejidos de la cuenca y tipos de vegetación predominantes en estos ejidos.

5.3.4 Tarjeta de Evaluación de Cuencas Hidrográficas (TECH) y su Aplicación Piloto a la Cuenca del Río Coapa, Chiapas, México

Aprovechando las experiencias recogidas en la formulación del Plan de Manejo de la cuenca y de las diferentes tareas e interacciones de los actores de la cuenca, se tomó la decisión de encaminar esfuerzos en torno al desarrollo de una herramienta que permitiese evaluar y comparar diferentes cuencas hidrográficas. A este proceso de se le denominó Tarjeta de Evaluación de Cuencas Hidrográficas (TECH), y su primera etapa

consistió en una presentación general de la herramienta para luego internarse en los detalles conceptuales y operativos del desarrollo, estructura y modo de aplicación de la tarjeta. En la segunda parte se presentaron los resultados de su aplicación a la Cuenca del Río Coapa.

La TECH es una herramienta diseñada para evaluar cuencas hidrográficas en forma rápida y poder utilizar los resultados de distintas maneras. Los usos principales que se previeron fueron: 1) análisis de una cuenca hidrográfica en particular, respecto a su situación ideal, 2) comparación simultánea entre diferentes cuencas hidrográficas, con fines descriptivos o de priorización de actividades, inversiones, etc., y 3) monitoreo de la evolución de una cuenca determinada mediante repetidas aplicaciones de la tarjeta a lo largo de los años.

La TECH está construida desde una perspectiva que considera a la cuenca hidrográfica como un territorio, abarcando a los componente hídricos, los ambientales y socioeconómicos. La tarjeta también considera aspectos descriptivos y de tendencia de la situación de la cuenca, así como aspectos operativos como capacidades y medios para el manejo y otros. Esta herramienta está organizada en cinco aspectos con sus respectivas variables (ver Tabla 3).

Cada uno de estos aspectos y variables se evalúa mediante sus respectivos indicadores (GICCCH, 2006c). Los indicadores han sido seleccionados para que su valor pueda determinarse tanto por mediciones específicas como por estimación de expertos; de esta manera se pretende mitigar el frecuente problema de la falta de datos. A partir de los datos o estimaciones mencionados, los indicadores evalúan con escalas de desempeño, que convierten los valores específicos de cada indicador en una escala de juicios, cuyo rango va de 1 (juicios más desfavorable) hasta 5 (juicio más favorable). Las escalas de desempeño permiten combinar indicadores y obtener índices tanto a nivel de variable como de elemento clave.

Tabla 3. Aspectos y Variables para la TECH.

ASPECTOS	VARIABLES
1. Estado de la cuenca.	Recursos hídricos. Estado de la biodiversidad (ecosistemas). Conectividad ecológica. Uso de los recursos naturales (tierra, agua, aire, biodiversidad). Bienestar de la población. Buen gobierno.
2. Tendencias en la cuenca.	*Las mismas seis variables de estado de la

	cuenca.
3. Acciones hacia la sostenibilidad.	Oportunidades sostenibles emergentes.
4. Medios y capacidades para el manejo de la cuenca.	Medios. Capacidades.
5. Innovaciones, lecciones y ajustes.	Innovaciones. Lecciones aprendidas. Ajustes.

La TECH es, por lo tanto, una herramienta para apoyar la gestión realizada en forma directa por las personas y organizaciones que manejan los recursos de la cuenca (a partir de sus derechos de propiedad y/o acceso a las tierras, aguas y recursos de la cuenca) con el apoyo de organizaciones externas (gubernamentales, locales, académicas, etc.) que tratan de influir en aquellos que manejan el territorio.

SECCIÓN 6

6.1 Actividades propuestas de fortalecimiento

i. **Talleres para "Fortalecer Mecanismos de Colaboración y Alineación de Objetivos Interinstitucionales e Internacionales"** convocados por instituciones académicas, gubernamentales y/o no gubernamentales, entre actores gubernamentales en la Sierra Madre (CONAGUA, SEDESOL, SEMARNAT, INESA, COFOSECH, etc.), Instituciones Educativas, ONGs, y otras similares que operan proyectos en la región, (incluyendo los Grupos Técnicos Institucionales, GTI). El taller debería incluir la revisión de estructuras administrativas y operativas actuales y propuestas de modificación de dichas estructuras, así como el establecimiento y vigencia de convenios interinstitucionales, para fortalecer los objetivos de conservación de la biodiversidad y servicios ecosistémicos de manera coordinada. Adicionalmente, se podría considerar la posibilidad de elaborar un Plan de Ordenamiento Ecológico a nivel de consejo de cuenca como guía rectora para los planes de gestión de las microcuencas de la región en estudio. También en estos talleres se debería promover la instalación del Comisión intersecretarial contemplada en la Ley del Desarrollo Rural Sustentable para coordinar las acciones en la Sierra Madre con el objetivo de fortalecer la conservación. Se sugiere que se realice un primer taller a nivel de toda la zona de estudio para identificar las instituciones y sus áreas de acción. Derivado de estos resultados, definir los talleres necesarios a nivel de una o más microcuencas para alinear trabajos interinstitucionales en la zona específica.

ACTIVIDADES ESPECÍFICAS.

Un taller general de toda la zona de estudio (costo $150,000.00) en Tuxtla Gutiérrez. Duración: Un día

Tres talleres regionales: 1) Región Fraylesca, 2) Región Itsmo-Costa, y 3) Región Soconusco. Duración: Un día cada taller. Costo por taller ($100,000.00)

b. **"Talleres para el fortalecimiento de objetivos de conservación de la biodiversidad y servicios ecosistémicos; y establecimiento de mecanismos de coordinación y cooperación entre los diferentes comités (Comités de Cuencas, Comités de Desarrollo Sustentable, COPLADEM, etc.) que operan a niveles de microcuenca y actores claves involucrados (i.e., CONAGUA, etc.)".** Estos talleres deben incluir intercambio de experiencias exitosas y no exitosas de comités ya existentes en materia de coordinación, aplicación de recursos, etc. Adicionalmente se pueden proponer, como en el caso específico de la Cuenca Coatán, el fortalecimiento legal a las propuestas de incremento a Áreas Naturales Protegidas (i.e., Volcán de Tacaná).

   ACTIVIDADES ESPECÍFICAS.

   i. Se propone un taller en cada una de las microcuencas que cuentan con un comité de cuenca ya instalado (Cuxtepeques, Lagartero, Zanatenco, Coapa y Coatán); adicionalmente para las cuencas que están en proceso de instalación (Huehuetán, Huixtla, Cahoacán y Cuenca Alta del Río Suchiapa-Santo Domingo que incluye la microcuenca Río Tablón). Los talleres deberán realizarse en un lugar estratégico de cada microcuenca. Se estima un costo aproximado de $100,000.00 por taller con una duración de un día. Monto total de los 9 talleres es de $900,000.00.

c. **"Taller de capacitación y discusión relacionado al conocimiento de la normatividad existente y propuestas de adecuación a niveles de comités de cuencas y usuarios, con el objetivo de promover la conservación de la biodiversidad y servicios Ecosistémicos"**. Este taller deberá ser coordinado por un especialista en materia normativa y alguna institución académica donde participen por lo menos dos integrantes de los comités de cuencas y de asociaciones civiles.

   ACTIVIDADES ESPECÍFICAS.

   Se propone un taller en Tuxtla Gutiérrez con un costo aproximado de $ 350,000.00 con una duración de un día.

"Análisis jurídico de la legislación actual en cuanto a las organizaciones existentes para el manejo de microcuencas en la zona de estudio" por especialistas en la materia, (tomando en cuenta los insumos derivados del punto c) a través de la contratación de un consultor en materia normativa y legislativa; y propuesta de alternativas de modificación y/o creación de normatividad para fortalecer los objetivos de conservación de la biodiversidad y servicios ecosistémicos. Estas propuestas deberán ser presentadas a actores claves (i.e., tomadores de decisiones, legisladores, etc.) para considerarles en sus agendas de trabajo.

ACTIVIDADES ESPECÍFICAS.
Se propone una consultoría para hacer este trabajo. Costo aproximado de $ 200,000.00.

d. **"Taller para establecer criterios de homogenización para la elaboración de los Planes y/o Programas de Gestión y Manejo Integral de Cuencas, y Apoyo para Actualización y/o Elaboración de planes de manejo para comités de cuencas ya establecidos".**

ACTIVIDADES ESPECÍFICAS:
Un taller para establecimiento de criterios homogéneos para planes de manejo en Tuxtla Gutiérrez donde participan expertos en la materia, instituciones gubernamentales y no gubernamentales, y comités de cuencas. Costo aprox. $500,000.00
Actualización y/o elaboración de planes de manejo de cuencas que participan en el proyecto. SE sugiere cinco proyectos de $300,000 cada uno.

i. **"Fortalecer una instancia rectora para la coordinación y el establecimiento de un sistema de monitoreo de intervención institucional en la Sierra Madre"** con relación a gobernabilidad,

política pública, recursos invertidos, etc. a través de indicadores propuestos de medición que referencien sobre el alcance de los objetivos de la conservación de la biodiversidad y servicios ecosistémicos. Esta instancia podría ser la Comisión intersecretarial contemplada en la Ley del Desarrollo Rural Sustentable, las Gerencias Operativas de los Consejos de Cuenca de los Ríos Grijalva y Usumacinta y de la Costa de Chiapas; o el Comité Estatal de Manejo Integral de Microcuencas del COFOSECH.

ACTIVIDADES ESPECÍFICAS:

Se sugiere un monto de un millón de pesos administrados durante la duración del proyecto.

6.2. Recomendación de Comités de Cuencas para Cooperación en el Proyecto

Con base a los avances y experiencia, a la probabilidad de obtener resultados en corto plazo y a la presencia e interés institucional, se recomiendan **los Comités de Cuencas de los ríos Cuxtepeques, Coapa, Zanatenco, Lagartero, Huehuetán y Coatán** para trabajar como **cuencas prioritarias**.

Dentro de las principales características generales de las cuencas propuestas como prioritarias, se considera que:

1.-Están ubicadas en la Sierra Madre de Chiapas

2.-Tienen vinculación con áreas naturales protegidas como las Reservas de la Biosfera La Sepultura, El Triunfo, La Fraylescana y La encrucijada.

3.-Son importantes por su oferta de servicios ecosistémicos como agua para consumo humano, agua para irrigación, pesca y acuacultura, generación de electricidad, sumidero de carbono y conservación de biodiversidad, principalmente.

4.-Presentan alto riesgo a desastres por inundaciones por la presencia de peligros (naturales y antrópicos) y alta vulnerabilidad.

5.-Con excepción de Huehuetán, todas tienen instalados Comités de Cuencas con sus respectivas gerencias técnicas, a los cuales resolviendo sus problemas de funcionamiento podrían dar resultados en corto plazo.

6.-Hay grandes inversiones en estudios, planes de manejo y acciones de desarrollo, y

7.-La mayoría reciben o han recibido los pagos por servicios ambientales hidrológicos otorgados por la CONAFOR.

Así también se pueden mencionar algunas características particulares por la que se recomiendan:

Cuenca del Río Cuxtepeques:

Cuenta con la mayor presencia institucional. Importante por su contribución al abastecimiento de agua para consumo humano, distrito de riego y generación de electricidad. Hay experiencias pilotos a nivel de microcuencas. Es la única que cuenta con un grupo técnico institucional en apoyo a la toma de decisiones coordinado por la SEMARNAT. INIFAP en coordinación con TNC y la gerencia de cuencas ha impartido capacitación a los consejos de desarrollo rural sustentable municipal y distrital y a los pobladores de las microcuencas. Hay un relleno sanitario en una de las localidades de la cuenca. Vinculada con la Reserva de la Biosfera El Triunfo.

Cuenca del Río Zanatenco:

Señalada entre las tres cuencas con mayores avances por las instituciones. Tuvo su auge en el año 2003-2006 con graves afectaciones en su continuidad por el cambio de gobierno municipal. Importante por abastecimiento de agua para consumo humano y por su humedales. Vinculada con la reserva de la Biósfera La sepultura. Riesgo de inundaciones en las partes bajas. INIFAP en coordinación con SAGARPA y Secretaría del Campo capacitó a los consejos de desarrollo rural sustentable municipal y distrital y a los pobladores de las microcuencas.

Cuenca del Río Lagartero:

Sobresale por la alta participación e interés de sus pobladores por resolver los problemas de la cuenca. La sociedad interesada fue capacitada y está organizada en dos Asociaciones Civiles (Grupo Lagartos y comité de cuenca del río Lagartero). Es la única fuente de abastecimiento de agua a aproximadamente 22,000 habitantes de la cabecera municipal. Hay avances en la construcción de un esquema de pagos por servicios ecosistémicos coordinado por TNC, INIFAP y una de las Asociaciones Civiles. Vinculada a la Reserva de la Biosfera la Sepultura. Problemas de azolvamiento de la toma de agua, contaminación aguas abajo por la mancha urbana e inundaciones. La presidenta de A.C. comité de cuencas del río Lagartero ganó el premio nacional de conservación 2008 y el Grupo Lagartos actualmente está compitiendo por el primer lugar de “Limpiemos México” evento organizado por TV Azteca a nivel nacional. Es la única cuenca donde la gerencia técnica y los pobladores se organizaron para superar el problema de los cambios de gobierno, van tres trienios municipales trabajando en forma continua.

Cuenca del Río Coapa:

Sobresale por la gran cantidad de estudios técnicos y asesoría de expertos coordinados por TNC. Vinculada con la Reserva de la Biosfera el Triunfo. Avances en proyecto pilotos con comunidades (ejemplo sistemas silvopastoriles). Cuenta con un plan de gestión de la cuenca, un plan de manejo integral de la cuenca actualizado, tarjeta de evaluación de cuencas, mapas escala 1:5000 y 1:25,000, una evaluación después de STAN por expertos USFS. Por contar con mucho trabajo realizado e información esta cuenca fue propuesta por TNC para ser un ensayo piloto de coordinación integral de acciones.

Cuenca del Río Huehuetán:

A finales del 2008 la CONAGUA inició en esta cuenca la implementación de un proyecto denominado emblemático asociado al agua, el cual es un conjunto de acciones integrales concertadas con los usuarios y la sociedad en su conjunto, realizadas en coordinación con diversos órdenes de gobierno, con el propósito de impulsar el bienestar social, el desarrollo económico y la preservación del medio ambiente a nivel local. Este proyecto tiene como antecedentes las experiencias generadas por la CONAGUA en el Programa de Manejo del Agua y Preservación de Suelos (MAPS) realizado en convenio con el INIFAP y en el Proyecto denominado "Evaluación de los efectos del cambio de cobertura y de uso del suelo en la erosión hídrica y las relaciones precipitación-escurrimiento en las cuencas de los ríos Huixtla, Huehuetán y Coatán, del estado de Chiapas", desarrollado bajo convenio de colaboración con Universidad Autónoma Chapingo y con la UNACH-Huehuetán. Se platea realizar de manera lógica, en espacio y tiempo, las siguientes etapas o líneas de acción prioritarias: Diagnóstico y Línea Base, Ordenamiento Territorial Participativo, Organización Comunitaria, Implementación y Ejecución así como el Monitoreo y Evaluación.

Esta cuenca aún no tiene establecido un comité de cuencas, sin embargo, tiene una gran inversión en el proyecto emblemático que está ejecutando la CONAGUA.

Cuenca del Río Coatán:

Es sumamente importante por los altos riesgos de inundaciones a que está sujeta la cabecera municipal de Tapachula, ya que el río Coatán es uno de los tres ríos que atraviesan la ciudad. Cuenta con un sistema de alerta hidrometeorológica temprana para el municipio de Tapachula, un Plan de Gestión con énfasis a la prevención de desastres y Mapas de riesgo y protección de cauces para evitar inundaciones en el río Coatán en

Tapachula, Chiapas. Es una "cuenca binacional" compartida entre México y Guatemala que requiere atención diferenciada.

Adicionalmente, se podría incluir como **cuencas participantes**, a los Comités de Cuencas que se encuentra en proceso de promoción e instalación por acuerdo del Grupo de Seguimiento de Evaluación (CONAGUA), los cuales son:

a) El Comité de Cuenca del **Río Cahoacán**, en los municipios de Tapachula, Suchiate, Tuxtla Chico, Cacahoatán y Frontera Hidalgo y

b) El Comité de Cuenca del **Río Huixtla**.

Para fortalecer también las acciones sobre la vertiente del lado del pacífico de la Sierra Madre y considerando que se encuentra dentro de la Comisión de Cuenca del Cañón del Sumidero, se recomienda (sugerencia de la CONANP), aunque no cuenta con un Comité de Cuenca establecido, trabajar con la **Cuenca Alta del Río Suchiapa-Santo Domingo** en las que se encuentran los ríos Tablón (municipios de Villaflores y Villacorzo), Los Amates y El Pando.

Ya que a mediano plazo se pretende continuar con el proceso de promoción e instalación de otros Comités de Cuenca (CONAGUA), se sugiere trabajar adicionalmente a las cuencas mencionadas en los puntos anteriores, las siguientes:

- El Comité de Cuenca del **Río Tiltepec**, en el municipio de Tonalá, Chiapas;
- El Comité de Cuenca del **Río San Diego**, en el municipio de Pijijiapan, Chiapas;
- El Comité de Cuenca del **Río Tapanatepec**, en municipio del mismo nombre y
- El Comité de Cuenca del **Río Acuites**, Oaxaca.

