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Ministry for Environment and Natural Resources

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Sustainable Land Management in Drought Prone Areas of Nicaragua
PIMS 3008

Summary

Land degradation in Nicaragua's drylands affects 80% of the nations population and limits the potential to develop sustainable livelihoods in the poorest areas of Nicaragua. A sustainable economy is needed to provide the country with the majority of its needs for beef, corn, beans, and sorghum. Severe land degradation has reduced production to almost half of traditional levels with declining productivity in sight. Erosion of topsoil, loss of fertility, and deforestation contribute to global warming, biodiversity loss, and reduce the infiltration of fresh water while altering the structure and integrity of local ecosystems. Those phenomena are exacerbated by inappropriate land use and damaging agriculture and grazing practices. The national and local efforts of the Nicaraguan government to reverse the trend through political and institutional actions have not translated into on-the-ground action due to persistent political, technical, and financial barriers that impede the effectiveness of the baseline efforts to improve the environment and livelihoods of the residents of the drylands.

UNDP together with the Ministry for Environment and Natural Resources (MARENA) propose a GEF Full Size project that will complement the national and local efforts by mainstreaming SLM concerns into policies, developing local and national capacities, harmonizing SLM into poverty reduction programs, and developing the sustainable financing necessary to promote long-term sustainable land management and assure the environmental services needed to reduce poverty.

The outcomes of the project, once completed will mitigate the causes and negative effects of land degradation and as a result strengthen the integrity, stability, functions and services of the ecosystem upon which local residents depend for their livelihoods, thus qualifying in the #15 GEF operational program within SLM-2 with elements of SLM-1. It will do so through: i) creating policies at the national level and capacity, policy, and mechanisms at the local level to mainstream SLM into national and municipal development plans, ii) development of National and local capacities to plan and implement SLM programs, iii) harmonize SLM into economic development packages at the national and local level, iv) developing sustainable financial programs and mechanisms to finance SLM and local structures to support SLM, and v) though investments in the project's management system, in inter-institutional coordination mechanisms and in training to implement SLM. The project hopes to introduce sustainable land use in at least 22,500 ha and indirectly in 100,000 ha during the life of the project.

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ACRONYMS

To aid in translation and facilitate understanding between languages, acronyms are presented in their Spanish language equivalent accompanied by English language descriptions.

APR	Annual Project Reports
AECI	Spanish Agency for International Cooperation
AFRD	Forest and Agricultural Rural Development Strategy
AMULEON	Association of Municipalities of North Leon
AMUNORCHI	Association of Municipalities of North Chinandega
BID	Inter-American Development Bank
BM	World Bank
CDM	Municipal Development Committee
CAM	Municipal Environment Commission
CCF	Country Cooperation Framework
COSUDE	Swiss Development Cooperation Authority
CSD	Sector Commission on Decentralization
CNP	National Project Coordinator
DANIDA	Danish Agency for International Development
DNP	National Project Director
ERCERP	National Strategy for Economic Growth and Poverty Reduction
EDERP	Productive Rural Development Strategy
EMS	Drought Management Strategy
ENB	Biodiversity National Strategy
FAITAN	Farming and Forestry Research Technical Support Fund in Nicaragua
FAO	Food and Agriculture Organization
FAT	Technical Assistance Fund
FUNICA	Foundation for the Technological Development of Agriculture, Livestock and Forestry
FONDECA	Rural Development Fund
FOPEN	Competitive Fund for Business and Employment Financing
FONDEPOL	Rural Political Development Fund
FSP	Full Size Project
GEF	Global Environment Facility
GN	Government of Nicaragua
GVTT	Generation, Validation and Technology Transfer
HIPC	Highly Indebted Poor Countries Initiative
IDR	Rural Development Institute
IFAD	International Fund for Agricultural Development
IDH	Human Development Report
INAFOR	Forest National Institute
INATEC	Technological National Institute
INEC	Nicaraguan Institute of Statistical and Census
INETER	Nicaraguan Institute of Territorial Studies
INIFOM	Nicaraguan Institute for Municipal Development
INTA	Nicaraguan Institute for Farming Technology
IR	Inception Report
MAGFOR	Agricultural and Forestry Ministry
MARENA	Ministry of Environment and Natural Resources
MDC	Municipal Development Committees

MED	Ministry of Education
MINREX	Ministry of External Relations
M&E	Monitoring and Evaluation
MFU	Municipal Financial Unit
MTR	Mid-term Review
NAP	National Action Plan to Combat Desertification and Drought
NC	National Coordinator
NGO	Non-Governmental Organization
NPC	National Project Coordinator
NEX	National Execution
OTR	Office for Rural Titling
ONDL	National Office of Climatic Change and Clean Development
OP-15	Operational Programme #15- GEF
PASOLAC	Programme for Sustainable Agriculture on Hillsides in Central America.
PDF-B	Project Development Facility
PCC	Project Coordination Committee
PcaC	Farmer to Farmer Programme
PESA	Special Programme for Food Security
PANIC	Nicaragua Environmental Plan
PRODEP	Programme for Property Regulation
PRODESEC	Economical Development Programme of Nicaragua's Dry Region
PRONOT	National Programme for Land Use Planning
POTEM	Municipal Territorial Organization Plan
PROCHILEON	Development Projector of Chinandega - León
PDM	Municipal Development Plan
PND	National Plan of Development
PROSESUR	South Dry Zone Project
SIG	Geographic Information System
SLM	Sustainable Land Management
TROPISEC	Capitalization Program for Small Producers of the Dry Tropics
TA	Technical Assistant
UA	Municipal Environmental Unit
UTM	Municipal Technical Unit
UMGF	Municipal Units of Financial Conduct
UCA	Central American University
UNA	Universidad Nacional Agraria
UNAG	National Union of Farmers
UNDP	United Nations Development Programme
UNAG	Unión Nacional de Agricultores y Ganaderos
UNCBD	United Nations Convention for Biodiversity Development
UNCCD	United Nations Convention to Combat Desertification
WFP	World Food Program

SECTION I: ELABORATION OF THE NARRATIVE

PART I. Situation Analysis

Context and Global Importance

1. Nicaragua is the second poorest country in Latin America with half of its 5 million inhabitants living in poverty. It is also the largest country in Central America with over 130,000 km^2 with a rich biological endowment. The nation is home to 78 distinct terrestrial and aquatic ecosystems[1] and to over 7% of the world's flora and fauna[2]. Nicaragua depends heavily on the ecosystem services such as the productivity of the soils and water resources provided by the dry forest ecosystems (broadleaf dry forest, semi-deciduous, pine forests, and tropical savannahs) for economic development and to sustain the livelihoods of the regions poor. Over 80% of Nicaragua's population (116 of 156 municipalities) is concentrated into the dry region. The region is characterized by fertile volcanic soils with high agricultural, livestock, and forestry potential. Dryland agricultural production supports the nation by providing over 60% of the nation's employment and 55.8% of total exports; in addition to producing 49% of the nation's beans, 33% of corn, 100% of the national production of sorghum, and 80% of the nation's beef.

2. Nicaragua's dry zone is part of the Central American "drought corridor," an extensive area that is characterized by moderately low rainfall and an extended dry season. The country's dry lands are located in the north-central and pacific regions of Nicaragua occupying 36% of the total land surface of the nation. The Pacific region, occupying approximately 30% (15,000 Km^2.) of the area, has gentle slopes (0-20%) while the central-north area, occupying approximately 70% (26,000 Km^2), is characterized by steep topography with slopes above 50%. The annual rainfall regime ranges from 800 to 1200 mm. However, with only 2% of the area being irrigated, the uneven distribution of the rainfall results in a 6-month dry season that severely limits agricultural potential.