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Review of Markets for Ecosystem Services and Sustainable Agricultural and Forestry Products:

Opportunities for Market Expansion in the Sierra Madre of Chiapas, Mexico

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August 2009

QuickTime™ and a
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Table of Contents

Executive Summary

This report was produced under a Project Preparation Grant for the proposal development of the Global Environment Facility project *Mainstreaming the Conservation of Ecosystem Services and Biodiversity at the Micro-Watershed Scale in Chiapas, Mexico.* The purpose of the report was to identify and evaluate opportunities for the GEF project to increase private sector involvement in the markets for ecosystem services and markets for sustainably produced agricultural and forestry products from the Sierra-Costa region of Chiapas. Rather than proposing the creation of new projects, this report placed emphasis on opportunities and needs within partner organizations that aligned with this GEF project's priorities and that if provided GEF project support would yield high environmental benefits for minimal investment.

The opportunities identified are as follows:

Xate: Support ProNatura's efforts to diversify and expand the market by commissioning a market study and feasibility analysis of the market for xate seedlings

Cattle: Support The Nature Conservancy's efforts to have its sustainable cattle practices adopted by the Chiapas state government as the preferred method by commissioning a study of the costs and benefits of conventional ranching versus sustainable. Also, support TNC's efforts to develop the Sustainable Cattle and Climate Change network.

Timber: Support ProNatura's efforts to diversify and grow the market for sustainably harvested wood by commissioning a market study to assess niche markets for interior construction materials and furniture-grade wood

Ecosystem Services Credits: Three NGOS – Ambio, FONCET, and Reforestamos Mexico – sell carbon and watershed services credits generated in Chiapas, yet sales are low. Improve their marketing strategy and capacity by commissioning a market study, developing a marketing plan, building staff capacity, and strengthening alliances.

Climate Change in Cattle Pastures:
Support ECOSUR and Ambio's efforts to pilot methods for reducing greenhouse gas emissions from cattle pastures and test climate change adaptation strategies. [pending receipt of further information from partner]

Support TNC's Sustainable Cattle and Climate Change Network's demonstration projects to reduce greenhouse gas emissions from cattle production and enhance carbon sequestration capabilities. [also pending receipt of further information from partner]

Introduction

The research and recommendations documented within this report are the product of a contracted assignment under a Project Preparation Grant (PPG) for the proposal development of the full size Global Environment Facility (GEF) project *Mainstreaming the Conservation of Ecosystem Services and Biodiversity at the Micro-Watershed Scale in Chiapas, Mexico.* The purpose of this project is to mainstream biodiversity conservation into natural resources management in the Sierra-Costa region of Chiapas, Mexico, by integrating ecosystem service considerations into land use planning and decision-making at the micro-watershed level.

This report documents the research, conclusions and recommendations of interviews and investigations the author carried out from June to August 2009. The purpose was to identify and evaluate opportunities for the GEF project to support the demand-side of markets for ecosystem services and markets for sustainably produced agricultural and forestry products from the Sierra-Costa region of Chiapas. The report places emphasis on outlining the top opportunities for the project, noting the rationale for intervention, the expected outcomes, a basic description of the concept and potential partner organizations. The interventions outlined herein are only proposed ideas based upon initial research by the author. It is expected that once the project has been outlined in its entirety, that the executing team will re-visit these concepts and plan the interventions in greater detail, working closely with partner organizations.

Methodology

Given the limitations of the full scale project, the author avoided identifying new project ideas that would have to be created in their entirety and therefore be costly, instead seeking out 'bottle necks' in the projects of partner organizations that, once overcome, would yield high impacts with minimal investment. The author sought out projects among partners that shared common visions and timelines with this GEF project, and therefore presented a clear case for collaboration. Opportunities were identified through interviews with partner organizations, and to a lesser degree, through literature searches (See Annex for a list of persons interviewed).

Sustainable Products

This section addresses three products being produced under sustainable practices in the Sierra-Costa region: xate[1], cattle and timber. Each section

[1] "Xate" is the common name of palms from the genus *Chamaedorea*. In parts of Mexico, the palms are referred to as "camedor", "palmas chamaedorea" or simply "palmas". Throughout this document, "xate" will be used to refer to all fronds of

provides a brief market overview, a summary of projects currently underway by partner organizations, and recommendations for the GEF project to grow markets.

Xate (*Palma Chameodora*)

Market Overview[2]

The xate palm is harvested in the wild and on plantations in many parts of southern Mexico and Central America for use as a decorative frond in the floral industries of the United States and Europe. An estimated three-quarters of the palms are harvested in the wild and the remainder are cultivated on plantations. Roughly 80% are used in funerals and weddings and an estimated 10-15% are used for ceremonies on Palm Sunday. Mexico's exports to the US from 1998-2005 have remained stable at an average of 8 million bunches annually; however, global imports to the US are in a steady long-term decline, dropping over 50% in 20 years from a high of 450 million stems in 1985 to 200 million stems in 2005. Dean Current, a consultant specializing in the xate industry, speculates the decline is attributable to an increase in substitute fronds such as the leatherleaf and due to changes in consumer preferences. In Europe, demand is concentrated in Holland and Germany.

According to a report by IDESMAC[3], there are opportunities for growth in the industry provided producers are able to deliver a quality product on a consistent basis. Key factors in buyers' purchasing decisions are quality, uniformity, price, packing, availability and continuity of supply.

Actors

ProNatura: Has been working since 2003 with communities harvesting xate in the buffer zones of the Sierra Madre. Created in 1991, ProNatura promotes the conservation of flora, fauna and priority ecosystem services in harmony with social development. Its satellite office, ProNatura-Sur is located in San Cristobal de las Casas, Chiapas, Mexico.

Romeo Dominguez	Eduardo Ramirez
Director	Agroforestry Specialist
ProNatura-Sur	ProNatura-Sur
San Cristobal de las Casas	San Cristobal de las Casas

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the genus *Chamaedorea* that are harvested and sold as decorative leaves in the floral industry.

[2] Current, Dean. "The International Market for Cut Greens from the Genus *Chamaedorea:* Current Market Conditions and Opportunities", February 20, 2006.

[3] Instituto para el Desarrollo Sustentable en Mesoamerica, www.idesmac.org.mx

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CEC (The North American Commission for Environmental Cooperation): Identified Christian churches as a target market for their interest in social and environmental issues and their use of the palms during Palm Sunday and in weddings and funerals held at the church.

Continental Floral Greens: US wholesaler of xate accounting for the majority of palms imported to the US.

Current Projects

The following section outlines projects by partner organizations working to support sustainable production of xate in the Sierra-Costa region.

ProNatura

ProNatura is working with ten communities in the buffer zones of La Sepultura and El Triunfo reserves with xate enriching projects. The "enriching" includes developing nurseries to grow xate plants from seed to seedling, and then eventual planting in the surrounding natural areas. This program ensures an abundance of naturally raised xate in surrounding areas and reduces the need to travel long distances in search of xate.

ProNatura wants to help producers improve the volume and quality of production. They are in the process of forming a second level organization which will function as an intermediary between producers and wholesalers or retailers. This organization will primarily represent the communities with which ProNatura works, and may provide such services as storage warehouses, technical assistance and support of nursery development.

Currently, producers are selling to only one client, Continental Floral Green. While this has been a long-time customer, it presents some concerns. First, they are dependent on a sole buyer, which presents a great risk if this buyer should cease purchasing. Second, this buyer has an effective monopoly, and while there is no evidence of abuse of this market position, the communities lack bargaining power, which could allow them to obtain better prices.

To expand market opportunities, ProNatura is doing a study of local market opportunities for the xate leaves to identify new potential buyers. Additionally, ProNatura would like to explore the market for xate seedlings for use in the domestic gardening market. They suspect that Mexico's tourist areas, where landscaping is intensive, could have demand for xate plants. If this proves to be a viable market, it could provide an additional reason to support the community-based nurseries.

Opportunities and Recommendations

1. Support ProNatura's Efforts to Study and Enter the Market for Xate Seedlings

[Note: Awaiting further input on specifics of activities from Eduardo Ramirez]

Rationale: The communities need to diversify and expand their base of buyers beyond just that of Continental Floral Green for purposes of increasing income and reducing risk of depending on a sole buyer. The regional market for xate seedlings demonstrates initial potential according to Eduardo Ramirez of ProNatura, a technical specialist in xate. However, before entering the market, the communities need to be assured that the there is sufficient demand for their products and that such a market entry would be commercially viable.

Activity 1: Conduct a Regional Market Study of Xate Seedlings
Working in close collaboration with Eduardo Ramirez, who proposed this idea, the project should contract an agroforestry market specialist to assess the demand for xate seedlings. As with any market study, this assessment should identify and assess such factors as potential buyers, volume demanded, product characteristics preferred, quality demands, channels of distribution, prices, competitors and market trends and forecasts. Collectively, this information will provide ProNatura and the communities the ability to gauge the relative attractiveness of the market.

Activity 2: Conduct a Feasibility Assessment
Central to this assessment should be the potential profitability of this endeavor. Market demand alone is not enough to ensure sustained profitability. The assessment should model the forecasted revenues versus the many costs (start-up, transportation, administrative, production) to ascertain whether or not the endeavor would be profitable in the long-term.

Benefits: If the above assessments prove this to be a viable market opportunity, it could yield multiple benefits for the communities. Foremost, it would raise incomes of the xate producers. Secondly, it would mitigate the risk of depending on a sole buyer of their product. Finally, it would support ongoing efforts in the communities to raise seedlings in their local greenhouses, all of which are currently planted in the surrounding forest.

Cattle

Actors

ECOSUR (El Colegio de la Frontera Sur) has the Livestock and Environment Division dedicated to sustainable cattle production, ecosystem services in pastoral landscapes, local knowledge of grass and tree grazing, and the use of pastures as an ecological restauration tool. Dr. Jose Nahed Toral researches and supports best practices and organic certification among ranchers in buffer

zones of Chiapas. Dr. Guillermo Jimenez studies carbon sequestration in sustainably managed pastures.

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The Nature Conservancy (TNC) has an office in Tuxtla Gutierrez which serves projects in La Sepultura, El Triunfo and La Encrucijada biosphere reserves.

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Current Projects

1. *TNC Supporting Sustainable Practices in El Triunfo*
TNC has been working in the buffer zone of El Triunfo for the past 12 years helping some 35 ranchers adopt best practices. A recent environmental evaluation confirmed that the new practices have reduced impacts and in many cases created additional forested areas. The land required per head of cattle has reduced from 3.0 hectares to 1.5 hectares, while milk yields have risen.

Their next steps are two-fold. First, they want to form a network of sustainable cattle production as it relates to climate change, to include UNACH, Catie and others to promote best practices and to form a collective voice for petitioning the state government to formally endorse the best practices. The second step, and one that is part of their effort to campaign change with the state government, is to document the costs and benefits of adopting to and practicing sustainable practices versus maintaining conventional production methods.

2. *ECOSUR and UNACH supporting conversion to silviopastoral and organic practices.* Along with colleagues from ECOSUR and UNACH, Mr Nahed is supporting ranchers in buffer zones of La Sepultura, Lacandona and Ocote to convert from conventional to silviopastoral and, eventually, organic practices by providing technical assistance and training on the process of conversion and the education on the environmental benefits. In addition to reducing negative environmental impacts in the buffer zones, the benefits also include the promise of earning ranchers higher prices. In a recent study Mr Nahed cites, 61% of the ranchers surveyed in Tecpatan complied with the majority of the criteria under the most common US and European organic certification systems. He also notes that ranchers sell conventional milk for MX$3.60 per liter versus MX$4.20 per liter for organic milk. Producers are not earning a premium for organic beef.

Marketing of the milk produced under silviopastoral or organic standards is unregulated and irregular. Pradel, one of the region's top retailers of dairy products, is the chief buyer of milk from ranchers participating in the project and sells the milk in stores under organic labeling, even though as of yet organic certification has not officially been approved and not all producers are in compliance with standards. The Secretaria del Campo, SECAM, provides marketing support for sustainable beef and dairy products, including the annual organic products fair, ExpoOrganico. The European Organic Standard (*La Norma de la Union Europea*) is the certification the ECOSUR team is pursuing for ranchers within its projects. Certimex, a Mexican-based company, is doing the certification.

Opportunities and Recommendations

1. *Define Costs and Benefits of TNC's Best Practices*

Rationale: The GEF project should support TNC's efforts to conduct a cost/benefit assessment of its sustainable cattle program. By documenting the "business case", TNC will strengthen is argument considerably to the Chiapas state government that sustainable cattle practices be promoted as the official practice throughout the state. Additionally, this assessment will clarify whether or not it is more profitable for a rancher to switch from conventional to sustainable practices.

For a rancher to switch from conventional production to sustainable practices bears costs, yet brings benefits. Some costs are more evident, such as new equipment, employee time for travel to and participation in training workshops, or the cost of getting certified as in compliance with sustainable practices standards. Other costs are less evident, such as the employee time and travel expenses to attend training workshops, or the employee time it takes to understand and adapt to the niche market that favors beef or dairy products produced under sustainable criteria. On the contrary, sustainable practices bring their benefits, often in the form of a market price premium. However benefits can also take less apparent forms, such as preferential treatment by stakeholders There are also obviously environmental benefits appreciated by the broader public for the protection and enhancement of ecosystem services provided by sustainable cattle practices.

Activity 1: Contract Consultant to Document Costs and Benefits of Sustainable Cattle Production
Consult Alejandro Hernandez of TNC who is overseeing this program to work out the finer details of the best way in which the GEF project could support his

efforts. Most likely that will be by financing the cost of a consultant to conduct the cost/benefit analysis.[4]

Activity 2: Support the Development of the Sustainable Cattle and Climate Change Network
This network is just starting up and Mr. Hernandez has expressed an interest in support of its initial activities. Some activities he has proposed include promoting the network, hosting a forum for founding members, and advancing logistical details.

Benefits: TNC's project has been highly successful demonstrating that ranchers can achieve higher yields while enhancing ecosystem services. This could be a clear win-win for ranchers and conservationists alike if they are able to get this type of practice formally adopted by the state legislature. Thus, this is viewed by the author as a high priority activity given its high potential for environmental gains with a minimal amount of investment.

*[The following recommendation is **optional** and not in the set of top recommendations. While it is a promising project and aligns well with the GEF project, in the opinion of the author, it requires a high amount of investment for ranchers to reach a point of self-suficiency and the long-term commercial viability remains highly uncertain.]*

2. *Market Feasibility Study for the ECOSUR Project Promoting Organic Certification.* [optional]
The ECOSUR project is addressing the essential needs of halting further deforestation in buffer zones due to an advancing ranching frontier and supporting ranchers in their efforts to adapt best practices. The next step is to ensure that this change is in the best financial interest of ranchers, and if it is not, to identify the necessary adjustments. While we need to be vigilant of the environmental impacts of cattle production, when proposing changes to rural enterprises, we need to ensure that new practices bring increased profitability to ranchers – and do not impose a loss – and that the market risk is not unduly high.

Activity 1: *Conduct a Break-even Analysis*
Switching from conventional to silviopastoral or organic practices bears costs and yet brings eventual benefits. Benefits come in the form of market premiums for sustainably-produced products, while costs can include the certification process, the purchase of new equipment, employee time for traveling to and participating in workshops, and marketing. A break-even analysis will tally the upfront and

[4] Note: At the time of preparation of this report, the author was still awaiting further clarification on the details of Activity 1 from Mr. Hernandez. If/when that information is received, it will be passed on as an addendum to this report.

recurring costs vs the anticipated additional revenues and forecast the point at which a rancher will, if at all, recoups his expenses. First, this break-even point should be as short as possible, ideally less than three years. Second, if upfront costs pose financial obstacles to ranchers, the project should facilitate rancher's access to microfinancing.

Activity 2: *Commission a Market Study and Plan*
As noted, the local market for organic dairy and beef products is poorly understood. Further, there needs to be greater understanding of the potential for local producers to access regional and international markets. A market study should measure the local demand for sustainably produced dairy and beef products compared to the current and anticipated supply. Second, the study should assess the potential to access regional and international markets, identifying the unique needs of those markets of such product attributes as quantity, quality, certification, sanitary conditions and packaging. Finally, if the market studies reveal that there is sufficient and sustained demand for these products, then there needs to be a plan by which ranchers are supported in their efforts to market their new products *and* retain the capacity to continue to do so after the life of the project. The marketing plan should identify should include the basic components of price, product attributes, distribution and promotion. It is unlikely that small, rural ranchers will have the capacity to carry this out, in which case the project should identify an organization, such as the division with SECAM dedicated to organic products in Chiapas, to lead these efforts, and if necessary build their knowledge or staff capacity to carry this out.

Timber

Current Projects

ProNatura-Sur works in four areas of Chiapas, including the Sierra Madre, where they focus on the buffer zones of El Triunfo, La Sepultura and, to a lesser degree, La Encrucijada. They focus on building community capacity and on environmental education regarding sustainable forestry management. The *ejido* Octones is the only one to have SmartWood certification at the moment; however three more will receive certification shortly, including Copillas in northern Chiapas, Montes de Sianes and a third near La Sepultura.

The ejidos producing timber products in Chiapas yield small volumes, which puts them at a disadvantage compared to other producers in regional, national and international markets who are able to provide the larger order volumes required by many buyers and are able to achieve cost savings through economies of scale.