3. The issue of desertification is extremely important for the residents of the drylands. The Universidad Centroamericana (UCA)[3], estimates that the territory is at risk of desertification. Similarly, the National Action Plan (NAP) has prioritized a 15,000 km^2 area of the region as "high risk." The Socioeconomic and Environmental Diagnostic Study conducted as part of the PDF-B activities indicates that "rural poverty in the target area has increased as a consequence of the natural phenomena that have affected the region". El Niño and the subsequent drought caused the loss of grain harvests in consecutive crop cycles as well as the near disappearance of surface water and accessible groundwater resources. El Nino was followed by Hurricane Mitch that destroyed cattle stocks and natural resources such as loss of forest, inundations, and accelerated erosion of topsoil beyond the already high levels. During the worst drought registered in the region, the World Food Program calculated that 1.5 Million small producers were directly affected by crop and livestock losses due to lack of rainfall. The vicious cycle of poverty in rural Nicaragua, according to FAO's Food Security Programme (PESA), reveals that the municipalities that are most vulnerable to drought depend directly on ecosystem services, which are paradoxically vulnerable to human activities in response to drought and poverty. The small farmers of the region confront the greatest vulnerability due to the effects of drought[4].

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[1] MARENA, Estrategia Nacional de Biodiversidad, 2001.
[2] TWSC,1990. Incluido en la Primera Comunicación Nacional ante la UNCCC, Marzo 2001.
[3] "Caracterización Agro-socio-económica de La Zona Seca de Nicaragua", 2002.
[4] "Estudio País sobre Desertificación en Nicaragua", MARENA, 1999

4. To recover from losses caused by drought, the regions farmers adopt more vigorous and exploitative production strategies. Traditional farming practices adopted by farmers to avoid risk and minimize costs ultimately lead to over-utilization and degradation of the land with respect to its bio-physical characteristics and productive capacity. Geographic information for the area compiled by the Ministry for Agriculture and Forestry (MAGFOR) indicates that over 50% of the drylands are over-exploited and are being managed with unsustainable practices that cause severe land degradation and threaten ecosystem stability and function. To maximize production within the short period of rainfall, Farmers rely on extensive production strategies, such as migratory farming or open grazing, or invasion of forests for sale of wood products to generate secondary income; and on traditional practices, such as burning, hillside tillage, or uncontrolled, unmanaged extractions of wood from remaining forests. Producers have no access to credit institutions or facilities, limited access to reliable markets, and no access to information about new technologies. Switching production to lower risk and more secure options, such as livestock or more extensive migratory agriculture, has led to a decline in forest cover and soil productivity, both proxy indicators for ecosystem stability and function.

5. The municipalities most affected by drought are those with precipitation at or below 800 mm of rainfall/year. They also present the most critical social conditions and the most advanced stages of soil degradation and drought vulnerability, suffering directly from the effects of El Niño[5]. From this group a target area of 7 municipalities were selected as sites for the implementation of a full GEF land degradation initiative. The selection was based on criteria such as water recharge potential, physical access, and were identified as areas that contribute to the environmental degradation of Lake Managua, Estero Real (an important Pacific estuary), and the San Juan river. The selected municipalities are strategically important to the counterparts enlisted for this project. In addition, the area is prioritized within the country's National Development Plan, the National Poverty Reduction Strategy (ERCERP) and the National Environmental Action Plan (PANic).

6. The target area, which covers 2,693 Km^2, is among the poorest in Nicaragua, where the percentage of rural poor living in extreme poverty ranges from 83.5% to 97.1%[6]. The agriculture sector is characterized by small farmers (50% of farms with less than 3.5 Ha.) and mid-size farmers (30% between 3.5 and 17.5 Ha) with small ranching (between 14 and 70 Ha[7].) practicing subsistence agriculture (37%), livestock management, (43%) and mixed agriculture and livestock (20%). Over 50% of the properties lack legal documentation affecting almost 80% of the areas farmers. The families demonstrate a high illiteracy rate (30%) and poor nutrition and state of health, as witnessed by a high infant mortality rate 9%[8]. Also within that area, migratory agriculture and expansion of pastures have reduced forest cover to only 6% leading to a rate of soil erosion estimated at 150-300 t/Ha./year. Significant declines in agricultural yields indicate a loss of soil productivity and thus reduced ecosystem productivity. Corn production has diminished by 62%, beans by 50%, millet by 62% and pasture biomass production by 50% indicating a decline in productive capacity and thus sustainable livelihoods. This decline in productivity has taken place over the last 50 years. It is also estimated that infiltration of water has diminished 50-60%[9]. It is estimated that 77% of the lands in the target municipalities are over exploited[10]

[5] MAGFOR, 2002 Estrategia para el Manejo de la Sequía
[6] INEC, 1999
[7] :Diagnostico Socioeconómico y Ambiental en 7 Municipios propensos a sequía en Nicaragua", MARENA-PNUD-GEF, 2005
[8] "Agenda de Políticas del Sector Agropecuario y Forestal", MAGFOR, 2002.
[9] Zee, J.J.Van der et al, Identificación de opciones productivas y manejo eco-sostenible de 6 Municipios de Norte de Chinandega, 2002.
[10] Análisis del Impacto Existente y Potencial del Sector Ganadero en 7 Municipios propensos a sequía en Nicaragua, MARENA-PNUD-GEF, 2005. Note that the term "over exploitation" does not refer to carrying capacity.

7. At the national level, the policy environment is fragmented leading to overlapping and conflicting policies and mandates, and incentives for activities not consistent with the sustainable management of the land base. The national context is not conducive to sustainable land management as described in "barriers" (section I part II). The environment is characterized by policy constraints, capacity gaps between the national and local levels, poverty development initiatives that are not responsive to SLM, and financial constraints at all levels.

8. As the productive environment declines, global values are threatened. According to the Nicaragua's First Communication to the UNCCD, the conversion of forest to agriculture and range activities and the extraction of firewood increase atmospheric CO_2 directly through the burning of firewood and debris, decomposition of organic matter, and future increases through the permanent reduction of carbon sinks. The unplanned expansion of the ranching sector also translates into an increase in CH_4 and CO_2 through the decomposition of manures and through burning of pastures. The mentioned factors contribute to global warming, which creates more uncertainty for the farmers, leading to a vicious spiral of unpredictable and unsustainable livelihoods ending in environmental degradation that further reduces environmental benefits and vice verse.

9. The problem to be solved relates to the United Nations Development Assistance Framework (UNDAF) within the "Social and environmental sustainability" category through the promotion of policies of land use planning, with an integrated and cross-sector approach and the reduction of environmental vulnerability through the promotion of practices for sustainable natural resource use. The problem to be addressed related to the UNDP Country Cooperation Framework (CCF) within the area of "environment and energy" through the integration of environmental policies into national and local development plans, the validation of innovative experiences of conservation and sustainable natural resource use; and the strengthening of local capacities to combat desertification processes and to mitigate the effects of drought in critical areas.

10. The problem to be solved by the project is (see Problem Analysis in Section IV: Part IV) *"the degradation of soils and loss of forest cover contributes to a reduction in global benefits, ecosystem resilience, and stability, which negatively impacts on the development of the local economy and the sustainable livelihoods of the local population. The reduction in agricultural and livestock production, loss of local forest cover, limited access to land and capital, lack of economic opportunities, and the resulting vulnerability to climatic events results from and contributes to the reciprocal process of land degradation and poverty".*

Threats, Root Causes and Barriers Analysis

11. The problems presented pose 2 principal threats to the stability and function of the ecosystem and to the sustainable livelihoods of those that depend directly on ecosystem services and functions. The first refers to the application of unsustainable production practices and systems and the second is the over-utilization of the land with respect to its bio-physical capacity.

12. In the former case, productive activities such as agriculture, livestock production, and commercialization of firewood compromise the stability of the ecosystem by altering its structure and function through the following[11]:

[11] "Diagnostico Socioeconómico y Ambiental en 7 Municipios Propensos a Sequía en Nicaragua", MARENA-PNUD-GEF, 2005"

- Uncontrolled burning in agriculture and livestock management: Farmers burn during field preparation to eliminate large woody debris and to take advantage of potassium released (potash) released after burning. Burning is so frequent that organic matter cannot accumulate in the soil. Ranchers also use fire to renew the vigour of their pastures and to eliminate competition from invading brush. Only 15% of the ranchers practice controlled burning techniques. Agricultural fires result in wildfires affecting large areas of land under recovery. In the departments of Managua, Leon, and Chinandega, an estimated 14,000 Ha./year[12] are burned due to agriculture and livestock.

- Hillside tillage is practiced on steep slopes on soils that are thin and susceptible to erosion. The typical upland agriculture system of corn, beans, and millet involves animal traction with rudimentary planting technology using planting sticks. Soils are ploughed several times during the dry season and lay exposed until the spring rains. Soils are susceptible to the effects of high temperatures and desiccation, leaving them dusty. Given the steep slopes, the local soils (loam and clay loam soils) are easily eroded when exposed to the heavy seasonal rainfalls. Soil conservation measures are practiced on a limited basis: contour ploughing (9% of farmers), contour barriers (7%) and no till farming (2%). Erosion ranges from 150-300 tons/Ha./year and may reach 450 t/Ha./year in the steeper areas.

- Unmanaged Grazing: Approximately 49% of the project area is under grazing systems. The most common are savannah combined with Jicaro (Crescentia alata) and savannah with naturally occurring legume species of trees (Caesalpinia coriaria, C. violacea, Parkinsonia aculeate, etc.) The systems are extensive with one head/Ha. and without management such as pasture rotation or renovation. As a result, pastures degrade lowering the forage output and later reducing soil fertility and forage recovery.

- Monoculture: Producers have practiced monoculture agriculture in the lowland agriculture environment. Rice, sesame seeds, and peanuts are produced as monocultures. Simplification of the agricultural system exposes the soil to loss of organic matter, erosion by rainwater, and overheating for lack of shade during parts of the crop cycle.

- Extraction of firewood: the cutting and sale of firewood is the third most important source of income following agriculture and livestock management and is very common among the population. Firewood is cut and dried for transportation and sale to the cities of Managua, Leon, and Chinandega, where an estimated 15,000 tons/year of firewood are sold. Dried wood is gathered for local consumption that amounts to an estimated 34,000 tons/year.[13]

- Deforestation: Producers remove forest for the sale of wood products fomenting a permanent change to crops and pastures. Unplanned cutting without consciousness of the proper use of the land. The rate of deforestation is estimated at 40,000 ha./year between 1980 and 2002. Presently, 94% (2,532 km2) of the area within the municipalities is deforested.

- Use of agrochemicals: approximately 68% of the areas farmers apply herbicides and almost 60% apply insecticides and pesticides (the commonly used pesticides are Clorpirifos, Carbofuran and Paraquat, none of them considered to be persistent organic pollutants – POPs) without criteria and in detriment to their own health and to that of the environment (loss of beneficial insects, loss of biodiversity, contamination of soils and water, accumulated human health effects.).

13. The *root causes* of the application of unsustainable practices strengthen the producers' tendency towards risk aversion, and ultimately the *status quo*, by making traditional practices appear as the most

[12] NOAA/MARENA estadísticas.
[13] CATIE-PROLENA, 2001. Diagnostico de la Comercialización de la Leña en Nicaragua.

attractive option for small farmers and ranchers (see also Section IV, Part IV). The principal underlying causes are the following:

- Deficient knowledge base with respect to new and indigenous technologies proven to contribute to sustainable land management. Technicians from national agencies, local authorities, and producers have not been exposed to the concept of sustainable land management or to practical and profitable sustainable management ideas and solutions at the local level where decisions on the land base are made.
- Short time horizon. Farmers must recover losses from droughts quickly and do not have the time to experiment with unknown or risky options.
- Limited access to capital. Traditional practices are accessible. Capital is often required in order to change practices or technologies or to compensate for mistakes while learning new practices or technologies.
- Secure access to land. Land tenure is a cross cutting cause for both application of traditional practices and for land use anomalies (described below). In the target area, the majority of the large landowners own their land while the majority of the small landowners (80% of the farmers are farming on less than 3 ha.) do not. (See Section IV, Part IV, table 1). It is common for farmers to rent land to landless farmers. Therefore, farmers with clear title have their land in the possession of persons whose status will preclude them from investing in sustainable land management or stewardship.
- Incentives or targeted investments to promote improved agriculture alternatives are inaccessible to agencies.
- Regulations against damaging practices, such as burning, are rarely enforced. In relation to the burning regulations, there is a generalized lack of knowledge from the local actors and thus a lack of conscience amongst them.
- The national institutions dealing with land degradation, MARENA, MAGFOR, INETER and INTA have their own gender streaming policies but are having internal problems to apply them, especially in the establishment of procedures to incorporate gender equity in their programs and projects. At the municipal, local level, women encounter particular problems to be integrated into the local development processes mainly due to the still prevalent macho culture which is directly related to land degradation. Also, women' lack of access to rural credit services is a strong barrier for the reactivation of productive activities as well as sustainable land management.

14. The second threat relates to the sector aspects and impacts of land use. Within the target area of the project, more than 77% of the total area is considered as "over exploited," meaning that land deemed as appropriate for forest (cover) is being dedicated to alternate production activities which are altering the local ecosystem for lack of sustainable management and conservation practices without regard to the functionality of the ecosystem. The current land use situation is summarized as: livestock management (48.9%) annual crops (13%), permanent and semi-permanent crops (0.6%). Areas not considered "over-exploited" are fallow (23.7%) and forest (6.1%).

15. The root causes (See also section IV, part IV) of land use abnormalities are:

- Land tenure. The majority of the small farmers are not the legal owners of the land, whereas the majority of large landowners are. Land ownership patterns are not uniform, within the target area of the project, concentrations of large landowners with title are found in San Francisco Libre, El Jicaral, and El Sauce, while small holders are more characteristic in Cinco Pinos, San Francisco del Norte, Achuapa, Santa Rosa. Among the farmers, ownership is recognized amongst their piers. It is the lack of security of the land tenure that creates a psychological problem to making

investments in the land. The lack of title in the 50% of the properties creates a technical problem in securing loans for agricultural improvements and an impediment to investing in the land (see paragraph 12 for land rental). Attempts at land reform have led to the sale of land rather than on improvements to the land. Therefore, the issue appears to be the obstacle created by the land tenure situation to securing services or participation in incentive programs.