ProNatura is considering a two-staged solution. First, they will group the timber yields of area ejidos to achieve the economy of scale. Second, they want to improve the strategy with which these communities approach the market. The lead forestry expert at ProNatura, Eduardo, suspects that with more modern

equipment, such as dryer stoves, and better market data on such characteristics as dimensions, packaging and price, that these producers could access niche markets of furniture and interior decorating that could likely prefer the higher quality pine found in Chiapas. Before advancing with this strategy, ProNatura would like a market study that could illuminate for them such issues as target markets, competition, market trends, preferred product characteristics, and the potential to brand Chiapas wood to differentiate it from competitors, to name a few.

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Opportunities and Recommendations

1. *Commission a Market Study to Assess Niche Markets of Interior Construction Materials and Furniture-Grade Wood*

[Note: Awaiting further input on specifics of activities from Eduardo Ramirez]

Rationale: If these ejidos are to survive in the long-term, they require a viable long-term strategy that will sustain a competitive advantage. Currently, they are losing market share as other regional players who are able to fill the higher volume orders at better prices win out. If, as Eduardo suspects, the Chiapas wood is a higher grade and therefore more suitable to the interior construction and/or furniture producing markets, the ejidos have the potential to capture a competitive advantage. First, however, we must assess the viability of such a move. We must gauge the demand among these niche markets for Chiapan wood, the ability of ejidos to meet market demands (volume, quality, consistency, etc), and an ensure that this yields higher, sustained profits for the ejidos versus their current practices.

Activity 1: Commission Market Study
Engage Eduardo Ramirez of ProNatura to identify the specifics of how the GEF project will collaborate. The likely scenario is that GEF will finance a portion of the cost of a consultancy to carry out the market study, the terms of which will primarily be outlined by Mr. Ramirez.

Activity 2: Share Results with Ejidos to Gauge their Interest
If the results of the market study reveal that there is indeed an opportunity, then the results should be shared with the ejidos to gauge their interest in continued assessment.

Activity 3: Conduct a Cost/Benefit Analysis
Provided the Market Study in Activity 1 revealed a viable market, and provided the ejidos support continued study, the third activity should gauge the cost-effectiveness of entering this market. If should weigh the potential benefits in terms of increased revenues, against the costs of shifting production to meet demands of the new market. If this analysis yields that the niche markets would be more profitable than current practices *and* yield a sustained competitive advantage, then ProNatura and other supporting groups should assist ejidos with the switch.

Payments for Ecosystem Services

This section profiles some of the payments for ecosystem services (PES) schemes active among partner organizations in the Sierra-Costa region and their efforts to market the credits. The recommendations focus on addressing needs expressed by partners to enhance their ability to build the demand side of these markets, in particular most recommendations center around marketing efforts.

Current Projects

Ambio and the Scolel'Te Project

Ambio, in collaboration with the University of Edinburgh and ECOSUR, has designed and implemented the Scolel'Te project, which uses the Plan Vivo system to certify carbon projects with farmers in communities around Chiapas and Oaxaca. Since 1998, Ambio has managed the Fondo BioClimatico (BioClimate Fund), a marketplace for sellers and buyers of carbon credits under the voluntary market. From 1997 to 2006, the fund sold over 77,000 credits.[5]

While Ambio has been successful at selling thousands of carbon credits over the course of its nearly 10 year history, it still faces a challenge of identifying willing buyers, and could possibly garner a higher price per credit if it were to target buyers who particularly value the multiple benefits of Plan Vivo certificates. By the funds' own admission, it "does not have resources to carry out marketing," instead relying on "possible carbon purchasers through its national and international contacts."[6] Ambio is also building a team to conduct sales, but has expressed an interest in having a more strategic marketing plan.[7] Additionally,

[5] Ambio web page. http://www.ambio.org.mx/index.php?option=com_content&task=view&id=28&Itemid=1

[6] Fondo BioClimatico Systems and Procedures manual. http://www.additionality.co.uk/plan_vivo/manual/downloads/FBC_op_man.pdf

[7] In personal communication with Ambio director Sotero Quechulpa, San Cristobal de las Casas, July 10, 2009.

Ambio has had some success selling credits through Reforestamos Mexico, having sold 1000 credits, which in turn were sold to Mexican companies.

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Reforestamos Mexico

Reforestamos Mexico has several initiatives underway to enhance the marketing of Mexican-based carbon credits to Mexican companies. One is *MercadosAmbientales.com*, an information site on the voluntary market for carbon that they will soon develop to also serve as a trading platform for the posting and buying of carbon credits. Another is *Programa Carbono Neutral*, a new program that will help Mexican companies measure their carbon footprint, reduce emissions and offset remaining emissions through credits purchased from the Scolel'Te project. Reforestamos has already developed an initial list of companies to target based on their carbon emissions.

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FONCET

El Fondo de Conservacion El Triunfo A.C. (FONCET) is developing a payments for ecosystem services scheme to finance the protection and restoration of El Triunfo. Under the scheme, CFE (Comision Federal de la Electricidad), which generates electricity from a hydro-electric dam, will place a levy upon the electricity charges made to residents of Tuxtla Gutierrez for compensating the regulation of water flow provided by the watershed. There is also discussion of CFE making a one-to-one match donation of funds raised through the levy applied to its customers. The scheme will also sell carbon credits created by the reforestation, restoration and avoided deforestation in El Triunfo.

As of the time of this report, the program had produced a pilot study with TNC and were soliciting feedback from partner organizations, had established the carbon baseline had, had surveyed Tuxtla Gutierrez residents on their willingness to pay a levy, and identified the vegetation types within the reserve. They also expect a sizeable grant from WWF to arrive as early as January 2010, which will allow the bulk of the project to begin, including establishing parcels in El Triunfo, and initiating a feasibility and marketing study. It is likely they will contract Ambio to carry out the technical aspects in the field and use the Plan Vivo system for certification of carbon credits.

FONCET is an organization dedicated to seeking economic resources for supporting projects that ensure the conservation of natural resources and

promote social development in the long-term of the El Triunfo Biosphere Reserve and its region of influence. The organization is formed along two levels, 1) the General Assembly constituted by the partners that form the organization and 2) its core staff consisting of an Executive Director, Administrative Assistant and Project Coordinator.[8]

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ECOSUR's Project Addressing Climate Change in Cattle Production

Along with Ambio, Dr. Guillermo Jimenez of ECOSUR is coordinating a project, the first phase of which finishes in December 2009, that has established a quantified baseline of carbon dioxide and methane emissions from cattle pastures in the Selva Lacandona. From this basis, he and his colleagues intend to design agroforestry-silvopastoral systems that contribute to the mitigation of GHG emissions, as well as designing strategies for adapting to the greatest challenges posed by climate change to cattle producers in Chiapas. Thirty ranchers and cattle-producing communities throughout Chiapas are being considered for this second phase of the project, including areas in the Sierra Madre and the Pacific coast region.

ECOSUR's (El Colegio de la Frontera Sur) Livestock and Environment Division is dedicated to sustainable cattle production, ecosystem services in pastoral landscapes, local knowledge of grass and tree grazing, and the use of pastures as an ecological restoration tool. Dr. Guillermo Jimenez studies carbon sequestration in sustainably managed pastures.

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The Sustainable Cattle Production and Climate Change Network

TNC, along with CATIE and UNACH, is forming a network of organizations and producers who research and support sustainable cattle production in Chiapas. The group wants to explore cattle practices that reduce GHG emissions and

[8] Translated from personal communication with Silvia Llamas, Project Coordinator of FONCET, 15 August 2009.

enhance the sequestration of carbon. The group is in the early stages of forming, so demonstration projects have not been identified yet.

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GEF Project: Integrated Silvo-Pastoral Approaches to Ecosystem Management in Colombia, Costa Rica and Nicaragua

While not a project taking place within this GEF project's area of interest, this project contains many aspects that could be applied to the current project in regards to carbon capture in cattle producing landscapes. See the Annex for a full project abstract and Web link.

Opportunities and Recommendations

1. *Marketing Support for Chiapas-based Ecosystem Services Credits*

Rationale:
The three organizations described above – Ambio, Reforestamos Mexico and FONCET – share many aspects in common as well as offer complementary services to one another as regards their efforts to market ecosystem services credits. Their common thread is that all three endeavor to sell credits, whether they be carbon credits or watershed protection, that were generated in Chiapas and contain multiple benefits beyond just that of protecting ecosystem services. These credits also support biodiversity conservation and rural economic development. The unique and multiple qualities distinguish these credits from other credits available on the voluntary markets. In order for these organizations to increase their sales and sustain a viable business in the long-term, it will be essential for them to have a strategic marketing plan that allows them to capitalize on the unique qualities of their credits thereby differentiating from the competition, and to identify and sell to buyers who place extra value on credits originating in Chiapas.

In interviews with the three organizations, all expressed a need and interest in building their capacity to successfully market these credits and in strengthening coordination among one another. Further, in the opinion of the author, the organizations require (1) a better sense of the buyers most likely to buy their credits (the "target market"), (2) the messaging required to communicate the product characteristics to the target market in a manner that meets their needs and interests, (3) identification and development of the modes of communication, and (4) building the capacity of staff to carry out marketing activities. The activities listed below lay out a four-part sequential plan to address these needs.

One key attraction to this recommendation is the leverage to be gained because each of the three organizations will benefit from the same set of activities.

Activity 1: Commission a Market Study
This study will profile the market and provide the basis for creating a strategic marketing plan. The study should identify the following:

- Target market (the companies most likely to favor the unique characteristics of ecosystem service credits from Chiapas)
- Product preferences (those characteristics of the credits that most appeal to the target market and the factors that influence their purchase decision)
- Communication channels (the means by which the target market is most effectively reached, whether it be direct phone calls, advertising in certain trade journals, or presentations at trade shows)
- Competitive analysis (define the competitors, the products they sell, how their products are similar or different, and price)
- Market volume and trends (identify the total potential sales volume of the market and its growth/decline forecast)
- Price (determine the prices that will yield highest profits)

Most important in this study will be identifying the companies within the target market that present the greatest chances of purchasing credits. It will be key here to identify those companies that would most value the unique characteristics of credits from Chiapas, such as a coffee retailer seeking to offset emissions but wants to direct proceeds towards the origins of the coffee production.

Also critical here is to coordinate with FONCET, which already has a very similar market study planned, but one that will focus not just on carbon credits but credits for watershed protection as well. FONCET has agreed to discuss the potential of working jointly to develop one comprehensive marketing plan that could be shared among the three organizations.[9]

Activity 2: Develop Marketing Plans
The second step is to take the output of the market study to craft an actionable marketing plan. The end result will be a more effective marketing strategy that yields more sales to a diversified market with higher profits. The plan should identify the following:

- The Marketing Mix (also known as the 4 P's)
    - Price (the price that yields the greatest profits)
    - Product (product attributes to highlight)
    - Place (the channels of communication to reach the target market)
    - Promotion (the messaging and means to promote the products)
- Competitive Advantage (the strategy to maintain a sustained competitive edge over competitors, including how to differentiate from competitors)

[9] In personal communication with Siliva Llamas of FONCET 12 Aug 2009.

- Action Plan (the tasks, timeline and resources required to implement the marketing plan)

Activity 3 – Build Staff Capacity
The third step is to build the capacity for executing the marketing plan. This make take several forms, such as providing training for Ambio's new sales team, co-financing the cost of additional staff at Fondo BioClimatico dedicated to marketing, or supporting Reforestamos Mexico's marketing capacity. Once the marketing plan is complete, and partners have a better sense of their role, they will be able to assess their capacity shortcomings and request capacity building activities accordingly.

Activity 4 – Strengthen Alliances
In a sense, Ambio, Reforestamos Mexico and FONCET are competitors in that they all try to sell similar, if not the same, credits to the same target markets. However, given there are relatively so few sellers such as these organizations in this niche market, there should be plenty of opportunity (e.g. high supply, and high demand) for all organizations to be successful. In this case, it could be mutually beneficial to facilitate coordination among the groups to share lessons learned, share research and collaborate on advertising. Reforestamos Mexico, in particular, could play a valuable lead role selling the credits FONCET and Ambio are not able to sell given Reforestamos Mexico's focus on corporate engagement and closer ties to Mexican industry. The details of this alliance will have to be worked out among the organizations at a later point.

2. Support ECOSUR and Ambio's GHG Mitigation and Climate Change Adaptation Projects in Cattle Landscapes

[Note: this is a placeholder for further detail that is forthcoming form Dr. Guillermo Jimenez on the project's plans for 2010]

3 *Support Demonstration Projects of TNC´s Sustainable Cattle and Climate Change Network*

This network is still in the very early stages of design, and has not yet identified specific demonstration projects. However its intentions are to design and implement projects to reduce greenhouse gas emissions in cattle production and enhance carbon sequestration capabilities. Further details have been requested of TNC representative Alejandro Hernandez. If possible, the GEF project should create a space holder to review proposed demonstration projects at a later point, if they prove worthwhile and in alignment with GEF objectives.

Corporate Social Responsibility Programs

Programs

Reforestamos Mexico (RM)

- Founded and supported by Bimbo, one of Mexico's largest companies, Reforestamos Mexico (www.reforestamosmexico.org) is a not-for-profit organizations with the "legitimacy and access" to many of Mexico's largest companies. They have many companies willing to provide donations, but who first want to see clear plans for the projects they would support. RM is developing this list of projects and associated plans now.
- Wal-Mart is one such company with which RM works. Wal-Mart provides direct match funding to Bimbo's reforestation projects.

GEI Mexico

- GEI (Gases de Efecto Invernadero, www.geimexico.org) is a member organization representing 72 Mexican companies, many of them among the country's largest. It aims to inventory and report company-based emissions and generate projects to reduce emissions.
- Members voluntarily submit their carbon inventories. To date, 47 companies have complied, representing 18% of Mexico's emissions. (See Annex for a list of the companies)
- Program coordinated by SEMARNAT and CESPEDES, with support from WRI, The World Bank, and the WBCSD

CEMEFI

- Centro Mexicano para la Filantropía (www.cemefi.org) is a national non-profit organization promoting philanthropy, and corporate social and environmental responsibility
- CEMEFI posts an annual list of the Mexican companies who meet their CSR standards. In 2009, some 350 companies received the distinction (http://www.cemefi.org/esr/pdf/Distintivo%20ESR%202001-2009.pdf)

Opportunities and Recommendations

During the course of this research, the author did not find CSR programs that presented a clear and effective opportunity for the GEF project. However, if project funds or timing permit, the ideas listed below could be considered as secondary activities for the project.

1. *Target GEI companies for the sale of Scolel'Te carbon offsets* [optional]

The companies reporting carbon emissions under the GEI Mexico program could be considered as potential buyers for carbon credits produced under the Scolel'Te project, or other carbon projects in the Sierra-Costa region. It would be a worthwhile endeavor to prioritize those companies that source products from Chiapas, such as coffee, cocoa, beef, dairy, or wood, as this would provide them a double-benefit of not only offsetting their GHG emissions, but also supporting the sustainable production of products they source.

2. *Solicit grants from top CSR companies on CEMEFI list* [optional]
Companies on CEMEFI's list of the top Mexican companies with CSR programs would be good candidates to support conservation in the sierra-costa region. Candidates should include those companies expressing a willingness to offset their carbon emissions, companies providing conservation and/or development grants through a CSR program, or companies whose product or service depends on raw materials or ecosystem services from the sierra-costa region.

ANNEX

GEI Mexico – Companies voluntarily reporting GHG emissions

- Altos Hornos de México, S.A.
- ArcelorMittal ASSA, S.A. de C.V.
- ArcelorMittal Las Truchas, S.A. de C.V.
- ArcelorMittal Lázaro Cárdenas, S.A. de C.V.
- ASSA ABLOY de Occidente S.A. de C.V.
- Autotransportes Herradura de Plata, S.A. de C.V.
- Boehringer Ingelheim Vetmedica, S.A. de C.V.
- Cementos Moctezuma, S.A. de C.V.
- Cementos y Concretos Nacionales, S.A. de C.V.
- CEMEX México S.A. de C.V.
- Cervecería Cuauhtémoc Moctezuma, S.A. de C.V.
- Cinemark de México, S.A. de C.V.
- Coca-Cola FEMSA, S.A. de C.V.
- Compañía Minera Autlán, S.A.B de C.V.
- Continental Automotive Guadalajara México, S.A. de C.V.
- Cooperativa La Cruz Azul, S.C.L
- Fabrica de Jabón La Corona, S.A. de C.V
- Ford Motor Company, S.A. de C.V.
- Grupo Bimbo, S.A. de C.V.
- Grupo Cementos de Chihuahua, S.A. de C.V.
- Grupo Embotellador CIMSA, S.A. de C.V.
- Grupo JUMEX, S.A de C.V.
- Grupo Modelo, S.A. de C.V.
- Grupo Porcícola Mexicano, S.A. de C.V.
- Holcim Apasco, S.A. de C.V.
- Honda de México, S.A. de C.V.
- Industrias IEM, S.A de C.V.
- Industrias John Deere, S.A. de C.V.
- Industrias Monterrey, S.A de C.V.
- Industrias Peñoles, S.A. de C.V.
- Ingenio de Huixtla, S.A. de C.V. y Fomento Azucarero S.P.R. de R.L. de C.V.
- Ingenio Santa Clara S.A. de C.V. y Cañaverales Mexicanos, S.P.R. de R.L. de C.V.
- Minera México, S.A. de C.V.
- NHUMO, S.A. de C.V.
- Nissan Mexicana, S.A. de C.V.
- Petróleos Mexicanos
- Productos Farmacéuticos, S.A. de C.V.
- Red de Transporte de Pasajeros del Distrito Federal
- Secretaria del Medio Ambiente del Gobierno del Estado de México
- Sistema Integral para el Manejo Ecológico y Procesamiento de Desechos (SIMEPRODE)
- Sistemas Automáticos contra Incendio, S.A de C.V.

- Tecnológico de Monterrey, Campus Guadalajara
- Ternium México, S.A. de C.V.
- Tetra Pak Querétaro, S.A. de C.V.
- Turbo-Mex Refacciones, Mantenimiento y Seguridad Industrial, S.A. de C.V.
- Wal-Mart de México

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GEF Project: Integrated silvo-pastoral approaches to ecosystem management Colombia, Costa Rica, and Nicaragua

http://www.gefweb.org/interior_right.aspx?id=26516

Project Manager: Juan Pablo Ruiz Senior Natural Resources Management Specialist, World Bank

GEF grant US$ 4.5 million Co-finance US$ 3.5 million Project cost US$ 8.0 million

The project aimed to improve ecosystem functioning of degraded pasture lands through the development of more intensive silvo-pastoral systems that generate global environmental benefits while providing socio-economic benefits. Silvopastoral systems (SPS) were successfully introduced in the three participating countries. The project has been successful in demonstrating and measuring the effects of the introduction of payment incentives to farmers for the adoption of integrated Silvopastoral farming systems, resulting in 12,262 hectares of improved biodiversity status and enhanced carbon sequestration indices by the end of implementation (the target was 12,000 hectares). Many other environmental benefits of Silvopastoral systems were demonstrated: improvement of water infiltration; soil retention; soil productivity; reduction of fossil fuel dependence (e.g. substitution of inorganic fertilizer with nitrogen fixing plants); diversification of farm benefits; scenic beauty enhancement; and land rehabilitation.

Perhaps one of the most innovative outcomes of this project was the establishment of a differentiated payment scheme according to the degree of environmental service being provided. This was innovative in various fronts. First, it eliminated the inefficiencies of paying a flat fee per hectare for conservation on a farm irrespective of the level of conservation effort applied by the farmer. This scheme allowed farmers to decide “how much” conservation they were willing to undertake. While the flat fee is easier to manage it is not as economically efficient. Based on their experience in this project of applying the differentiated silvopastoral payments, Costa Rica is now considering a differentiated scheme of payments for other payment for ecosystem service schemes they are currently applying.

The ability of the Silvopastoral project to effectively integrate biodiversity conservation into cattle ranching was innovative. Farmers have been able to increase productivity, reclaim degraded soils and increase biodiversity

conservation. The increased tree cover enhanced habitat for a wide diversity of species and facilitate the genetic flow of species by providing a biodiversity-friendly vegetative corridor. Another important outcome is in the use of SPS in improving productivity and mitigation of greenhouse gases. Carbon was sequestered both in the soil and above ground in the trees that were planted through the project. A resource monitoring methodology was developed which was used to measure carbon sequestration and biodiversity conservation. Carbon stocks measured in Silvopastoral habitats were higher than in degraded lands, and emission of green house gases was found to be lower in Silvopastoral habitats.

The project has been instrumental in increasing the awareness of the potential of integrated ecosystem management has on providing critical environmental services including the restoration of degraded pasture. This has been achieved through extensive training, capacity building and dissemination of knowledge generated through the project. Finally, based on the results of this project, Colombia is currently developing a national sustainable cattle ranching project that will incorporate lessons learned from the regional pilot project.

Addendum: Supporting the Sustainable Cattle Production and Climate Change Network

Brian Gurr
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5 Sep 09

[*This paper is an addendum to the report "Review of Markets for Ecosystem Services and Sustainable Agricultural and Forestry Products: Opportunities for Market Expansion in the Sierra Madre of Chiapas, Mexico" by Brian Gurr, August 2009, which was submitted for the proposal development of the Global Environment Facility project "Mainstreaming the Conservation of Ecosystem Services and Biodiversity at the Micro-Watershed Scale in Chiapas, Mexico".*]

Background
In October 2008, TNC-Mexico, along with CATIE, CONANP and UNACH, launched a network of organizations and producers who share the goal of developing silvopastoral systems and sustainable ranching for adapting to the challenges presented by climate change in sites where conventional ranching threatens the biodiversity of Natural Protected Areas in Chiapas. The network wants to establish demonstration plots to test these systems, the results of which will be fed into a best practices manual the group wants to develop and disseminate.

Recommendation
The GEF project should connect with this group to determine which of the demonstration projects could benefit from GEF support. The person to contact is Alejandro Hernandez of The Nature Conservancy (See contact info below). The author has already spoken with Mr. Hernandez about this opportunity and he expressed great interest in collaborating. Below is a list of the network's pending activities, costs, and timelines estimates from which the GEF project could choose its areas of intervention and support.

Activity	**Duration** (months)	**Cost (US$)**
Situational diagnostic of cattle in the intervention area of the project: (1) identification of geographical limits of intervention area; (2) estimation of potential to generate benefits for ecosystem service protection, sustainable	2	6000

enterprises, and community social and economic development.		
Develop at least three training workshops regarding sustainable cattle production as a strategy for climate change adaptation	2	10,000
Participative planning with at least 30% of the producers interested in implementing best practices	1	5,000
Establish at least three pilot ranches	6	30,000
Establish community nurseries with native grass species for use in intervention sites	4	6,000
Monitor pilot ranches	18	3,000
Develop best practices manual for ranches for adaptation to climate change	4	3,000
Present results	2	2,000

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Reporte final de Consultoría

“Identificación de Oportunidades para Fortalecer los Programas de Capacitación en en Manejo de Recursos Naturales y Pago por Servicios Ambientales en la Sierra Madre de Chiapas, México”

presentado a:

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I. Introducción

Este documento presenta los resultados del proceso de consultoría, cuyo objetivo principal fue el de obtener información y hacer recomendaciones sobre los procesos de construcción de capacidades[1] de miembros clave de los Comités de Cuenca (CC), en los temas de servicios ambientales y conservación de la biodiversidad.

Los objetivos específicos fueron:

- Realizar un análisis de las necesidades de capacitación en los comités de cuenca y de la efectividad (fortalezas, debilidades y vacíos) de los programas de capacitación existentes para satisfacerlas.

- Compilar una lista detallada de programas o cursos de capacitación, formales e informales, ofrecidos por instituciones académicas, OSCs y organizaciones gubernamentales, en temas de servicios ambientales y biodiversidad a nivel de microcuenca.

- Hacer recomendaciones sobre los contenidos y métodos idóneos para consolidar un proceso de capacitación permanente a comités de cuenca.

En lo que se refiere a la estructura del documento, la información respectiva al primer objetivo planteado está contenida en la sección III del presente documento, la cual describe la demanda educativa. El segundo objetivo está manifestado en la sección IV, que describe la oferta educativa. El tercer objetivo se presenta en la sección V, donde se hacen una serie de recomendaciones para mejorar las estrategias de construcción de capacidades a nivel de CC.

II. Metodología

a. Descripción general del proceso

El proceso de investigación llevado a cabo para fines de esta consultoría tuvo dos componentes principales: el primero fue un análisis de las necesidades de capacitación existentes en los comités de cuenca, y el segundo fue un análisis de la oferta educativa disponible, incluyendo las características de los programas para el entrenamiento efectivo de los integrantes (en sus diferentes niveles) de los CC. A partir del analisis de la realidad, se hacen sugerencias sobre estrategias adecuadas para construir capacidades en los integrantes del comité, para que estos a su vez puedan incorporar elementos de servicios ecosistemicos y biodiversidad en los procesos de capacitación para el

[1] Cabe aclarar que, aunque a lo largo del documento se utilizan indistamente los conceptos de “construcción de capacidades” y “capacitación”, éstos no se limitan simplemente a cursos y programas de capacitación formal, sino que incluyen todo tipo de experiencias de fortalecimiento de habilidades, conocimientos y actitudes.

desarrollo y manejo de su microcuenca.

Dado que nuestros públicos meta son gerentes, técnicos y usuarios del CC, éstos ocuparon un rol central en nuestra investigación. Fue necesario adentrarnos en la estructura del CC y en su funcionamiento, con el fin de enmarcar temas de capacitación en las condiciones del contexto en el que ésta se desarrolla. A medida que la investigación fue avanzando, la necesidad de entender el contexto político en el que está inmerso el CC se hizo evidente. Si bien el objetivo de esta consultoría no es despejar una compresión profunda de las dinámicas políticas que tienen lugar en la institución, se consideró pertinente indagar y dar cuenta de la incidencia que algunas cuestiones estructurales tienen sobre cuestiones de capacitación, y sobre el funcionamiento del comité de cuenca en general. La dinámica mas relevante en este sentido es cómo la llegada de un nuevo presidente municipal afecta la continuidad de los procesos de capacitación y participación que se dan en este contexto.

b. Revisión bibliográfica

Para tener una base sólida de información sobre el tema de construcción de capacidades a nivel de microcuencas, se revisaron documentos sobre investigaciones realizadas en relación a la oferta y necesidades de capacitación en la región, en los temas de manejo de cuencas, servicios ambientales y conservación de la biodiversidad.

Los documentos revisados fueron seleccionados principalmente a partir de recomendaciones realizadas por actores participantes en el taller inicial de este proyecto. A partir de los documentos revisados y las entrevistas realizadas durante el proceso de investigación, se detectaron nuevos documentos que a su vez fueron estudiados (Anexo 1: Documentos revisados).

Estos documentos nos permitieron tener una primera aproximación general a temas de manejo de cuenca, servicios ecosistémicos y conservación de la biodiversidad a nivel federal y mas específicamente, en la región. También nos permitieron conocer la estructura y funcionamiento de los CC, así como los esfuerzos de capacitación realizados en torno a los temas de manejo de cuencas, SE y conservación de la biodiversidad, esto además de algunas propuestas que se han hecho para mejorar la construcción de capacidades a nivel de microcuencas. Otra razón fundamental por la cual se incorporaron éstos documentos, fue la voluntad de las consultoras de realizar recomendaciones que se sumen a los esfuerzos ya realizados.

c. Obtención de información sobre la oferta de capacitación existente

El primer paso para obtener información sobre la oferta de capacitación existente fue compilar una lista preliminar de instituciones académicas,

organizaciones gubernamentales y organizaciones de la sociedad civil que contaran con programas educativos en los temas ya mencionados. Esta lista se configuró a partir de sugerencias realizadas por actores que participaron en el taller inicial del proyecto. Posteriormente, se agregaron otras instituciones relevantes a partir de investigaciones realizadas en internet y de la revisión bibliográfica que precedió al trabajo de campo. Esta lista fue confirmada con algunos actores claves del proyecto que participaron en el proceso de investigación, quienes nos facilitaron los teléfonos y correos electrónicos de personas laborando en las instituciones meta.

El siguiente paso fue realizar una investigación en los sitios de internet de cada institución con el fin de obtener información sobre programas, cursos y materiales educativos (manuales, libros, etc) disponibles para comités de microcuencua, en relacion a los temas de manejo de cuencas, servicios ambientales y conservación de la biodiversidad.

Dado que la información obtenida en sitios de internet de estas instituciones es de orden general, se realizaron llamadas telefónicas y contactos via correo electrónico para tratar de detectar a las personas idóneas en cada institución que pudieran proveer la información relevante para esta etapa de la investigación.

Para esto se diseñó una encuesta cerrada cuyo objetivo fue obtener información mas detallada en cuanto a los programas ofrecidos, áreas temáticas, públicos meta, fortalezas y debilidades de los programas. Dado que nuestros públicos meta son los integrantes del comité de cuenca, en dicha encuesta se incluyó un apartado para instituciones que trabajan en directa relación con éstos. El objetivo de este apartado fue indagar de manera mas detallada en las estrategias de capacitación implementadas por estas instituciones con los comités de cuenca.

La encuesta fue enviada vía electrónica y obtuvimos respuesta del 73%. Se recontactó a aquellas instituciones que no respondieron a la encuesta y se les propuso hacerlo vía telefónica.

Como anexo a este documento se proporcionan los contactos de cada institución teniendo en cuenta aquellas que dieron respuesta a nuestra demanda así como aquellas que, por diferentes razones, no lo hicieron (Anexo 2: directorio).

d. Trabajo de campo

Entrevistas a personas de instituciones capacitadoras

En esta etapa de la investigación el objetivo fue obtener información detallada sobre las necesidades y áreas de oportunidad en cuestión de capacitación para los integrantes de comités de cuenca en torno a los temas que nos ocupan. Para esto, se realizaron entrevistas abiertas -tomando como

referencia algunas preguntas formuladas en la encuesta cerrada a instituciones capacitadoras- a personas de instituciones con experiencia en la materia que nos proporcionaron sus percepciones sobre estos temas.

Visita a comités de cuenca

El objetivo de la visita a comités de cuenca fue entender de manera más directa su estructura y dinámicas reales de funcionamiento, su participación en procesos de capacitación, el estado actual de la capacitación en técnicos, gerentes y usuarios, e identificar necesidades y áreas de oportunidad existentes en cuestión de capacitación.

Se hicieron visitas a dos comités de cuenca: Lagartero y Zanatenco. Dado que durante el taller no se definieron de manera precisa los comités de cuenca con lo que se debería trabajar, éstos fueron seleccionados de acuerdo a criterios definidos por las consultoras. La razón de mayor peso fue que estos dos comités habían tenido experiencias exitosas de capacitación, participación y de funcionamiento en general. La idea de visitar un CC que no tuviera éxito en su capacitación fue descartada por las consultoras luego de obtener elementos -durante el proceso de investigación- que nos indicaron que la principal causa del mal funcionamiento de éstos es la falta de recursos económicos.

Entrevistas a gerentes, técnicos y usuarios de Comité de Cuenca

Para obtener la información deseada en los CC se diseño una encuesta semi estructurada que fue aplicada a dos gerentes de CC, tres técnicos y cuatro usuarios (tres representantes de usuarios en el seno del comité y un usuario que ya no participa de las actividades del comité). El objetivo de la encuesta fue obtener información sobre:

- El funcionamiento del CC (propósito, efectividad, roles).
- La motivación de los miembros del comité para trabajar en el comité y capacitarse (razones por las cuales participa, intereses de capacitación, mejores experiencias de capacitación).
- Conocimientos, habilidades y actitudes instaladas, así como aquellas que se desean desarrollar.
- Capacitación que han recibido en el pasado, así como los obstáculos y facilitadores que detectaron para el fortalecimiento de la capacitación en comités de cuenca.

e. Sistematización de la información

La información obtenida se categorizó dividiendo primeramente toda la información respectiva a la demanda para la construcción de capacidades en

los CC (necesidades identificadas por los CC y personas clave) y posteriormente toda la información respectiva a la oferta educativa (cursos, programas, materiales, etc) existente, alrededor de los temas de Servicios Ambientales, Manejo Integral de la Cuenca y Biodiversidad.

Para hacer un análisis de la demanda fue necesario describir concretamente las funciones de cada uno de los públicos meta, así como la situación actual de los CC, para entonces descubrir los resultados esperados a raíz de un proceso de construcción de capacidades. Finalmente se identificaron de manera diferenciada los conocimientos, las habilidades y las actitudes que requieren fortalecerse, así como los métodos más adecuados para el trabajo en cada una de estas tres dimensiones

El análisis de la oferta consistió de una identificación de las fortalezas y debilidades de los programas de capacitación que existen y son accesibles a los integrantes de los CC. También se hizo una comparación entre las necesidades de capacitación identificadas y los programas de capacitación disponibles, con el fin de saber qué areas son fuertes, cuáles son débiles y qué vacíos esxisten. Para complementar este análisis, se identificaron algunos factores contextuales que van más allá del tema educativo, pero que tienen un impacto importante en la capacidad de los CC de construir capacidades.

A partir del análisis, se hicieron recomendaciones diversas para la implementación de procesos de capacitación permanentes y efectivos en el desarrollo de capacidades en los comités de cuenca, cada una intentando atacar alguno de los problemas identificados.

III. Demanda de Capacitación

Para darle sentido a esta sección, se parte de una descripción de los públicos meta en los que se pretende fortalecer la construcción de capacidades, su situación actual, las necesidades de capacitación identificadas y los resultados esperados como consecuencia de la construcción de capacidades.

a. Públicos meta

Comités de Cuenca

En el proceso de investigación se pretendió descubrir cómo entienden la función del CC, los diversos integrantes que forman parte de ellos. La descripción que se presenta en la Ley de Aguas Nacionales, los describe como "órganos auxiliares de los Consejos de Cuenca que se constituyen al nivel de subcuenca o unidades hidrológicas de menor orden[2]. Se crean para la

[2] Al ser una unidad natural, las cuencas no obedecen a divisiones políticas, por lo que puede haber varios municipios involucrados en su manejo.

atención de problemas que requieren de acciones específicas especializadas". Entre las descripciones que dieron las instituciones de apoyo como los gerentes, técnicos y usuarios de los CC entrevistados, sobre las funciones del CC, destacan las siguientes tendencias:

- Gestionar proyectos
- Planear proyectos
- Monitorear lo que esta pasando en la cuenca.
- Obtener asesoría y apoyo
- Reflexionar sobre alguna problemática específica (darla a conocer y encontrar soluciones)
- Mediar intereses entre los usuarios y las instituciones interesadas en la conservación
- Ser una estructura de política pública

Integrantes de los Comités de Cuenca

En los CC participan diversos actores, en teoría divididos el 50% en instituciones de gobierno (federal, estatal y municipal) y el 50% en sociedad civil (usuarios de suelo y Organismos No Gubernamentales). La operación está a cargo de un gerente y varios técnicos (entre 1 y 10, dependiendo del CC). Para fines de esta consultoría, se definieron como públicos meta en relación a la construcción de capacidades los usuarios de suelo, los gerentes y los técnicos. A continuación se describe brevemente el perfil de cada uno y sus funciones declaradas en relación al CC.