- Deforestations lead to a change in land use. Following extractions of wood, farmers cultivate deforested areas and cattlemen run livestock into the areas. The demand for beef is increasing relative to the demand for firewood. It is interesting to compare the prices of beef at the national level. In this regard, in 1970 the price of 1 Kg was USD 0.33 and in 2003 the price was USD 0.84/Kg.
- Land degradation is treated with sector approaches without ecological, economic, and social dimensions in the design of local policies.
- Technical and development assistance is implemented without a land use planning framework that would target investments according to the functionality of the land.
- Undeveloped social and human capital to manage land use at the local level
- Fragmented decision-making environment. The municipal agendas are incomplete and do not provide a framework to orient agencies, donors, and investors to the capability of the land.

16. There are four principal barriers that impede the development of actions to address the root causes of the problem: political gaps, institutional capacity gaps, poverty reduction and economic development opportunities not aligned to the functionality of the land, and financial barriers.

Barrier #1: Incomplete political framework to implement SLM at the local level.

17. Nicaragua has an organic natural resources law (Law # 217) and regulation (Legislative decree # 9-96) and a considerable number of national action plans and strategies (see Policy context) that creates a policy framework and priorities for territorial organization, the conservation of biodiversity and the combat of desertification and drought. However, there is a gap between the policies and priorities as defined at the national level and what is actually operational at the local level. Additional legislation is in the draft stages, such as soil conservation act and the territorial planning acts that would provide guidelines and more broad scale authority to municipalities for managing the land base at the local level (see political context, paragraph 32).

18. At the local level, policies and institutional linkages that enable SLM are not developed. To reduce the over-exploitation of the land base without a local political process that would lead to a participatory level and regulatory framework based on appropriate land use at the municipal level[14]. In none of the municipalities has the territorial planning process been subjected to widespread public comment and debate to determine the range of environmentally sound investment options and priorities for a given land use zone. Low levels of awareness and knowledge of SLM and experience in holistic NR planning are all contributing factors to this barrier. Community groups do not have enough knowledge of land use planning to adequately prepare them to dialogue and defend their interests during local level policy debates. Without a participatory political process, it will be impossible to use the geographic information

[14] Análisis del marco legal e institucional del manejo sostenible de la tierra en 7 municipios propensos a sequía en Nicaragua , MARENA-PNUD-GEF, 2005

that is generated as an instrument for the development of local policy (ordinances) and for the creation of incentives for sustainable land-use.

19. The political process in the rural municipalities operates within a multi-level organizational structure that is also an effective vehicle for proposing political solutions to land degradation at the local level (see institutional, sector, and political context). However, the persons operating within that structure require motivation, facilitation, and know-how with regards to the possibilities in land-use planning for that structure to effectively organize their territories, establish ordinances, and respond to community based land-use planning issues. Land use planning is normally met with opposition by the private sector that associate it with centralized command and control rather than an integrated framework for environmentally sound investment and development. Without input, comment, and consensus at the local level, territorial organization will be based on assumptions and run the risk of being rejected by those using the land base.

20. Several of the target municipalities in dry land areas have promoted the formulation of local development plans. In addition several have environmental plans or agendas that treated as separate policies rather than as mainstreamed components of a holistic local development plans. Local development plans backed by the municipal financial structure, whereas the environmental plans are mostly shelved documents without the financial resources needed to carry out those plans.

Barrier #2: Weak Capacity to Implement SLM

21. The capacity barrier that impedes SLM is both organizational and technical in scope and reaches both national and local levels. In the organizational realm, national institutions, such as MARENA are committed to decentralized management, but are hesitant to transfer responsibilities until capable local counterparts can manage that responsibility. National level organizations have difficulty fostering that capacity at the local level. Although they are technically competent at the upper levels, their local-level operational and delivery capacity is limited in infrastructure and budget. Operationally, the national institutions are not designed for grass-roots action. The municipalities, on the other hand, operate within an advanced socio-political scenario (see baseline analysis) with a better delivery capacity based on a network of local committees and representatives. Many of the municipalities have environmental and technical units within the municipal structure, whose role is to provide support to multiple political committees within the municipal governance structure. Those units are also under staffed. Some municipalities do work in a form of commonwealth that enables some degrees of cost-sharing. This concept has not been applied to the environmental units who duplicate functions and as a result, are costly for small municipalities to establish and maintain. This network could complement the structure of the national institutions but does not due to several basic technical factors.

22. Technical capacity problems are most noticeable at the local level, but not limited to local institutions. Knowledge of SLM considerations by representatives of central institutions is a concern and impedes knowledge transfer to local institutions. These local delegates are not prepared to design, follow-up, and evaluate such programs, nor are the equipped for training or for capacity building[15]. In spite of their organizational capacity, the municipalities lack a technical structure and knowledge of territory organization processes and the capacity to design productive activities to the benefit of the environment. The mentioned environmental units are un-trained and un-equipped for that purpose. Only one of the municipalities in the target area (Sauce) has their territory organized and mapped into land use zones. Geographic information is, however, not available in a level of detail that will permit planning at the farm level. The municipal units lack the experience in the interpretation, application, and follow-up within the

[15] Diagnostico de capacidades institucionales municipales en los 7 municipios, MARENA-PNUD-GEF, 2005

context of territorial organization. The majority of the municipalities has a development plan and an environmental agenda. A review of those agendas indicates that SLM is not considered. At all levels within the municipal structure, there is a lack of consciousness or lack of understanding about desertification, the link between productive activities and loss of environmental services, and sustainable land management. This particular knowledge gap creates difficulty in establishing the link between the municipal development plan and the ecosystem functionality. The municipal environmental units are therefore technically ineffective in assisting the political committees in developing an environmental agenda that responds directly to problems that cause the degradation of the municipal land base.

23. Small farmers are particularly vulnerable without adequate knowledge or means to adapt to unpredictable climatic conditions. Local producers have unfortunately not been exposed to appropriate agricultural and livestock management technologies that are adapted to the dry areas and designed to mitigate the effects of drought, such as the dryland agricultural and irrigation technologies of the TROPISEC program whose technologies that won the acclaim of the farmers. These technologies are appropriate and have been validated by Nicaraguan farmers. Lessons such as these have unfortunately not been disseminated throughout the drylands or within the target municipalities. There is no generation, validation, and technology transfer (GVTT) taking place in the communities. The local representation of Nicaraguan Institute for Agriculture Technology (INTA) is not adequately staffed, financed, or trained in the mentioned technologies. They do not have a strategy for identifying promising technologies from within the area that responds to their limitations. During the PDF-B phase, GEF financed the identification of potentially productive local models of production appropriate to various scenarios of ecosystem functionality. Those are discussed on Project Strategy paragraph 62 and in Section IV Part VI. Executive Summary of the Proposed Production Models.

24. The land tenancy issue, when resolved in traditional ways (land titling) does not resolve land degradation. In fact, in Nicaragua, land titling generally leads to the sale of the land and exacerbates campesino migration. The land tenancy issue must be addressed as part of a holistic incentive program for which the municipalities and local organizations lack the structure and experience to respond.

Barrier #3. : Economic development initiatives not oriented to SLM.