Usuarios del suelo

Los usuarios de suelo que forman parte del CC son representantes de su comunidad. Idealmente, se espera que los usuarios propongan acciones para el manejo de la cuenca y se involucren o ejecuten actividades como diagnóstico, planeación, identificación de recursos locales, gestión de apoyos externos, seguimiento a acciones, monitoreo de la cuenca, etc. En la práctica, su involucramiento es limitado.

Los usuarios cuentan con conocimientos empíricos sobre el cultivo y la siembra, así como creencias y tradiciones que les fueron transmitidos por generaciones anteriores. Son capaces de reconocer la importancia de conservar el medio ambiente, aunque a veces deciden darle prioridad a sus necesidades de producción.

Técnicos

Son los encargados de hacer la transferencia de tecnologías, por medio de capacitación y asesorías, y promover la organización de actores locales para favorecer su empoderamiento hacia el manejo integral de cuencas. Cada técnico tiene su especialidad y área de trabajo, y se encargan también de dar acompañamiento y supervisar los proyectos que se implementan. Son quienes tienen contacto directo con los usuarios.

Existen bastantes fuentes de capacitación para técnicos, aunque en realidad se observó que éstos sólo cuentan con conocimientos y habilidades básicas en los temas de manejo de cuencas, conservación y restauración.

Gerentes

Se encargan de hacer gestión con el gobierno del estado, administran los recursos y dirigen la planeación del CC. Además, son los responsables de la operación de los planes y de la rendición de cuentas.

La percepción de las instituciones y de los integrantes de los comités visitados es que los gerentes tienen conocimientos y habilidades limitadas de planeación, gestión y supervisión.

Capacitación recibida

Los CC visitados reportaron que han recibido capacitación de Comisión Nacional del Agua (Conagua), Comisión Nacional Forestal (Conafor), Comisión Nacional de Áreas Naturales Protegidas (Conanp), INIFAP y TNC. Cuentan con algunos materiales informativos de Conafor y han recibido cursos cortos (tres o cuatro días) sobre conservación, cuidado de los bosques, ríos, aguas, y manejo del trabajo. También han recibido capacitación sobre estrategias para la restauración como son: presas filtrantes de piedra, de madera, cercas vivas.

Reportaron que han habido cursos y diplomados básicos sobre Manejo de Cuenca, a veces dirigidos sólo a técnicos, otras veces para gerentes y técnicos y otras más que también incluyen a usuarios. En Zanatenco reportaron que los procesos de capacitación con usuarios se llevaban a cabo dos o tres veces por año, y que los procesos para técnicos y gerentes eran mucho más frecuentes (alrededor de ocho veces por año).

Las personas que imparten la capacitación son generalmente consultores independientes contratados por las diversas instancias interesadas en la capacitación de los CC. La gerencia de los CC (gerente y técnicos) cuenta con algunos materiales de consulta para sus proyectos en las comunidades (ej. manual de manejo de cuencas de Chapingo).

Aunque existen muchas organizaciones que ofrecen capacitación en temas de interés para los CCs, son pocas las que llegan al campo, y algunas tienen regiones determinadas en las cuales trabajan, por lo cual, su oferta no llega a

todos los públicos.

b. Situación actual de los Comités de Cuenca

A continuación se presentan algunos datos sobre la situación actual de los CC que nos permiten tener un panorama de los problemas a los que se están enfrentando. Se pretende partir de esta realidad para demostrar la necesidad y características que debería tener una estrategia de fortalecimiento de capacidades en el manejo integral de la cuenca, los SE y conservación de la biodiversidad.

Los problemas que a continuación se describen son las tendencias generales expresadas tanto en los documentos revisados, como en las entrevistas realizadas a las instituciones que ofrecen capacitación y a los integrantes de los CC.

- Muchos CC sólo llegan a ejecutar entre el 20 y el 40% de lo que se planea, esto debido a la falta de acompañamiento y a que muchas veces las prioridades de las instituciones no coinciden con las problemáticas identificades en los planes de los CC (López, 2007).

- Los usuarios de suelo tienen una visión limitada de la problemática de la cuenca, no tienen una comprensión integral de su funcionamiento. Aunque tienen consciencia de la crisis ambiental, están concentrados en su actividad productiva, y la priorizan por encima del cuidado del medio ambiente. Cuando hay resultados decepcionantes no entienden las causas (López, 2009).

- Hay una falta de continuidad en el trabajo de los CC debido a los constantes cambios y rotación de los gerentes y técnicos. Esto está ligado a los cambios en el gobierno municipal. Los proyectos se "caen" por falta de permanencia de las personas que los coordinan.

- La participación de los usuarios es limitada debido a factores tales como: escasa o nula representación de las comunidades productoras de agua (cuenca arriba) (Negrete, 2009), desinterés y desconfianza de los usuarios de suelo por participar debido a la percepción de que las instituciones que participan en los CC quieren que en las comunidades se deje de practicar la agricultura, hartazgo de los usuarios al no ver resultados o beneficios de los programas en los que han participado. Sin embargo, ha habido proyectos que han funcionado debido a que la demanda ha surgido de los usuarios.

- Aunque reciben recursos económicos de Conagua y la presidencia municipal, éstos son limitados para la ejecución de los proyectos y para pagar al personal (gerentes y técnicos). Esto se debe en gran parte a la desaparición de programas de apoyo a CC (ej. Programa Nacional de Cuencas, operado por FIRCO) y al hecho de que el CC no tiene una figura

legal que le permita gestionar fondos del gobierno y de ONGs (Burguete, 2009).

- En lo que se refiere a vinculación con otras instancias, se observa que el acompañamiento de instituciones de gobierno (ej. CONANP, INIFAP) y ONGs (ej. TNC) ha sido una ayuda importante para que algunos CC a avancen en sus proyectos.

- La vinculación con el municipio no ha sido fácil. Dos ejemplos de esto son cómo, a pesar de que los presidentes municipales son los coordinadores de los CC, no se percibe interés de su parte para convocar a reuniones; también el hecho de que los Consejos de Desarrollo Sustentable no conocen los planes de trabajo de los CC (Negrete, 2009).

- En ocasiones hay varios municipios implicados en una cuenca, por lo que se vuelve complicado coordinar esfuerzos. Generalmente el coordinador del CC es el municipio que da el dinero. Esto se convierte una dinámica muy compleja en la que “el que paga manda”, y los demás no se comprometen.

- La toma de decisiones no se hace de manera colectiva. La mayoría de los usuarios solo acatan las propuestas que llegan de arriba, y las reuniones de la mayoría de los CC no son frecuentes. Un problema que limita la oportunidad de los integrantes del CC de tomar decisiones es la atribución de la máxima jerarquía a los presidentes municipales (Morales, 2009).

- No se sabe qué impacto ha tenido el trabajo a nivel de CC. No ha habido estudios que demuestren los resultados de lo que se ha hecho hasta la fecha en los CC (Negrete, 2009).

- Muchos CC no han logrado operar de manera efectiva. Esto tiene que ver con diversos factores, desde la capacidad del gerente y los técnicos, como el hecho de que no hay suficientes extensionistas que llegan al campo para cumplir con el papel de técnicos de CC.

- Se cuenta con ciertos conocimientos y capacidades instaladas. La mayoría van en relación a conceptos básicos relacionados con el manejo integral de la cuenca, metodologías de planeación, y conocimientos o habilidades técnicas (ej. curvas de niveles, control de incendios, elaboración de químicos naturales, agricultura, trabajo de la tierra, manejo de ganado, elaboración de composta, bancos forrajeros, presas de piedra, reforestación, trazo de laderas, conservación del suelo, etc).

- En lo que se refiere a Servicios Ecosistémicos y biodiversidad, muchos integrantes de los CC no tienen claro lo que esto significa, ni tienen claridad acerca de sus derechos o las reglas de los programas (Thomas, 2009).

c. Resultados esperados a partir de los procesos de capacitación

El propósito de la construcción de capacidades en este ámbito es tener un manejo efectivo de la cuenca, lo que significa poder controlar y prevenir los efectos derivados de la actividad humana sobre el funcionamiento de los sistemas naturales para mantener el ciclo hidrológico y la calidad del agua. Esto se deriva en las capacidades de: conservar la calidad y la cantidad en cuerpos de agua, conservar los recursos naturales en el marco de las cuencas, aprovechar de manera sustentable los recursos para fines productivos, prevenir y controlar la deforestación, degradación o mal uso de los recursos naturales, prevenir y controlar los desastres naturales. (Alternativas, 2009)

Los cambios esperados, en los que el fortalecimiento de capacidades de los integrantes del CC podría ser una contribución importante, se describen a continuación:

- Los pobladores locales y usuarios tienen más información y están sensibilizados sobre el valor los recursos naturales y la importancia de su participación en el manejo de la cuenca. Tienen mayor conciencia de los problemas actuales y lo que pasaría en el futuro si no se toman medidas preventivas y correctivas. Las poblaciones locales participan de manera activa en el manejo integral de la cuenca y tienen actitudes que favorecen la conservación y restauración de las áreas protegidas.

- Se disminuye el impacto de las actividades productivas y se fomentan prácticas agrícolas, pesqueras, ganaderas y forestales alternativas sustentables con alta productividad.

- Se cuenta con un concepto mental de la cuenca como sistema interconectado y de cómo todos nos veremos afectados si no se toman las medidas necesarias (Hernandez, 2009). Esto se relaciona con la capacidad de ver a la cuenca como una empresa que produce bienes y servicios, que pueden ser ofrecidos y “cobrados” a usuarios dentro o fuera de la cuenca (Hernandez, 2009).

- Hay movilización y participación social para la gestión de proyectos y organización de productores, la toma de decisiones informadas, el desarrollo de una visión común en los miembros del comité de la cuenca para promover el uso sustentable de los recursos, su restauración y conservación, y la integración de la comunidad alrededor de una causa.

- Los CC implementan de manera efectiva sus planes (incluyendo diagnósticos y definición de prioridades) y sistemas de evaluación y seguimiento.

- Los CC funcionan de manera efectiva, respetan los acuerdos establecidos y logran hacer llegar la información a donde tiene que llegar (Hernandez,

2009).

d. Capacitación requerida

Para lograr los resultados anteriormente descritos, se identificaron las necesidades de capacitación, así como los métodos que han sido utilizados para la construcción de capacidades, en tres dimensiones centrales: los conocimientos (lo que se necesita saber), las habilidades (lo que necesitan saber hacer) y las actitudes (los valores y creencias que guían la acción). La detección de necesidades se realizó a partir de percepción de usuarios y actores claves del proyecto y de las instituciones que ofrecen capacitación.

Conocimientos

Esta dimensión se refiere a la teoría o los conceptos que necesitan manejar los diferentes públicos meta. Se describen primero aquellos conocimientos generales que se esperaría que todos los integrantes del CC manejaran y después los conocimientos específicos, que sólo las personas involucradas en un proyecto en particular necesitan dominar.

Generales

Se esperaría que todos los integrantes del CC tengan cierta claridad conceptual sobre los temas centrales alrededor del manejo de la cuenca, los SE y la biodiversidad, para que pueda darse el trabajo en equipo. Algunos de estos temas son:

- Concepto de cuenca y su funcionamiento (qué es, cómo se divide, de qué orden es su corriente).
- Manejo integrado de la cuenca: métodos y conceptos básicos (requerido en todos los niveles).
- Conservación, su importancia y propósito.
- Servicios ecosistémicos o ambientales: recursos hidrológicos, captura de carbono, etc) y su importancia a nivel local, regional y global.
- Programas de Pago por Servicios Ambientales, venta de bonos de carbono, mercados voluntaries.
- Prevención y control de desastres naturales, contaminación, cambio climático.
- Ordenamiento territorial, elementos para la administración de la cuenca, división técnica del trabajo en una cuenca.
- Marco legal, dependencias de gobierno que apoyan el trabajo a nivel de

microcuenca y sus programas de apoyo.

- Características o problemáticas de su región, como pueden ser la geografía básica, las especies en peligro de extinción, los usos e importancia de ciertas plantas y animales regionales (Thomas, 2009).

Específicos

Se esperaría que ciertos integrantes del CC cuenten con conocimientos técnicos que le permitan ejecutar los proyectos que se requieren en su comunidad. Algunos de los temas son:

- Reconversión productiva para la producción sostenible: manejo de ganadería, sistemas silvopastoriles, manejo de bosques y potreros.

- Captación de agua.

- Conservación de suelos y restauración de la vegetación.

- Prevención y control de sedimentación, erosión hídrica y eólica.

Métodos utilizados:

Hasta el momento se han llevado a cabo cursos y difundido materiales muy diversos, diseñados por las diferentes instancias de apoyo. En lo que se refiere a los conocimientos generales, los materiales que se utilizan en los comités son básicos, pero en varios casos el lenguaje utilizado podría ser complejo para los usuarios.

En cuanto a los conocimientos específicos, las técnicas de transferencia de tecnología son sobre todo asesorías de los técnicos a los usuarios, usando en ocasiones modelos basados en resolver problemas concretos presentes en los sistemas de producción, y algunos métodos basados en el intercambio de experiencias (ej. de campesino a campesino) o la formación de promotores locales (ej. escuela de campo). Los CC tienen poco acceso a manuales o material didáctico adecuado a sus necesidades o realidades.

Habilidades

De igual manera, se dividen las habilidades que se espera puedan desarrollar los integrantes del CC en dos: generales y específicas (para los tres diferentes públicos meta).

Generales:

Se esperaría que todos los integrantes del CC, cada uno a su nivel, puedan desarrollar su capacidad de:

- Trabajar en equipo. Esto tiene que ver con saber coordinarse e integrar esfuerzos para generar sinergias y poder solucionar conflictos.

- Tomar decisiones de manera informada y a través de procesos participativos.

- Desarrollar su pensamiento crítico.

- Ejercer su liderazgo.

- Gestionar apoyos.

Específicas:

Se esperaría que los gerentes desarrollen su capacidad de:

- Elaborar, gestionar y administrar proyectos (integración de expedientes, proyectos, elaboración de proyectos).

- Comunicarse y establecer relaciones con los usuarios de la cuenca, usando lenguaje adecuado al nivel de la comunidad y siendo capaces de sensibilizarlos y motivarlos a que participen.

- Saber dirigir una organización de actores múltiples y conducir un proyecto.

- Saber relacionarse con autoridades, con otros consejos a nivel local (ej. COPLADEM) y fortalecer alianzas con Asociaciones Civiles -cuando éstas ya existen en el seno del CC-.

Se esperaría que tanto gerentes como técnicos desarrollen su capacidad de:

- Conducir procesos de planeación estratégica y operativa.

- Conducir un proceso de monitoreo y evaluación de impacto.

- Hacer diagnósticos para el análisis de la situación en la comunidad.

- Manejar herramientas para obtener datos en campo como son los sistemas de información geográfica.

- Utilizar herramientas participativas en el trabajo con los usuarios.

Métodos utilizados:

Hasta la fecha, se han empleado diversas metodologías para el desarrollo de las habilidades antes mencionadas. Las capacidades que han logrado incorporar los usuarios han sido las que han desarrollado al involucrarse en un proceso de manera empírica, trabajando con un problema concreto de su

comunidad.

Actitudes

Las actitudes necesarias para el éxito de los proyectos que son necesarias en todos los integrantes del comité, cada uno desde su nivel, son:

- Interés por el largo plazo: Se requiere ver más allá de los beneficios inmediatos y poder desarrollar estrategias que ataquen las causas de los problemas y no sólo las consecuencias.

- Visión integral y sistémica: Esto significa que los integrantes del CC y la comunidad son capaces de entender que un problema en la cuenca impacta mucho más allá de la región donde se presenta, y que los cambios en un elemento de la cuenca terminan afectando a los demás.

- Corresponsabilidad: Esto se manifestaría cuando la población sienta la necesidad de responder de manera conjunta a los problemas que afectan el bien común, superando el individualismo.

- Disposición hacia la participación social: Esto se logra cuando se tiene consciencia de la importancia del involucramiento personal en la solución de los problemas comunitarios.

Se esperaría que los usuarios desarrollen las siguientes actitudes o comportamientos:

- Cambio de paradigma con respecto a la explotación de los recursos naturales. Pasar de la idea de tener que hacer "productivas" a las tierras al convertirlas en tierras para la pastura a entender el alto costo de destruir los recursos naturales y el hecho de que son limitados, y pasar de ver las políticas de conservación como imposiciones que limitan sus posibilidades de subsistencia, a verlas como oportunidades de colaboración para la generación de servicios que son muy valiosos para su comunidad local, regional y global (Pujadas, 2007).

- Cambio de paradigma con respecto a su perspectiva del gobierno. Pasar de ver al gobierno como el responsable de resolver los problemas a los que se enfrentan, a verlo como un aliado estratégico que puede impulsar los proyectos que se emprendan desde la comunidad.

- Mayor disposición de los usuarios a participar y trabajar con los técnicos, no sólo acatar, en los planes y proyectos que se emprendan.

- Los representantes que participan en el CC necesitan tener el deseo de promover y apoyar la participación y la organización de la comunidad, cierto liderazgo y una actitud de servicio hacia sus comunidades.

Se esperaría que los técnicos contaran con las siguientes actitudes:

- Disposición y apertura para aprender de la comunidad, apegarse a sus costumbres y conocimientos e incluirlos en el proceso educativo, en vez de imponer enseñanzas que no responden a las necesidades de la comunidad
- Solidaridad y apoyo en relación a los problemas de la comunidad, actitud de servicio.
- Paciencia para el trabajo con los usuarios.
- Interés de generar procesos de enseñanza y transmisión del conocimiento que sean dinámicos.

Se esperaría que los gerentes contaran con las siguientes actitudes:

- Actitud de servicio publico, que se conciban al servicio de la comunidad
- Flexibilidad
- Paciencia
- Respeto y buena relación con los técnicos
- Construir confianza con los usuarios

Métodos utilizados:

Hasta hoy, los métodos que se han empleado son el uso de analogías y dinámicas que ejemplifican las actitudes tomadas y muestran a las personas el efecto que su comportamiento esta teniendo en el problema. Esto ha servido para que las personas sean capaces de tomar distancia de su comportamiento y puedan analizar y decidir por ellos mismos qué actitudes pueden ser favorecedoras de un cambio a nivel comunitario.

IV. OFERTA EDUCATIVA

En este apartado se presentan los programas ofrecidos por diversas instituciones en relación a los temas de manejo de cuencas, SE y biodiversidad, se analizan las fortalezas y debilidades de esta oferta educativa y se describen las condiciones que son necesarias para que los programas de capacitación a integrantes de los CC puedan ser efectivos.

a. Descripción de instituciones, sus programas y sus fortalezas y/o debilidades.

El esquema para presentar a las instituciones inicia con una breve descripción

del interés principal de la organización, y después se enlistan los programas, cursos y materiales que ofrece. Es importante señalar que algunas de estas organizaciones juegan un papel de financiadoras y otras juegan un papel de ejecutoras. En la descripción de los programas, para el caso de las financiadoras, se hace esta aclaración.

INSTITUCIONES DE GOBIERNO

INIFAP
Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias
Interés principal: Manejo integral de cuencas y ordenamiento territorial.
Programas:
- Transferencia de tecnologías conservacionistas y productivas

Cursos:
- Sensibilización sobre el enfoque de cuencas para funcionarios y/o sociedad civil (8 horas)
- Curso teórico – práctico sobre Manejo Integral de Cuencas para técnicos profesionales (48 horas)
- Diplomado sobre Manejo Integral y Sostenible de Cuencas Hidrográficas (120 horas)

Los temas que se cubren en los cursos son: cambio climático y desarrollo sustentable; el enfoque territorial y criterios de delimitación; conceptos básicos de cuencas; por qué trabajar con las cuencas; el enfoque sistémico y su aplicación a las cuencas; diagnóstico y planificación de cuencas; las cuencas y los PSE; aplicación de SIG a cuencas; estrategias tecnológicas; situación actual de la gestión de cuencas con énfasis en políticas públicas.

CONAFOR
Comisión Nacional Forestal
Interés principal: Manejo forestal sustentable. Incremento del acceso de los dueños de terrenos a incentivos como el Pago por Servicios Ambientales y otros programas de compensaciones.
Programas:
Ofrece capacitación bajo demanda para comunidades. Se imparten los contenidos que se solicitan. *Organización financiadora.*
Cursos:
Cursos en línea en la plataforma de CONAFOR:
- Manejo de cuencas
- Introducción a los servicios ambientales

Materiales:
- Guía para la Elaboración del Programa de Mejores Prácticas de Manejo para las modalidades de apoyo: Servicios ambientales hidrológicos; Conservación de la biodiversidad; y Sistemas agroforestales con cultivos bajo sombra.
- Lineamientos para el Desarrollo de la idea de proyecto de secuestro de carbono.

- Lineamientos para promover el mercado de los servicios ambientales a través de fondos concurrentes.

CONAGUA
Interés principal: Asegurar la conservación y gestión integral del agua mediante participación del gobierno y la sociedad.
Programas:
- Transferencia de tecnología.
- Apoyo para el diseño e implementación de proyectos de servicios ambientales (biodiversidad).
- *Organización financiadora.*

Cursos:
- Manejo Integral de Cuencas Hidrográficas (curso básico y avanzado). Los temas que incluye son: qué es una cuenca, cómo se divide, de qué orden es la corriente de una cuenca, elementos importantes de administracion de una cuenca, de la ley de aguas nacionales, los articulos que los pueden afectar.
- Existe una lista de cursos que se determinan a nivel central y se sugieren a los estados. Entre los cursos se incluyen cuestiones técnicas (sistemas de agua potable), cuestiones adminstrativas (division técnica, atencion de conflictos, planeación estrátegica) y desarrollo de actitudes (crear confianza en usuarios).

Materiales:
- "Protección, restauración y conservación de suelos forestales". Manual de obras y prácticas. 2004.

CONANP
Comisión Nacional de Áreas Naturales Protegidas
Interés principal: Conservación de las Areas Naturales Protegidas, fomentando una cultura de conservación y desarrollo sustentable de las comunidades asentadas en su entorno.
Programas:
Trabaja en alianza con otras organizaciones interesadas en la construcción de capacidades. *Organización financiadora.*
- Capacitación a promotores para la multiplicación de los conocimientos.
- Programa de capacitación rural
- Planeación para el Manejo de Cuenca
- Escuelas de Campo y Experimentación para Agricultores (ECEA) – dirigido a miembros de la comunidad

Cursos:
Talleres, cursos y asesorías enfocados a problemas específicos y relacionados con proyectos. Ej. incendios, café de conservación.

CECADESU
Centro de Capacitación para el Desarrollo Sustentable *(área de la SEMARNAT encargada de la educación ambiental)*

Interés principal: Impulsar procesos de educación, capacitación y comunicación para lograr una sociedad informada que participe activamente en la preservación y la restauración del medio ambiente, así como en el aprovechamiento sustentable de los recursos naturales.

Programas:

- Gestión Ambiental Local: Fortalecimeinto de los gobiernos locales en los temas de gestión ambiental que son de competencia municipal: ordenamiento ecológico local, evaluación impacto ambiental, gestión de áreas naturales para la conservación, manejo de vida silvestre, vigilancia ambiental, gestión del agua y gestión integral de residuos sólidos.
- Gestión Ambiental para funcionarios municipales de la Cuenca Lerma Chapala, en el Estado de México

Cursos:

Los talleres, diplomados o cursos son financiados por el CECADESU a solicitud de la Delegación de SEMARNAT en cada Estado. Los temas que ofrecieron este año, relacionados con el Manejo de Cuencas son:

- Gestión Ambiental para funcionarios municipales de la Cuenca Lerma Chapala, en el Estado de México
- Ordenamiento Ecológico para funcionarios municipales de la Cuenca Lerma Chapala, en Campeche y en Chiapas
- Manejo de fauna silvestre, en Nuevo León

Materiales:

- La cuenca hidrográfica: unidad básica de planeación y manejo de recursos naturales. Sánchez-Vélez, A. S.; Garcia, R.M. García-Nuñez; A. Palma Trujano. 2003.
- Introducción a los servicios ambientales. SEMARNAT-CECADESU, Hombre Naturaleza. México. 2003
- Todo por los árboles. SEMARNAT. México. 2006
- "Protegiendo lo nuestro" Manual para la gestión ambiental comunitaria, uso y conservación de la biodiversidad de los campesinos indígenas de América Latina. SEMARNAT-CECADESU, PNUMA, CONABIO.
- Sistema Integral de Gestión Ambiental Municipal. Guía para funcionarios municipales, SEMARNAT 2003

Colegio de Postgraduados - Sagarpa

Interés principal: generar, difundir y aplicar conocimiento para el manejo sustentable de los recursos naturales, la producción de alimentos nutritivos e inocuos, y el mejoramiento de la calidad de vida de la sociedad.

Programas:

- "Proyectos Escuela": Módulos demostrativos dentro de sus campus para ilustrar en forma práctica el establecimiento y manejo de proyectos productivos de interés local. Algunos aspectos productivos hacia los cuales están dirigidos, son: captación y purificación de agua de lluvia; cultivo de hortalizas en invernaderos; y módulo de traspatio, que incluye el cultivo de diversas especies agrícolas, así como de especies animales de valor comercial y doméstico, en pequeñas superficies anexas a la vivienda rural.

- Transferencia de tecnología: Proyectos específicos que se implementan directamente con organizaciones de productores, donde se busca familiarizar a éstos con tecnologías, sistemas y procedimientos que estén en condiciones de adoptar, respetando sus tradiciones culturales, formas de organización y considerando las mejores alternativas productivas en su entorno rural.

Cursos:

Capacitación alrededor de temas de trascendencia para la producción agropecuaria y forestal y para el manejo y conservación de los recursos naturales. Algunos ejemplos de temas son: *Captación y Purificación de Agua de Lluvia,* Cultivo de Hortalizas en Invernadero, *Combate de Plagas y Enfermedades de Cultivos Básicos, Agronegocios*

Centro Nacional de Investigación y Capacitación Ambiental - INE
Instituto Nacional de Ecología

Interés principal: Generar información técnica y científica en los campos de contaminación atmosférica, residuos, sustancias tóxicas, sitios contaminados y transgénicos que apoye la toma de decisiones de las autoridades ambientales y fortalezca la capacidad de respuesta de funcionarios y técnicos mexicanos.

Programas:

Programas anuales de capacitación en temas como: contaminación atmosférica, monitoreo atmosférico, exposición personal a contaminantes, manejo de residuos sólidos y peligrosos, sustancias tóxicas, remediación de sitios contaminados, análisis de contaminantes y de organismos genéticamente modificados, orientados a brindar capacitación especializada a funcionarios y técnicos especialistas para el fortalecimiento de la capacidad técnica en México.

Cursos:

Se coordinan asesorías, talleres y cursos en atención a las solicitudes de centros de investigación afines e instituciones gubernamentales tanto nacionales como internacionales. Un ejemplo fue el Taller de "Pago por Servicios Ambientales en México: Situación Actual y Objetivos de Futuro" llevado a cabo en julio 2007

Materiales:

- Folleto comunitario: “Los servicios ambientales de los bosques”.
- Técnicas de muestreo para manejadores de recursos naturales. Francisco Bautista Zuñiga (ed). 2004.
- Gestión de cuencas y servicios ambientales. Perspectivas comunitarias y ciudadanas. Luisa Paré Dawn Robinson Marco A. González Ortiz. 2008
- Cambio climático: una visión desde México. Adrián Fernández Bremauntz Julia Martínez Patricia Osnaya Ruiz. 2008
- Indicadores para la caracterización y ordenamiento del territorio. Jose Luis Palacio Prieto et al. 2004.
- El manejo integral de cuencas en México. Estudios y reflexiones para orientar la política ambiental. Helena Cotler Ávalos. 2004.

IMTA

Instituto Mexicano de Tecnología del Agua
Interés principal: Producir, implantar y diseminar conocimiento y tecnología para la gestión sustentable del agua en México.
Programas:
Diplomado a distancia en Gestión Integrada del Agua. Temas: el agua en el contexto histórico, principios de la gestión integrada de cuencas, conflictos por el agua, gobernabilidad del agua.
Cursos:
Se imparten a solicitud de instituciones:
- Rehabilitación de Cuencas, Subcuencas y Microcuencas (40 horas)
- Importancia del medio ambiente (24 horas)
- Planeación participativa de la autogestión en la prestación del servicio público del agua en zonas rurales
- Alternativas de tratamiento de aguas residuales para zonas rurales

Materiales:
- *Problemas socioambientales y experiencias organizativas en las cuencas de México.* Sergio Vargas y Eric Mollard, eds.
- *Efectos del cambio climático en los recursos hídricos de México.* Dr. Polioptro F. Martínez Austria

COFOSECH
Comisión Forestal Sustentable del Estado de Chiapas
Interés principal: Preservación de la naturaleza mediante el manejo integral de ecosistemas, sus bienes y servicios ambientales.
Programas:
- Intercambio de experiencias (a nivel de comités de cuenca)
- *Organización financiadora*

Cursos y talleres:
- Manejo integrado de cuencas
- Conservación de suelos dirigidos a funcionarios (impartidos por INIFAP)
- Reconversión productiva

IHN
Instituto de Historia Natural
Interés principal: Investigación, exhibición, manejo, rescate, difusión y educación ambiental.
Programas:
- Capacitación en educación popular ambiental.
- Escuela Latinoamericana de guardaparques.

ORGANIZACIONES DE LA SOCIEDAD CIVIL

AMBIO
Interés principal: Fortalecer las capacidades locales de organizaciones

sociales, comunidades rurales, grupos organizados, mediante el manejo racional de los recursos naturales y ambientales.

Programas:

Construcción de un modelo de café de conservación y créditos de carbono en la sierra madre de Chiapas.

Cursos:

En el marco del "Plan Vivo" se ofrecen talleres de capacitación para campesinos sobre:

- Cambio climático
- Sistema del plan vivo
- Comercialización y captura de carbono

Materiales:

Folletos y presentaciones sobre PSA

Pronatura

Interés principal: La conservación y el manejo sustentable en ecosistemas prioritarios; la educación ambiental y comunicación estratégica; el desarrollo comunitario sustentable; la política y gestión ambiental; la generación y manejo de información en relación a la conservación de los recursos naturales.

Programas:

- Comunidad de formación de líderes campesinos – 3 años (temas: autoestima y liderazgo, manejo de grupos, habilidades para el análisis, población y ambiente, planeación y evaluación de proyectos)
- Comunidad de formación de formadores (4 módulos de 3 días c/u). Herramientas para la práctica formativa
- Centro de evaluación de competencias laborales: Capacitación especializada al sector rural

Cursos:

- Diplomado Nacional de Profesionalización de OSCs (INDESOL): fortalecer la capacidad estratégica, organizativa y operativa de las OSCs
- Cursos cortos temáticos: agroforestería, ecoturismo, planeación ambiental municipal, género y medio ambiente, monitoreo de aves, cursos de humedales y manejo de fuegos, gestión ante gobierno de los PSA, capacitación en uso del aparato A y nivel de aire.
- Cursos, talleres o conferencias en convenio con especialistas: metodologías participativas, desarrollo regional, conservación, educación ambiental, sistematización, relaciones humanas, etc.

TNC (The Nature Conservancy)

Interés principal: Conservar portafolios de áreas de conservación funcionales dentro de ecorregiones y a través de ellas.

Programas:

- Programas de capacitación en coordinación con otras instituciones. Acuerda contenidos con organizaciones sociales y contrata consultores para impartir temas específicos.
- Viajes de intercambio de experiencias (en la misma cuenca – parte alta y

baja, nacionales e internacionales)
- Apoyo para elaborar propuestas para el pago por servicios ambientales (captura de carbono)
- Utilización de mejores prácticas productivas
- *Organización financiadora*

Cursos:
- Diplomados sobre Manejo Integral y Sostenible de Cuencas Hidrográficas (en alianza con INIFAP) – dirigido a gerentes de los CC
- Cursos cortos sobre ganadería sustentable (en alianza con CONANP)
- Taller sobre equidad de género en la gandería
- Concienciación de jóvenes (en alianza con Pronatura
- Cursos para técnicos: Uso del marco lógico para planificación del proyecto
- Curso de elaboración de obras de conservación de suelo y agua
- Curso Manejo Integrado de Fuego

Materiales:
- *Esquema de las cinco S para la conservación de sitios. Manual de planificación para la conservación de sitios y la medición del éxito en conservación (junio, 2000)*. Tarjetas de evaluación de Cuencas Hidrográficas
- Herramientas metodológicas para la toma de decisiones

UICN
Unión Internacional para la Conservación de la Naturaleza
Interés principal: influenciar, alentar y ayudar a la sociedad a conservar la integridad y diversidad de la naturaleza y asegurar que todo uso de los recursos naturales sea equitativo y ecológicamente sostenible.
Cursos:
Taller sobre manejo integral de cuencas en relación a fenómenos naturales
Materiales:
La Aplicación del Enfoque Ecosistémico en la Gestión de los Recursos Hídricos. Un análisis de estudios de caso en América Latina. Eduardo Guerrero, Otto de Keizer, Rocío Córdoba (*Editores)* 2006.

IDESMAC
Instituto para el Desarrollo Sustentable en Mesoamérica A. C.
Interés principal: Proponer junto con la propia población local, estrategias que posibiliten en el mediano plazo hacer una contribución a la superación de la pobreza y la conservación de los recursos naturales en el medio rural del Sureste de México.
Programas:
- Asesorías y consultorías para personal técnico calificado
- Diplomado en cafeticultura sustentable
- Diplomado en Sistemas de Información Geográfica.

Cursos:
- Agricultura Orgánica
- Cafeticultura orgánica

- Participación de la mujer
- Plantaciones forestales
- Ganadería de pastoreo intensivo
- Prevención y combate de incendios

Talleres:

- Evaluación de riesgo y vulnerabilidad
- Diagnóstico rural participativo
- Ordenamiento Comunitario

INSTITUCIONES ACADÉMICAS

Universidad Autónoma de Chapingo – Departamento de Irrigación

Interés principal: Formar profesionistas en el ámbito de la irrigación; realizar investigación científica; desarrollar, validar y transferir tecnología de riego; y servicios profesionales en el área de riego para coadyuvar al desarrollo sustentable del país, así como promover la difusión de la cultura que vincule adecuadamente a los egresados con su entorno social.

Programas:

- Ingeniería en Irrigación.
- Maestría y doctorado en Ingeniería Agrícola y Uso Integral del Agua.