25. Economic development packages, specifically, the PESA program (FAO) and the PRODESEC program (IDR with FIDA funds) invest in agricultural and non-agricultural activities, and thus employment and income generation. With no provisions for sustainable land management within the approval system of the loans or strong environmental criteria, it is uncertain that those funds will reduce the pressure on the land base. Funds are approved without a framework to assure that the investment is consistent with the sustainability of the land. For off-farm opportunities, there is not an environmental assessment process to assure environmental sustainability or additional threats to global benefits. Without the territorial zoning provided by the municipalities, the economic stimulus packages cannot be targeted to specific, sustainable investments and run the risk of aggravating land degradation. This barrier also affects the development efforts of private institutions, NGOs, and international development organizations, are also at a disadvantage without an established framework for social and economic investment that is both technically and socially validated with local and scientific input.

Barrier #4: Limited financial resources to promote SLM.

26. At the municipal level, transfers from real estate taxes (IBI) or land-use taxes do not support new or innovative SLM activities. In fact, money derived from contributions, when collected, is barely enough to cover basic service delivery in the poor municipalities. In several of the studies conducted during the PDF-B phase, the theme of sustainable financing has surfaced as the key barrier to taking action on the municipal environmental agendas. Opportunities have been identified that could partially pay for

promotion of SLM at the municipal level, but there are political and social impediments to collecting mandated land taxes. MARENA is mandated with charging for water use. They are however conservative about the collection of water users fees. Domestic water users also do not contribute to the conservation of the ecosystem upon which their services depend. There are very few banks in the area and no micro-credit lending institutions. Without the territorial zoning completed, environmentally sound investments can not be targeted. The area's 25 NGO's are small and are not a force in capturing fresh funds for the fresh resources for social and economic development. Municipalities are closing their environmental units for lack of ability to pay. Meanwhile, none of the municipalities has attempted cost, equipment, or technology sharing that could lower their recurrent costs to a sustainable level.

Institutional, sector and policy context

The Institutional Context

27. Four key state institutions are involved in territorial management at the local and national levels MARENA, MAGFOR, INETER, and INIFOM. The Ministry of Environment and Natural Resources (**MARENA**) formulates, proposes and directs national environmental policies, sets norms and regulates the sustainable use of natural resources, coordinates sector planning and policies for sustainable land use with MAGFOR, and defines the content of environmental education programs. The Ministry of Agriculture and Forestry (**MAGFOR**) formulates agriculture and forestry policies, plans and strategies, formulates ecosystem protection programs that emphasize soil and water conservation in coordination with MARENA, and proposes boundaries for agricultural, forest and agro-forestry development zones. MAGFOR is responsible for overseeing the National Forestry Institute (INAFOR) and the Nicaraguan Agriculture Technology Institute (INTA). The former is in charge of administering compliance with the forest regime, and the latter is responsible for generating, validating, transferring and publicizing agricultural technology. MAGFOR has a Geographical Information System (GIS) for supporting its strategies; however information does not reach farmers in a timely manner due to insufficient operational resources (both human and financial). The mandate of the Nicaraguan Institute for Territorial Studies (**INETER**) is to analyze and typify the nation's territory on the basis of its potential, limitations, and overall situation, for use in developing territorial organization studies at the national, departmental, municipal and local urban levels. Land Use Planning Studies have been already carried out in the Matagalpa, Jinotega and Madríz Departments; the remaining studies have not been implemented due to a lack of human and financial resources. The Nicaraguan Institute for Municipal Development (**INIFOM**) promotes the institutional development of municipal public administration structures, promotes citizen participation, and promotes the development of the capacities needed for decentralization and local development processes. The Institute has promoted strategic planning with a "territorial approach" in the municipalities, to foster comprehensive municipal development. This includes the development of Municipal Territorial Organization Plans (POTEMs). INIFOM supports citizen participation as specified in the Citizen Participation Law (2002), which creates structures, mechanisms and instruments that insure citizen involvement in formulating policies, strategies, laws, and investment plans in municipal spheres. INIFOM has Local Offices throughout the country, which lack sufficient human and operational resources for fulfilling their mandates.

28. The Nicaraguan Foundation for the Agricultural Technological Development (FUNICA) is a non-government organization that works in cooperation with the Nicaraguan government to execute internationally funded government initiatives. FUNICA manages the Agricultural Technology Fund (FAT) that is funded by IFAD funds through MAGFOR's FAITAN initiative and through IDR's PRODESEC project (see baseline analysis for project descriptions). FUNICA shares the same technical capacity problems as the government extensionists with respect to land degradation. They have managed

poverty reduction programs without analysis of environmental aspects at the approval stage of their loans and subprojects.

29. **At the local level**, municipal governments have administrative and financial autonomy and responsibility over matters affecting the economic development of their territories. Nonetheless, they face many constraints that limit effective and sustainable land management at the municipal level. The political-administrative structure of municipalities includes a Municipal Council and the following operational structures: a Technical Unit, an Environment Unit, Municipal Services, Training and Organization, Administration and Finances, and district delegations. They also receive support from the Municipal Development Committee (CDM), the highest-level permanent structure that is coordinated by the Municipal Mayor, and is a forum for different local stakeholders. Its members include institutional delegates, cooperation agencies, NGOs, religious organizations, civil society organizations, private enterprise, trade unions, territorial committees, and the coordinators of "sector roundtables" (commissions, work groups). The Municipal Environment Commissions (CAMs) are structures that foster local participation, in which delegates from CDMs also take part. There are also numerous community-based organizations, but their operational role is very weak: El Sauce (259), Achuapa (47), Santa Rosa del Peñon (33), Jicaral (34), Cinco Pinos (17), San Francisco del Norte (6), and San Francisco Libre (20), for a total of 379 in the selected municipalities. Municipal coordination structures are just barely operational, mainly due to the lack of leadership from municipal governments, little motivation due to their failure to define activities that would strengthen community development, and a low level of awareness among members about the importance of promoting sustainable development in the territories.

The Policy Context

30. Nicaragua has an extensive legal and policy framework whose implementation is impeded by a series of deficiencies. The General Law on the Environment and Natural Resources (Law 217) and its regulation (Decree 9-96) provide a legal framework for judicial issues linked to the environment and natural resources. The National Development Plan (PND) and the Poverty Reduction Strategy (PRSP) constitute the nation's highest level policy framework. Although the theme of the environment is mentioned in these two key policy documents, the concept of sustainable land use does not traverse them nor is it incorporated as an integral factor into the competitiveness strategy, the environmental policy, or the portfolio of projects. Thus, these important efforts have contributed very little to alleviating the serious social/environmental problems affecting territories that depend upon environmental goods and services.

31. Among the important policies for the project's development, the Fiscal Equity Law (2003) establishes categories for real estate taxation and exonerates protected areas and indigenous territories from this municipal tax. This Law permits the possibility of establishing incentives for conservation and restoration of ecosystems, in accordance with the General Environmental Law of 1996. Municipalities are however timid with respect to the payment of taxes. The Ministerial Resolution 38-2003, in accordance with the General Environmental Law, specifies the procedure for obtaining certification by MARENA in order to apply for incentives for conservation and restoration activities. The Fiscal Equity Law abolished one clause of the General Environmental Law, related to the possibilities of tariff exemption for imports of goods used for conservation purposes.

32. Sector policies and strategies such as the following do not include crosscutting sustainable land management criteria:

- MAGFOR's Policy for Forestry Development (2001), which includes five components (access to resources, promotion, protection, research, and regulation and control), does not explicitly mention the sustainable management of forestlands.

- The Agricultural Development Policy, whose guidelines include "promoting a new agricultural and rural culture that preserves biodiversity and natural resources, that promotes their rational use and sustainable exploitation, and develops capacities to prevent and respond to natural disasters".
- In conjunction with the goals of the PND and the PRSP, MAGFOR has formulated the Drought Management Strategy, or "EMS" (MAGFOR, 2002), and the Rural Productive Development Strategy, or "EDERP" (MAGFOR, 2003). The purpose of the EMS is to create a culture that is better adapted to the phenomenon of drought among the affected population, as well as with the most stable productive and environmental conditions that can reduce vulnerability to drought. The EDERP is aimed at reducing rural poverty and increasing the efficiency of agricultural production through zoning productive investments on the basis of land use. The land component of both strategies is weak, and the SLM is not mentioned as either a strategy or requirement for the nation's sustainable productive development.

33. Some very important policies have not been implemented due to a lack of capacity, as in the following cases:

- INETER has made important progress in formulating policies: Strategic Guidelines for Territorial Organization (1993) and the General Territorial Organization Policy (2001). It has also prepared norms, guidelines, criteria and methodologies for land use planning, which have not been implemented due to the absence of a Territorial Organization Law and the lack of human resources sufficiently trained and financed to implement these.
- Another significant weakness is the absence of Soil Conservation and SLM Law, and corresponding regulations, which would provide the norms required for adequately managing this resource and the necessary measures for guaranteeing compliance.
- MARENA has only made minimal progress in promoting the decentralization of environmental management, due to gaps in Law 290 (responsibilities of state institutions) that impede hiring personnel, training them, and creating the necessary mechanisms to go operational. This institution has also issued policies on the sustainable use of natural resources, such as: i) the National Environmental Policy (PANIC); ii) the National Policy on Water Resources; and iii) the Environmental Education Policy. The implementation of all of these has been deficient due to a lack of operational resources and insufficient political commitment.
- The National Decentralization Policy (2004), which provides policy guidelines for the decentralization of state entities. The application of this policy is just beginning.
- The General Water Law (2005), which includes rates for water consumption and other regulations for the use and protection of water resources and the payment of water-environmental services.

34. The institutional, sector, and political contexts are characterized by one-dimensional mandates, overlapping functions, and non synchronization with potential mechanisms to finance SLM (see Barrier 1).

Stakeholder Analysis

35. In the project's target area, there is a diversity of international, national and local institutions and organizations promoting local development that is closely linked to land use management. Section IV, Part V presents a detailed description of partners and their potential participation in implementing the project.

36. The bi-lateral and multinational cooperation agencies that are working in the geographic area of project intervention include: FAO, IFAD, COSUDE, the World Bank, DANIDA, the IDB, the EU,

USAID, ACDI and AECI, which finance local and departmental development (agricultural production, institutional capacity building, social-environmental projects, etc.) through local NGOs, trade associations, and central government projects. All of the mentioned are also co-financiers of the project.

37. The main national stakeholders include MARENA, IDR, MAGFOR, INTA, INETER, and INIFOM (please refer to the section on "political context" for institutional descriptions). The project will be implemented by MARENA, which will coordinate with the other institutions listed. In this regard, during the preparation of the concept paper, the official CCD Focal Point was really involved in the process and has accompanied the entire PDF-B process through meetings with the formulation team. The CCD Focal Point is currently a member of the Biodiversity and Natural Resources Department of MARENA where the FSP will be placed. Therefore, it will be easy for the CCD Focal Point to properly monitor and evaluate the development of the project. MAGFOR and INETER will mainly be involved with territorial organization and the development of capacities related to components 1 and 2 of the logical framework. MAGFOR will administer and promote forest development through INAFOR. Through INTA, it will generate, validate and transfer agricultural technology (Outcome 2), and will implement rural development policies through the IDR and FUNICA (Outcome 2). In addition, the Ministry of Finance is responsible for public finance in addition to supervising fiscal policy and managing both internal and external debt, tariffs, and customs. They are also responsible for resolution of land disputes. MH executes the PRODEP project (See baseline analysis) a local land tenure initiative.

38. INIFOM will be responsible for strengthening local governments and community organizations, and will take part in structuring fees for environmental services (Outcomes 2 and 4). These institutions have a weak presence at the local level, and little impact on territorial transformation. Educational aspects are covered by the MED, which is the institution most firmly grounded at the local level, but with a week lobbying capacity. Both the international institutions and national institutions such as MARENA, MAGFOR, IDR and INIFOM will have representatives on the Project Coordination Committee.

39. At the local level, municipal governments are responsible for planning, setting norms, and overseeing land use. The Municipal Development Committee is the most important organizational structure in the municipality. It coordinates implementation of social-economic-environmental aspects at the municipal level, and is the place where government institutions, NGOs and grassroots community organizations present in the municipality are represented. With respect to community-based organizations, there are some 379 operating in the project area. These are weakly consolidated, and are represented in the CDMs. There are two management structures at the departmental/zone level: the Association of Municipalities of Northern León (AMULEON), and the Association of Municipalities of Northern Chinandega (AMUNORCHI), which are forums for coordinating and managing inter-municipal interests. The Foundation for Agricultural and Forestry Development (FUNICA) is also represented in these departments, working to promote technological research in the agriculture and forestry sector, and improve the productive capacity of farmers (Please refer to Annex IV, Part V, Stakeholder analysis and Participation Plan).

40. The private sector is represented by two groups: The first is a community of 25 NGOs who focus their work on promoting agricultural production with small and mid-size farmers, but few SLM initiatives. These organizations are financed by international cooperation agencies. Collectively, they only account for slightly over $1 M USD in donations, demonstrating a significant weakness in their ability to enter fresh capital into the target area of the project. The second group is represented by UNAG. The National Union of Agricultural Producers (UNAG) also operates in these departments, representing the interests of small and mid-size farmers and promoting agricultural production and the development of local capacities. The most important group is small farmers (3,421), who represent 57% of all farmers in the area. These are subsistence farmers producing mainly basic grains, with low yields.

The next largest group is mid-size farmers (2,176), who represent 36% of the total and who produce basic grains and livestock on a small scale. The remainder are a small group of large-scale producers (409), mainly dedicated to extensive cattle ranching for milk and meat production.

Baseline analysis

41. In April 2003, The Government of Nicaragua presented its National Action Plan for combating Desertification and Drought (NAP-CCD), which constitutes a starting point for mainstreaming sustainable land management issues by defining four strategic lines of action: i) to revert soil degradation processes; ii) to mitigate the impact of drought in dry areas; iii) to protect the natural resources; and iv) to strengthen national and municipal capacities. This is the first project under the NAP, and is located in a priority area for desertification and social development. However, GoN has yet to consolidate the political and financial backing necessary to implement such a program. Among the most critical issues left to be addressed, is a considerable need for developing institutional capacities and creating financial mechanisms for restoring key ecosystems and actively combating desertification and drought. In this sense, the present GEF Alternative would also lead to the effective implementation of the NAP. Currently, MARENA is implementing two initiatives in the project's area of incidence: the Socio-Environmental Forest Development Program (POSAF), and the Second Project to Develop Rural Municipalities (SPDMR), which is being implemented in coordination with INIFOM. These do not have explicit SLM content. The failure to incorporate such elements could put achievement of their strategic objectives at risk. Decentralization actions are also being implemented as part of SPDMR, but with weak results. To improve this situation, the project is developing a strategy for decentralizing MARENA's environmental management. This will systematize fundamental aspects that need to be centralized so that the municipalities can take over efficient environmental management within their territories.