Cursos:

Dentro de la licenciatura se imparten relacionados con el manejo integral de cuencas (hidrología, conservación, etc)

Materiales:

"Manual de conservación de suelo y del agua". Instructivo. 1991

"Elaboración del plan de manejo integral de la cuenca del Río Zanatenco, municipio de Tonalá, Chiapas" Memoria. 2002-2003.

ECOSUR

Interés principal: Contribuir a la conservación de los recursos naturales, sistemas culturales y riqueza biológica mediante la investigación y la formación de recursos humanos a nivel técnico y superior.

Programas:

Maestría en Ciencias en Recursos Naturales y Desarrollo Rural

Orientaciones: Manejo y conservación de Recursos Naturales, Ecología y Sistemática, Estudios sociales y sustentabilidad, Entomología tropical, Gestión de ecosistemas y territories.

Doctorado en Ciencias en Ecología y Desarrollo Sustentable

Orientaciones: Conservación de la Biodiversidad, Agroecología y manejo de plagas, Población, ambiente y desarrollo rural.

Cursos:

Ofrecidos por el Laboratorio de Información Geográfica y Estadística (LAIGE)

- Diplomado en Sustentabilidad y Manejo de Recursos Naturales (122 horas – Chetumal)

- Diplomado en Educación Ambiental (120 horas – Tapachula)
- Toma de datos con receptors GPS (16 horas – San Cristóbal)
- Manejo de Herramientas para la Implementación de un Sistema de Información Geográfica (32 horas – San Cristóbal)
- Modelos Participativos de Capacitación con énfasis en Escuelas de Campo (24 horas – San Cristóbal)
- Planeación Comunitaria Participativa con el enfoque de Modos de Vida Sustentable (24 horas – San Cristóbal)
- Métodos de tratamiento de aguas residuales y parámetros operacionales (28 horas – Tapachula)
- Producción de abonos orgánicos (45 horas – Tapachula)
- Elaboración de proyectos participativos (20 horas - Campeche)
- Diagnósticos comunitarios participativos (20 horas - Campeche)

Materiales:

- *Diseño de sistemas agroforestales para la producción y la conservación. Experiencia y tradición en Chiapas.* Lorena Soto Pinto, Guillermo Jiménez Ferrer, Tina Lerner Martínez, México 2008
- *Ganadería, desarrollo y ambiente: una visión para Chiapas.* Trinidad Alemán Santillán, Bruce G. Ferguson, Francisco Javier Medina Jonapá. ECOSUR, Fundación Produce Chiapas, INIFAP, UNACH. México, 2007
- *Los Altos de Chiapas: agricultura y crisis rural.* Tomo I: Los recursos naturales. Manuel Parra, Blanca M. Díaz. ECOSUR. México, 1997
- *Manual de metodología rápida para la estimación y monitoreo de captura de carbono.* Nelson Rendón Carmona, Lorena Soto Pinto. ECOSUR. México, 2007
- *Diversidad biológica en Chiapas.* Mario González Espinosa, Neptalí Ramírez Marcial, Lorena Ruiz Montoya (coords.). ECOSUR, COCYTECH, Plaza y Valdés. México, 2005

CATIE

Centro Agronómico Tropical de Investigación y Enseñanza

Interés principal: Contribuir a la reducción de la pobreza rural promoviendo una agricultura y manejo de recursos naturales competitivo y sostenible, a través de la investigación y capacitación de profesionales a nivel técnico, decisores y líderes.

Programas:

- Manejo de cuencas
- Gestión de cuencas
- Manejo de cuencas y cambio climático
- Manejo de zonas de recarga hídrica
- Ordenamiento territorial
- Gerencia y liderazgo en la gestión de cuencas
- Diplomado DER

Cursos:

- Gestión Integral de Cuencas Hidrográficas

- Gestión Comunitaria en Áreas Protegidas, Zonas de Amortiguamiento y Corredores Biológicos
- Metodologías y Estrategias de Extensión para el Desarrollo Rural Sostenible
- Planificación y Manejo de Visitantes en Áreas Protegidas
- Bases Económicas e Institucionales para el Manejo y la Valoración de Servicios Ambientales
- Manejo de Cuencas y Cambio Climático
- Sistemas de Información Geográfica aplicados a la Ecología de Paisajes con Énfasis en Corredores Biológicos
- Manejo Diversificado de Bosques Naturales Tropicales ante los desafíos del Cambio Climático
- Ganadería Ambiental Herramientas para la Adaptación y Mitigación del Cambio Climático y Reducción de los Impactos en Fincas Ganaderas

Materiales:
Organización, liderazgo y reglamentación. Elementos claves para la gestión comunitaria del agua. Experiencia en siete comunidades de Copán Ruinas, Honduras. Noel I. Chica, Josué León, Cornelis Prins. 2006.

CIECO
Centro de Investigaciones en Ecosistemas de la UNAM Campus Morelia
Interés principal: manejo de ecosistemas, desarrollo humano, y ordenamiento ecológico territorial.
Programas:
Maestría en Servicios Ecosistémicos
Maestría en Ciencias biológica
Cursos:
Curso de 2 semanas concentrado sobre Servicios Ecosistémicos (gratis)
Materiales:
Herramientas de cuantificación y mapeo de Servicios Ecosistémicos

UNACH
Universidad Nacional Autónoma de Chiapas
Interés principal: Generar, recrear y extender el conocimiento con respeto a la identidad cultural de los pueblos, a la biodiversidad y al ambiente.
Programas:
- Licenciaturas: Ingeniero agrónomo tropical, Ingeniero forestal, Ingeniero agrónomo forestal.
- Maestrías: Ciencias en Producción Agropecuaria Tropical, Ingeniería (con opciones terminales en Hidráulica, Construcción ó Calidad del Agua).

Cursos:
Diversos cursos de educación continua en temas de: agricultura sostenible, agroecología tropical, agroforestería pecuaria, recursos fitogenéticos, sistemas integrales de producción, ganadería tropical, salud forestal, ecología de bosques de manglar, etc.

UNICACH
Universidad de Ciencias y Artes de Chiapas
Interés principal: Formar profesionales calificados, conocedores de la diversidad cultural y ambiental de la región y del país, comprometidos con la mejora continua y el desarrollo sustentable.
Programas:
- Laboratorio de Ciencias de la Tierra y Medio Ambiente
- Licenciatura en biología marina y manejo de cuencas
- Licenciatura en Ciencias de la Tierra
- Licenciatura en biología
- Se pueden estructurar programas bajo demanda. Ej. Diplomado de residuos sólidos, tratamiento de aguas residuales, Diplomado en MIC

Cursos:
- *Suelos:* Fertilidad de suelos, manejo y conservación; Captura de carbono en suelos; Erosión de suelos; Análisis físicos y químicos de suelos.
- *Desastres naturales:* Gestion para la reducción de riesgo; Riesgos, amenaza y vulnerabilidad; Riesgo Volcánico; Riesgo Sísmico; Riesgo por inestabilidad de laderas; Cambio Climático.
- *Educación ambiental y desarrollo sustentable:* Talleres de educación ambiental

Universidad de Querétaro - Facultad de Ciencias Naturales
Interés principal: Formar profesionales expertos en el aprovechamiento y conservación de recursos naturales, manejo integrado de microcuencas y planificación participativa, entre otras cosas.
Programas:
- Licenciatura en Biología
- Especialista en Gestión Integrada de Microcuencas
- Maestría en gestión integrada de cuencas
- Maestría en Ciencias

UNICH
Universidad Intercultural de Chiapas
Interés principal: Procesos de vinculación comunitaria, manejo sustentable de los recursos naturales, modelos de desarrollo, turismo comunitario y alternativo, desarrollo sustentable de comunidades.
Programas:
- Licenciatura en Desarrollo Sustentable
- Licenciatura en turismo alternativo

CBTA
Centro de Bachillerato Tecnológico Agropecuario (CBTA)
Interés principal: Ofrecer educación tecnológica agropecuaria en el nivel medio superior.
Programas:

- Técnico agropecuario
- Técnico en desarrollo comunitario
- Técnico en rehabilitación y mejoramiento ambiental

Universidad Politécnica de Chiapas
Interés principal: Formar profesionales de la Ingeniería, comprometidos con el desarrollo sustentable y bienestar del sur sureste del país; con valores y principios éticos.
Programas:
Ingeniería ambiental

b. Correspondencia entre la oferta y la demanda de capacitación.

A continuación se describe de qué manera las necesidades de capacitación identificadas están presentes en los programas descritos anteriormente:

Temas más presentes en los programas

- Varias instituciones cuentan con cursos para explicar los **conceptos básicos de la cuenca** y su funcionamiento, así como el **Manejo Integrado de la Cuenca**. Entre ellos INIFAP con propuesta sólida, Chapingo, CATIE, UICN y Conagua.

- Son muchas también las organizaciones que se enfocan al tema de **reconversión productiva**: INIFAP, CONANP, TNC, Pronatura, CATIE, Colegio de Postgraduados, IDESMAC.

- Los temas de **Servicios Ecosistémicos y programas de Pago por Servicios Ambientales** los trabajan varias organizaciones como Ambio, CONAFOR, TNC, CIECO, Conagua, Pronatura.

- El tema de **conservación de la biodiversidad** lo trabajan sobre todo CONANP, Pronatura y TNC.

- La orientación para la **planeación estratégica participativa**, al ser un elemento central del trabajo a nivel de microcuencas, es cubierta en los programas de varios organismos como el IMTA, TNC, Pronatura, Conagua, Ecosur, CONANP e INIFAP. IDESMAC también aborda este tema en sus talleres de ordenamiento comunitario.

Temas que se abordan por ciertas instituciones

- Los temas de **cambio climático, contaminación y desastres naturales** se tocan en varios programas, pero solo algunas organizaciones profundizan en ellos. Este es el caso de Ambio en temas de cambio climático, CATIE, IDESMAC y UNICACH en cuestiones de Desastres Naturales y el INE en lo

que se refiere a contaminación.

- El **ordenamiento territorial** es un tema que abordan principalmente INIFAP y CECADESU.

- La **captación de agua** es abordada por el IMTA y el Colegio de postgraduados. La **conservación de suelos** es trabajada por UNICACH y TNC.

- La capacitación para el uso de **Sistemas de Información Geográfica** es ofertada por INIFAP, IDESMAC, ECOSUR y CATIE.

- La asesoría y capacitación para la **gestión de apoyos** es ofrecida por Pronatura y TNC.

- Finalmente, la capacitación en **metodología participativas** está presente en los programas de Ecosur, IDESMAC y Pronatura.

Temas que trabaja una sola organización

- La preparación de los usuarios para el **conocimiento de su territorio** es trabajada por CONANP.

- El **marco legal** sólo es abordado por Conagua.

- Todo lo que tiene que ver con **trabajo en equipo, liderazgo, comunicación y relaciones humanas**: Pronatura es la única organización que lo ha trabajado a nivel de comités de cuenca.

- Aunque hay varias organizaciones que realizan diagnósticos, como son las universidades locales, la capacitación para la elaboración de **diagnósticos comunitarios** sólo la ofrecen Ecosur e IDESMAC.

Vacíos

- En cuanto a temas, ningún curso aborda de manera directa la capacitación para la **toma de decisiones**. Tampoco la capacitación en **evaluación de impacto**. En estos dos temas existen materiales desarrollados por TNC que son muy útiles (tarjetas de evaluación), pero tendrían que estar acompañados de un proceso de capacitación.

- En cuanto a métodos, son contados los cursos que se preocupan por la **construcción de pensamiento crítico** y utilizan metodologías educativas centradas en la transmisión de información.

- Finalmente, en lo que se refiere al **trabajo a nivel de actitudes**, las ONGs (AMBIO, TNC y Pronatura) y las instituciones de gobierno (INIFAP y CONANP) que trabajan en alianza con ellas, son las que abordan algunas

cuestiones relacionadas con esta dimension, pero ninguna lo hace de manera directa.

c. Debilidades y fortalezas generales de los programas existentes

A continuación se describen las fortalezas y debilidades detectadas en los programas de capacitación existentes, así como los vacíos identificados al hacer una comparación entre la oferta disponible y la demanda de capacitación a nivel de los CC.

Fortalezas

Integración de esfuerzos interinstitucionales para la capacitación

Algunos programas responden a necesidades identificadas conjuntamente entre diversos actores (TNC). Se han formado alianzas entre instituciones para dar capacitación a través de los comités de cuenca, es el caso de TNC, INIFAP, Pronatura, CONANP. En muchos casos se contratan expertos para dar estas capacitaciones. Se ha intentado también, en algunos casos con éxito, buscar apoyo en universidades locales (CC Zanatenco y Universidad de Chapingo en 2002-2004) para fortalecer la red de conocimiento local (Burguete, 2009). El hecho de que un programa educativo cuente con el respaldo de una institución universitaria le da cierta legitimidad que podría ser de interés para los técnicos.

Capacitación más allá del corto plazo

Algunas estrategias de capacitación han sido parte de programas de mediano plazo (cinco años) y contaron con recursos para su implementación y seguimiento (Hernández, 2008). La estrategia fue exitosa por el hecho de fomentar capacitación constante y contar con metas establecidas para el programa.

Capacitación que responde a la realidad local y valora los conocimientos locales

Han existido experiencias de capacitación dirigidas a productores y ligadas a proyectos. Estas respondieron a necesidades identificadas entre diversos actores (TNC, INIFAP, CONANP) y se utilizaron materiales adaptados al contexto, intercambios de experiencias (incluso internacionales) partiendo de las ideas de la comunidad y complementando con capacitación técnica.

Enfoque sistémico

En el caso de Lagartero, donde se impulsó la creación de una asociación

civil, se logró, gracias en parte a la creación de la A.C. Lagarteros, tener un enfoque sistémico de la cuenca. El concepto mental de la cuenca como una zona geográfica que es un sistema interconectado logró establecerse bien en ese momento.

Capacitación práctica, adaptada a los usuarios y participativa

Los usuarios entrevistados hicieron saber que las capacitaciones les resultan mas atractivas y exitosas cuando éstas son dinámicas, adaptadas a su contexto, donde se aprende a partir de la práctica demostrativa, se utiliza un lenguaje sencillo y que motivan la participación de mucha gente; los resultados son mejores. Por ejemplo, cursos en torno a establecimiento de sistemas agroforestales de Pronatura, cursos de manejo de cuencas de INIFAP. En cuanto a las prácticas demostrativas, algunos usuarios destacaron, por ejemplo, la construcción de presas filtrantes, resaltando el hecho de que es muy satisfactorio ver que lo que se les enseño está funcionando (ya no hay retención, ya no siguió escarvando el suelo porque las barrancas estan parejas).

Involucramiento en proyectos mediante el empleo

Algunos proyectos generan empleos en las comunidades, están mediados por la idea de trabajo, lo que genera compromiso de parte de los usuarios. Esto rompe de alguna manera con la idea de que “el gobierno debe resolver los problemas” y pone fin a la ilusión de que el que llega con un nuevo proyecto “dará dinero”. A partir de la mediación del trabajo, la idea es que todos aporten algo a cambio de un beneficio común.

Debilidades

Falta de participación de la comunidad en los programas

Algunos programas incluyen de manera formal (Pronatura) o informal (INIFAP, CONANP) temas de sensibilización de usuarios en cuanto a la importancia del buen manejo de la cuenca. De manera general, la sensibilización mas efectiva pasa por la relación que las instituciones capacitadoras establecen entre el buen manejo de la cuenca y enfermedades, catástrofes, muertes, etc. Sin embargo, el desinterés o pasividad de la comunidad sigue siendo una preocupación a nivel de técnicos y gerentes ya que se constata una baja participación de usuarios en los proyectos implementados a través del comité de cuenca.

Cabe destacar que el hecho de que los usuarios no tengan interés de participar en programas de capacitación no significa que no estén sensibilizados en relación a la problemática ambiental. Esta situación podría ser más bien una consecuencia de una metodología inadecuada, que no

toma en cuenta la realidad local, y que se enfoca en querer transmitir conocimientos de manera unidireccional.

Falta de coordinación institucional

No existe un programa para el desarrollo de capacidades sobre el manejo integral y sostenible de recursos naturales con enfoque de cuencas (López, 2009). A excepción de algunos casos, existen programas con enfoques e intereses diversos, lo que genera confusión y desconfianza entre los receptores. Esto se debe a que los intereses son difíciles de compatibilizar entre instituciones y en consecuencia, la información no fluye (López, 2009).

Otro factor que obstaculiza la posibilidad de coordinación entre diversas organiazaciones, son los tiempos institucionales. En el caso de las universidades, por ejemplo, la gestión de cualquier intervención debe pasar por todo un proceso burocrático que es difícil alinear con las dinámicas de la comunidad y los planes de las organizaciones sociales.

No tomar en cuenta las necesidades de la comunidad

Como se dijo anteriormente, la falta de adecuación de proyectos a las demandas de los usuarios, pone de manera inmediata a estos últimos en la posición de actores pasivos, de recipientes vacíos que deben ser llenados con ideas sobre la conservación para que dejen de destruir ecosistemas y adhieran a la causa de la conservación (Pujadas, 2007). En efecto. Algunos temas son incluídos en programas de capacitación solamente por que el donante está interesado en su aplicación, pero éstos no son una necesidad para los capacitados o al menos no lo identifican como algo prioritario (TNC, 2009). En otros casos, las prioridades institucionales no coinciden con las detectadas en las microcuencas (López, 2009). Un ejemplo de esto es que hay cursos dirigidos a todo el grupo de técnicos en comités de cuenca mientras que cada técnico -cuando hay varios- está especializado en temas diferentes; los cursos ofrecidos no tienen en cuenta esta variedad. Otra inadecuación puede ser el hecho de que algunas capacitaciones no son *in situ*, es decir que se desarrollan en las cabeceras municipales, lo que obliga a los usuarios de las comunidades a desplazarse a costa de su propio dinero (Thomas, 2009).

Herramientas inadecuadas

Algunas herramientas son demasiado elevadas para los CCs. De manera general, no se utilizan manuales de mejores prácticas, como por ejemplo ganadería sustentable, manejo integrado de fuego y plan de uso público en las áreas naturales protegidas.

Insuficiencia de técnicos capacitados en el campo

No se cuenta con un número suficiente de biólogos, geógrafos,

agroecologistas trabajando en campo (Thomas, 2009). Esto podría ser debido a que el número de técnicos capacitados en México es muy reducido para la demanda que hay (Pronatura, 2009), o debido a que los técnicos que cumplen con el perfil necesario para trabajar en los CC, no encuentran atractiva esta oferta de trabajo.

Estrategias poco claras para la construcción de capacidades

No hay un modelo claro de intervención en la construcción de capacidades. Una de las causas de la infectividad de la capacitación puede ser atribuída a la inclusión de un caudal máximo de información en cursos de curación corta. Esto puede provocar que los capacitados finalicen sin haber realmente comprendido los contenidos facilitados. Este puede ser el caso de las capacitaciones recibidas por usuarios, técnicos y gerentes en cuestiones de PSA o venta de bonos de carbono, dado que aquellos que fueron entrevistados manifestaron sus dudas en la comprensión de lo que esto significa. Un ejemplo de esto es la capacitación ofrecida por CONAFOR. El esquema de contratar a técnicos para que distribuyan el recurso de PSA y den información báscia no es suficiente.

V. FACTORES CONTEXTUALES

A continuación se describen algunos factores contextuales que van más allá de las inciativas para el fortalecimiento de capacidades de los integrantes de los CC. Se considera importante mencionalos puesto que influyen de manera directa, ya sea positiva o negativamente, en el éxito de una estrategia de capacitación. Es evidente que muchos de los elementos que se mencionan no podrán cambiarse fácilmente dada nuestra realidad política, económica y social, por lo que, en la sección de recomendaciones, se proponen algunas estrategias para abordarlos o aminorar su impacto en los procesos de construcción de capacidades.

a. Facilitadores

Acompañamiento institucional

Tanto en los comités visitados, como en las investigaciones hechas con anterioridad, se observó que la presencia de diversas instituciones sociales, gubernamentales y/o académicas en el CC, hacen que éste tenga avances más significativos. La creación de un grupo técnico interinstitucional como organismo auxiliar del CC, el establecimiento de convenios interinstitucionales y la creación de redes de apoyo científico y tecnológico, son ejemplos de esto.

Elaboración de un diagnóstico y un plan de manejo de cuenca con la colaboración de la comunidad

El hecho de haber elaborado un plan de conservación de la cuenca, como fue el caso de Lagartero, es algo que ayuda a desarrollar visión común entre los integrantes del CC. Una vez que existe un plan, con objetivos estratégicos claros, los intereses de los diversos actores pueden alinearse. Esto también permite llevar a cabo un proceso de consulta sobre las necesidades de capacitación más enfocado y concreto. Además, si se elaboran planes participativos que manifiesten lo que los usuarios quieren, será más fácil lograr su involucramiento.

Capacidad de coordinación del CC

Aquellos comités que procuran tener reuniones frecuentes, dan seguimiento a los acuerdos de las reuniones y cuentan con un equipo técnico integrado, tienen mayores posibilidades de éxito. Al contar con bases organizativas firmes, se facilita el cumplimiento de sus objetivos.

b. Obstaculizadores

Rol de la presidencia municipal

El esquema que impulsa CONAGUA le atribuye la máxima jerarquía a los presidentes municipales, deja sin mucho margen de oportunidad para la toma de decisiones a los integrantes del comité. Esto significa que cada tres años el comité de cuenca sufre cambios en su personal, lo que tiene consecuencias importantes en la continuidad de las acciones implementadas y, sobre todo, en la capacitación del personal. En efecto, si los técnicos y gerentes son capacitados para cumplir adecuadamente sus funciones, ésta queda obsoleta en caso de que éstos seas reemplazados y se debe iniciar un nuevo proceso de capacitación con los que los reemplazarán. De esta manera, en la práctica, el comité de cuenca esta supeditado a la voluntad del presidente municipal. Aunque el apoyo de la presidencia municipal, por su influencia en las dinámicas locales y su condición de financiador, es necesaria, no hay una norma oficial que equilibre poderes entre presidente municipal y usuarios (Hernandez, 2009). Un fortalecimiento del marco legal existente tendría posibilidades de asegurar una cierta continuidad en el fortalecimiento de los comités de cuenca.

Falta de coordinación entre instituciones

Se constata de manera general una falta de integración efectiva y construcción de una visión integral entre instituciones de apoyo a comités de cuenca. Los intereses de algunas instituciones gubernamentales y de la sociedad civil están fragmentados y por lo tanto se promueven soluciones aisladas. En muchas ocasiones se tratan los problemas de forma parcial, como un rompecabezas que no embona (López, 2009).

A nivel local, la limitada participación de presidencias municipales en los CC es

notable. También se da un funcionamiento desarticulado de los organos de planeación local, debido a que estos son numerosos, lo cual se presta a la burocracia, confusión y conflicto de intereses. La consecuencia es una falta de apropiación de la problemática (no visualizarla como propia) a nivel municipal.

Falta de mecanismos eficientes para la sostenibilidad

En lo que se refiere a recursos económicos, los comités de cuenca son financiados por la presidencia municipal y por la Conagua, pero estos recursos resultan a veces insuficientes para ofrecer una capacitación adecuada a los tres niveles (gerentes, técnicos, usuarios). En algunos casos, para paliar la falta de recursos económicos, se han explorado varias posibilidades con el fin de crear una figura legal que permita al comité de cuenca gestionar fondos. La posibilidad de crear una Asociación Civil se ha concretado en algunos comités de cuenca, obteniendo resultados muy favorables en el caso de Lagartero. Sin embargo, ésta AC se disoció del comité de cuenca -al momento del cambio de trienio- y se creó una nueva recientemente, aunque no se ha logrado crear alianzas fuertes entre ésta y el comité de cuenca.

En el pasado, muchos CC contaron con el respado de FIRCO para la elaboración de sus planes y la ejecución de sus proyectos. Cuando FIRCO dejó de implementar el Programa Nacional de Microcuencas, esos planes y proyectos dejaron de funcionar.

Falta de adaptación al contexto

Uno de los factores mas notables en la falta de participación, en el contexto de los comités de cuenca, es la falta de alternativas a los usuarios para fomentar prácticas productivas sustentables. Algunos usuarios no están interesados en participar en proyectos de conservación o restauración porque eso les implica dejar de llevar a cabo actividades productivas que aseguran su subsistencia económica. Los usuarios necesitan pasar por un proceso de análisis sobre su realidad, tomando en cuenta sus saberes tradicionales, para decidir en qué tipo de proyectos involucrase. Si esto no ocurre, la tendencia es a adoptar una actitud clientelar, aceptando solamente lo que se les ofrece.

La falta de adecuación al contexto de los usuarios es evidente sobre todo en la incapacidad de presentar alternativas económicas de parte de las instituciones que se ocupan de fomentar prácticas ambientalmente amigables y la falta de sensibilidad de los organismos de apoyo para integrar los saberes, costumbres e intereses de la comunidad en la implementación de proyectos.

Falta de entendimiento integral

Se constata una falta de comprensión de fondo de cuestiones como el manejo integral de cuenca, los programas de PSA y los mercados voluntarios. Los usuarios, técnicos y gerentes entrevistados no tienen claridad o conocen la noción de mercados voluntarios, ni los acuerdos internacionales que los

respaldan. Los PSA se entienden como un intercambio monetario por cuidar el bosque, pero no se comprende el trasfondo del sistema.

Incentivos inadecuados

Hasta hoy, los incentivos para lograr que los usuarios se involucren en un mejor manejo de la cuenca no han sido efectivos. En lo concerniente a PSA, los programas tienen un impacto a corto plazo y pueden generar una dependencia económica (Pronatura, 2009). Esto significa que, gracias al programa, los usuarios no desarrollan una consciencia de si es importante o no conservar, sino que lo ven como un apoyo económico.

Falta de indicadores de impacto

No existe hoy una cuenca en donde mostrar impactos significativos de su manejo con participación social, visión intersectorial y financiamiento de largo plazo (López, 2009). El impacto depende en mucho de una estrategia más amplia que le de seguimiento y soporte a mediano plazo al fortalecimiento de capacidades locales para la autogestión. Para lograr esto se necesita dar seguimiento permanente a los proyectos que se llevan a cabo en la cuenca y esta tarea demanda la implementación de nuevos mecanismos.

VI. RECOMENDACIONES

Esta sección consiste de una serie de propuestas para mejorar las estrategias de capacitacion disponibles, con el fin de abordar de manera más directa las necesidades de capacitación de los CC. Se presenta primero la necesidad detectada y posteriormente se hacen propuestas de acción concretas para lograr dicho objetivo.

Para contar con un plan de capacitación completo y adecuado al CC…

Primero que nada, las funciones y responsabilidades de cada uno de los integrantes del CC (gerentes, técnicos y usuarios) necesitan definirse claramente. Esto es indispensable para determinar qué capacidades requiere fortalecer cada uno. Una vez que esto se tiene claro, se puede construir una propuesta metodológica diferenciada de construcción de capacidades destinada a cada uno públicos meta.

Por otro lado, a partir plan de trabajo del CC, puede hacerse una lista de las tareas que requieren desempeñarse para alcanzar las metas del CC. Posteriormente puede hacerse un análisis del grado en que cada integrante del comité cuenta con las capacidades que se requieren para desempeñar las tareas.

Otra alternativa sería llevar a cabo un diagnóstico de necesidades de capacitación al inicio de cada trienio, pues históricamente, es el momento en el

que se integran nuevas personas al CC, y por lo tanto es un buen momento para definir un plan de fortalecimiento de las capacidades individuales.

Una vez que se conocen las necesidades del CC, puede definirse una agenda de fortalecimiento de capacidades desde el comité. Esto ayudaría a que el comité se responsabilice y se comprometa más con su proceso de capacitación, y no dependa de que las organizaciones de apoyo lleguen a él.

Para garantizar una capacitación continua…

Es necesario que las instituciones capacitadoras interesadas en el buen funcionamiento del CC se comprometan con la formación permanente de los miembros del CC. Esto puede hacerse mediante un seguimiento constante a la agenda definida por el CC. De esta manera, el funcionamiento del CC se vería menos afectado por los cambios de gobierno.

Por otra parte, la implementación de programas como el Servicio Civil de Carrera, podría ayudar a ver como algo redituable la inversion de recursos para el desarrollo de capacidades en una persona, dado que el riesgo de que se den cambios frecuentes en el personal es menor.

Para mejorar el acceso de los integrantes del CC a la oferta educativa…

Aunque la oferta educativa es extensa en el nivel especializado, existen dificultades para que los técnicos y gerentes accedan a ella. Se recomienda, para que los técnicos puedan acceder a estos programas, hacer esfuerzos en ambos sentidos (ofertante y demandante). Por un lado, se propone que una instancia de apoyo tome el papel de integrar la información sobre los programas de capacitación y materiales existentes con el fin de hacerla llegar a los CC de manera continua. Por otro lado se requiere implementar, desde el CC, un sistema efectivo para empatar la información recibida con las necesidades de capacitación identificadas. Esto podría hacerse mediante la designación de una persona responsable de esta tarea en el CC.

Para incrementar la participación social de los usuarios…

La apropiación de los proyectos así como su continuidad, y por ende la construcción de capacidades locales, se ven seriamente afectados por la falta de participación social. Para contrarrestar esto, se recomienda en primer lugar, crear desde el CC un mecanismo formal de atención a las demandas de los usuarios. Esto se podría lograr a través de la visita regular de la persona responsable de capacitación del CC a las comunidades que están en su jurisdicción con el objetivo expreso de recoger estas demandas e integrarlas al

plan de fortalecimiento de capacidades.

Un factor indispensable es la sensibilización de los usuarios desde los usuarios. Para esto podrían identificarse algunas personas de la comunidad que tienen consciencia de las problemáticas ligadas al funcionamiento de la cuenca y pueden fungir como promotores de la reflexión colectiva y participación social.

Otro elemento fundamental para lograr mayor participación de los usuarios es la capacidad de los técnicos y gerentes para promoverla. Esto significa que las personas que juegan dichos roles necesitan una formación metodológica sólida en procesos organizativos y didácticos que generen los resultados esperados.

Para mejorar la efectividad de los programas…

En todos los programas de capacitación, así como manuales y materiales dirigidos a usuarios, técnicos y gerentes, es necesario revisar el vocabulario empleado para hacerlo acorde a los niveles y perspectivas de cada uno de estos públicos. Los materiales utilizados por AMBIO son un ejemplo de lenguaje adaptado a los usuarios.

Un elemento central es la utilización de herramientas empíricas en los procesos de construcción de capacidades. Esto permite a los participantes, aprender a partir de la práctica (aprender haciendo) y lograr una asimilación más efectiva de los conocimientos o capacidades que se pretenden adquirir. Ejemplo de esto son las herramientas que se han utilizado en Zanatenco y Lagartero para la construcción de presas filtrantes.

Para que los procesos sean significativos para la gente…

Es indispensable que las estrategias de capacitación partan, tanto de los conocimientos, como de los intereses de los usuarios. De esta manera se podrá facilitar la apropiación de los contenidos, puesto que se parte de una base de conocimientos previos que serán optimizados. Además, al partir de una motivación intrínseca, habría una mayor disposición hacia la participación en el proceso de aprendizaje. Esto permite a las personas ver la capacitación como la continuación de un proceso en marcha, en vez de como algo completamente nuevo y ajeno.

Para lograr una visión integral…

En algunos CC se realizan visitas organizadas de la cuenca destinadas a dar a conocer a autoridades las dinámicas de funcionamiento de la cuenca, así como las causas y consecuencias del mal manejo de la cuenca. Estas visitas han sido

también destinadas a usuarios de las partes alta, media y baja de la cuenca con el objetivo de poner en evidencia la manera en las que las acciones de cada uno afectan a los otros. Estos espacios generan dinámicas de comprensión integral del manejo de la cuenca al mismo tiempo que pueden disparar procesos de involucramiento de parte de estos actores al ver las consecuencias de sus propias acciones. Estas visitas son altamente recomendadas con el objetivo de lograr una mayor implicación y participación de diferentes actores en el buen manejo de la cuenca.

Es importante que todas las organizaciones de apoyo involucradas en las cosntrucción de capacidades adopten en sus programas de capacitación una vision sistémica de la cuenca. Esto facilitaría el trabajo con los diferentes públicos meta en lo que se refiere a su comprensión de los intereses diversos involucrados en el manejo de la cuenca.

Otra posiblidad sería usar “temas unificadores” como puntos de partida para la capacitación y el análisis. Analizar un problema (ej. desastres naturales) desde los diversos factores que le dieron origen, ayuda a que los integrantes del CC entiendan un problema y sera más fácil que decidan resolverlo con enfoque integral.

Para evitar que los esfuerzos de capacitación estén fragmentados…

El problema de una capacitación repetitiva y dispersa se genera cuando llegan múltiples instituciones con intereses diversos, sería útil para mejorar esta situación, la recomendación antes mencionada de establecer una agenda de capacitación desde el comité y a partir de ésta solicitar el apoyo de las instituciones pertinentes.

Además, para evitar que los esfuerzos de capacitación sean aislados o contradictorios, se recomienda que las instituciones que ofrecen capacitación hagan un esfuerzo por integrar sus enfoques y contenidos. Esto les permitiriá trabajar por un objetivo común, y ser más estratégicos y efectivos en cada una de sus acciones.

Una posibilidad que se vuelve factible a raíz de este proyecto, es la de contar con un órgano rector que se encarga del fortalecimiento de capacidades en los CC. Las funciones de este órgano rector serían: 1) identificar la demanda de capacitación de los CC y ligarla a la oferta, 2) mejorar la oferta en relación a la demanda existentes y a los métodos idóneos, 3) asegurar una capacitación continua y 4) identificar o desarrollar materiales educativos adecuados. Lo ideal sería que este órgano rector consista de una persona que pertenezca a una institución de gobierno.

Otra cuestión que podría asegurar un esfuerzo más integrado para el fortalecimiento de los CCs, sería incluir en la capacitación a los funcionarios y

consejos locales.

Para asegurar la disponibilidad de recursos para la capacitación…

Una de las causas de la ausencia de capacitación adecuada en los CC es la falta de recursos económicos. En respuesta a este problema, algunos CC crearon Asociaciones Civiles (AC). Esta figura legal puede ser integrada en el seno del CC con el objetivo de generar fondos y, al mismo tiempo de generar mas participación social. Se recomienda retomar la experiencia del CC de Lagartero para la implementación de esta figura.

Para garantizar la comprensión de conocimientos básicos…

Una oportunidad que surge a raíz de este proyecto, el cual busca integrar esfuerzos para la conservación de los servicios ecosistémicos y biodiversidad, es la definición de una curricula básica para los CC de la region a partir de dicho objetivo. Es importante que en este proceso participen el conjunto de organizaciones involucradas, para asegurar que la currícula sea completa y acertada.

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