42. MAGFOR is implementing the Agriculture and Forestry Productive Rural Development Strategy, which includes activities that generate, validate and transfer technology (under INTA's responsibility), land titling, risk and vulnerability management, forest development and food security, among others. As part of the effort to reduce the vulnerability of the rural economy, environmental services such as carbon sequestration, agro-ecotourism, and organic production are promoted. This strategy is being reviewed, and the institution's activities are being adjusted to its policies and programs. Given the mentioned barriers to implementation, its actions are not helping to resolve problems in the territories.

43. To identify the training needs of institutions linked to UNCCD, UNCBD and UNFCCC Conventions, the GoN—via the Ministry of the Environment and Natural Resources (MARENA)—has recently received GEF funding through UNDP to carry out the National Capacity Self Assessment (NCSA) which implies a diagnosis of the state of compliance of the Conventions by Nicaragua as well as an analysis of the capacity building needs of the different institutions to adequately comply with the obligations. At this point in time, the project has finalized the diagnosis. In the remaining process, government focal points of the conventions, along with other national actors, will explore synergies and joint programs to improve capacities to comply with these international conventions. The results of both the diagnosis and synergies will be integrated into fine-tuning project activities as and when they are available which will coincide with the starting process of the present project.

44. In order to reduce poverty through rural economic development, the GoN has created with the support of the International Fund for Agricultural Development (IFAD) a series of trust funds geared to the National Poverty Reduction Strategy. The funds will generate rural employment and strengthen small and medium size rural businesses, provide credit and stimulate political reform. IFAD funds are programmed to be implemented though 2 executing agencies: MAGFOR and IDR. MAGFOR is the implementing agency for the Support Fund for Applied Agricultural and Forestry Research in Nicaragua

(FAITAN). The fund has a life of 6 years from 2002-2006 for a value of $2,670,000.00 U.S. including 50% co-financing from GoN. FAITAN funds are implemented through Nicaraguan Foundation for Agricultural and Forestry Technological Development (FUNICA). FUNICA is an NGO that provides on-the-ground implementation of numerous government programs here in the target area. FAITAN funds also support the Technical Assistance Fund (FAT), which is also implemented by FUNICA. FAT funds are aimed at increasing the productive and marketing capacity of small and medium size producers in rural areas. Both the FAITAN and FAT funds however lack the environmental impact assessment measures and controls as part of their approval process, therefore leaving the potential to develop business ventures that are not appropriate for the characteristics of the land, thus exacerbating land degradation.

45. Since 1999, with financing from the Spanish Cooperation (AECI), FAO has administered the Program for Food Security (PESA), coordinated by MAGFOR and executed by INTA with funding for $4,059,300.00 U.S. PESA promoted small scale irrigation systems, commercialization, local organization, small scale livestock management, and gender related activities throughout the drylands, including the target area of the project.

46. The Nicaraguan Institute of Territorial Studies (INETER) has invested $395,772.00 U.S. for the development of the National Program for Land Use Planning (NPLU) which attempts to define, design and develop the technical, financial, legal, institutional and political-administrative instruments for land use planning within the pilot municipality of Boaco. The pilot initiative, which was suspended due to financial constraints, will provide important baseline experiences and information to the present project.

47. The Nicaraguan Institute for Municipal Development (INIFOM) is carrying out two projects directly related to the present initiative of sustainable land management; Strengthening of Municipal Development (USD 800,000 with Austrian funding, started in 2003 and will run until 2005) and Support to the Preparation of Municipal Development Projects (USD 15 million with IDB funding, started in 2002 until 2005). Both initiatives have incidence on the target area of the full size project through strengthening of strategic planning and organizational structures at the municipal level. Nonetheless, none of the projects incorporates the thematic of sustainable land use planning which inevitably weakens their possible impacts on the ground. The Institute is also developing local capacities to carry out land management plans but does lack the technical national and local personnel as it was reflected on the institutional capacities analysis carried out during PDF-B phase of the project.

48. The IDR includes land titling services as part of their programs and is operating within the Departments of Leon y Chinandega, but not within the target area of the project. However, the activity is complementary to the proposed GEF interventions through the FSP which will support IDR carry out this process in the 7 municipalities targeted. Also, the Office for Rural Titling (OTR) has the Programme for Property Regulation (PRODEP) under the Ministry of Finance and Public Credit (5.5 million Euros) that in a first phase (2002-2006) is concentrating land titling in several dry land departments (Chinandega, Madriz and Estelí). Within the target area of the project, the municipalities of Cinco Pinos and San Francisco del Norte are included Those areas will soon have a detailed land ownership analysis and base map of land ownership in digital format, that will greatly accelerate the territorial management process. The second phase of the PRODEP project (2006-2008) with USD 23 million funded by the Millennium Account will concentrate on the Department of Leon and the northern municipalities of the Managua Lake basin.

49. The Nicaraguan Institute of Territorial Studies (INETER) is responsible for the development of the National Program for Land Use Planning (NPLU) which is trying to define, design and develop the technical, financial, legal, institutional and political-administrative instruments to elaborate land use planning at the municipal level (USD 395,772). Only the pilot municipality of Boaco has benefited from the project since it was stopped due to financial constraints. Nonetheless, the methodology and land use

planning guidelines developed can perfectly be applied by the GEF alternative in the targeted area and INETER can benefit from the capacity building activities planned under outcomes 1, 2 thus the project assist INETER in their task to carry out land use planning at the national level.

50. The IDR (1996-2002) developed the TROPISEC program that contributed important elements to the baseline on technologies for water catchments for human consumption and crop irrigation with IFAD, UE and Government of Nicaragua (USD 24,000,000). TROPISEC developed a natural resources component, rural financial services, training, gender development, and the development of technical support to productive models. An estimated $4,000,000.00 was invested in the development of the models, which will be baseline to this project. Those models were unfortunately not transferred or validated outside of the TROPISEC target area, which excludes the target area for the present GEF alternative.

51. Among the programs and projects promoting sustainable agriculture is the Farmer to Farmer program (PcaC). Initiated by the National Union of Farmers and Ranchers (UNAG) in 1987, it promotes sustainable alternatives for small farmers around the country and has a stable network of promoters on the ground. It focuses on small-scale experimentation and the diffusion of knowledge and sharing of experiences among the poorer sectors of the rural peasantry.

52. UNDP and the GoN are working closely with the development of institutional capacities in the regional and departmental development councils. There are several local human development initiatives, which are also focusing on community or municipality level initiatives for sustainable development.

53. Nicaragua's Ministry of Environment and Natural Resources, through its National Office for Climate Change and Clean Development (ONDL) is undertaking a regional project financed by GEF through UNDP. The project "Capacity Promotion for Phase II of Adaptation to Climate Change in Central America, Mexico and Cuba" (PAN-10-00014290) (2003-2005). The project's objective is to strengthen the institutional as well as the main stakeholder capacities to evaluate the vulnerability and adaptation of the prioritized systems (water and agricultural resources) against climate change, variability, risks and extreme events. This project is a clear partner to the present GEF initiative and during the PDF-B, a specific study of vulnerability and adaptability of the 7 municipalities is being conducted. Nonetheless, the results of this study will not be available until early June 2005 and shall be incorporated into the present document. Also, the ONDL has very recently obtained funding from the Global Mechanism to carry out the project "Payment for Environmental Services Diagnosis to identify the obstacles and opportunities for its use in the fight against desertification and drought in the prioritized dry areas of Nicaragua". This initiative is perfectly in line with the present project since it will evaluate the obstacles and opportunities for the development of payment for environmental services in the seven municipalities identified by the project.

54. As to existing research, several projects and research institutions have addressed the topic of sustainable land management in dry land areas. Among these can be mentioned Nitlapán/UCA, with a study presenting a zoning of agrarian systems and a typology of farmers, as well as a diagnosis of the dry land corridor by UCA.

55. NGO baseline activities within the 7 municipalities account for a total collective investment of $ 1,008,600.00 by 25 NGOs for organizational strengthening, training in agriculture, forestry and agro-forestry, establishing agro-forestry and forest-pastureland systems, producing basic grains, and promoting organic agriculture. Few of these organizations work in the areas of soil conservation, watershed management, or land use planning and very few incorporate gender content into their work. They have accumulated valuable local experiences, but these are currently at a standstill since most do not have the

necessary financial resources for continuing their projects because of their inability to negotiate external resources.

56. Local governments have investments estimated at approximately $50,000.00/year in institutional structures, albeit with minimal capacities, to manage economic development and the environment. All have Environmental Units (UAs) and Municipal Technical Units (MTUs). Four municipalities possess environmental agendas as instruments for assisting environmental management, and only one municipality has issued municipal environmental ordinances. Five have developed Municipal Development Plans (PDMs), which signifies important progress in strategic planning, and offers a good opportunity for incorporating SLM. With respect to organizational development, Municipal Development Committees (CDMs) have been set up in each municipality, bringing together all local stakeholders from a total of 379 community and district committees. There is, however, weak participation from delegates. These structures have minimal management capacities and few operational resources.

PART II. Strategy

Project rationale and Policy Conformity

57. Under the baseline situation, policies, programs, projects, and strategies have been developed to respond to effects of desertification through local development. Investments in infrastructure for social capital have been partially realized, and the decentralization of government authority is planned for, but is contingent on the ability of the municipalities to acquire the technical capacity to manage the environmental issues of their own territories. Those actions unfortunately do not translate into on-the-ground improvements to the root causes of land degradation which are integrated but not specific to the agriculture, ranching, and forestry sectors. Nonetheless, economic development packages (loans) are being promoted and implemented by Government institutions such as IDR and INTA that invest in agricultural and non-agricultural activities but do not take into consideration sustainable land management or environmental criteria within their loans approval system (please refer to paragraph 25). The present situation is not sustainable from either a technical or a financial standpoint. Municipalities require specific tools and training that once in place could facilitate participatory land use planning and management. Several of the existing mechanisms, such as the Municipal Environmental Units are in danger of closing due to lack of adequate funding. Closures of said units and continued lack of participation on the part of local residents in the process will worsen the current situation and will make it more difficult to find a participatory solution to land degradation. Under the baseline scenario, missing policies, lack of public participation in land-use planning, low technical capacity, lack of controls on productive investments, and the overall absence of a sustainable financial plan and backing and a sector focus towards problem solving will assure the continuance of the status quo which will ultimately lead to more land degradation.

58. The GEF increment will respond to the multi-sector nature of the land degradation problem by integrating SLM concerns (land use and land functionality analysis plus cross sector planning and participation to determine and balance between environmental and social priorities) into an integrated territorial management approach at the municipal level. The GEF alternative will provide policies, capacity development, mainstreaming of SLM concerns into poverty reduction programs, and financial strategies and tools to enhance for cross sector planning, participative territorial organization and integrated investment planning. The GEF alternative at the national level will create the policies, regulations and agreements that will enable the implementation of the integrated and participatory territorial management approach at the local level. In addition, capacity building will enable decision-makers to better comprehend the concept of sustainable land management and national organizations (MARENA, INTA, INIFOM) will be better trained and equipped to develop capacities at the local level.

At the local level, GEF capacity building activities coupled with investments from co-financed poverty reduction programs will harmonize SLM into diverse levels of municipal and institutional decision-making. In addition, SLM concerns will be integrated into the planning framework of poverty reduction programs that will realize on-the-ground investments in agriculture, livestock management, and forestry within the framework of the integrated territorial management plan and process. As part of the capacity building process, sustainable production models in agriculture, grazing, and forestry will be implemented and validated to provide tested solutions to unsustainable land management within the context of the functionality of the ecosystem. The territorial planning framework will provide the opportunity to develop investment plans that will make operational the territorial management plans designed to support the mainstreaming of SLM concerns into the municipal planning framework.

59. Once implemented in the 7 municipalities, the GEF increment will contribute to global benefits beyond the scope of the GEF project while maintaining compatibility with the major national poverty reduction strategies. These solutions will be validated and developed at the end of the project as new elements for the redesign of the Municipal Development Plan into a Municipal Sustainable Development Management Plan that integrates SLM concepts into the planning matrix by 2010. Dissemination for replication of the lessons learned will contribute to Nicaragua's struggle to control land degradation throughout the drought prone region and to other nations within the drought corridor.

Link to the GEF operational area and the focal area.

60. Successful completion of the project outcomes will mitigate the causes and negative effects of land degradation and as a result strengthen the integrity, stability, functions and services of the ecosystem upon which local residents depend for their livelihoods, thus qualifying in the #15 GEF operational program #15. The project qualifies primarily within SLM-1 by developing policies and capacities at the national and local levels in addition to mechanisms to mainstream SLM into national and municipal development plans. Furthermore, the project will harmonize SLM into economic development packages at the national and local level. The project will also develop mechanisms to finance SLM and local structures to support SLM at the municipal level. The project also qualifies within SLM-2. Model projects developed will directly influence improvements on 22,500 Ha. of land through the development of sustainable agriculture, grazing, and forestry models. The mainstreaming of SLM concerns into poverty reduction actions will also translate into on-the-ground investments of up to 5 M USD (estimated 100,000 Ha.) in agriculture, grazing, and forestry with integrated SLM concerns (Please refer to Section IV Part VI Executive Summary of the Proposed Production Models).

Project goal, objectives, outcomes and outputs/activities

Project objectives

61. The *project goal* is, *"to generate global environmental benefits and to contribute to the reduction of poverty through sustainable development and the conservation of the natural capital in Nicaragua's dry zone ."* The *project objective* is to *improve the stability, integrity and functions of ecosystems through SLM by enabling productive systems that support sustainable livelihoods in the 7municipalities in the North of León, Chinandega and Managua.*

62. The achievement of this objective includes farmers and leaders of the rural communities of the 7 selected municipalities, the technical teams of the territorial delegations of the MARENA, MAGFOR, INTA, INETER, INIFOM, local NGOs and private enterprise; equally, key government officials at the national level have to give orientations, supervise and support the project's execution. This objective is the means to approach the global objective.

Project strategy and approach to the development of project, outcomes and outputs

63. The project strategy is to integrate SLM concerns into a further integrated institutional, political, and sector frameworks. In addition, it will develop the capacities at the national and local levels to manage.

64. The project strategy will implement actions that will enable the integration of SLM concerns (land use analysis, land function analysis, inter-sector planning) within the context of a participative and integrated territorial planning approach, which is the centrepiece of the strategy. Such an approach will lead to plans that outline productive areas for investment in harmony with the bio-physical conditions of the land and in accordance with poverty reduction strategies. That level of planning will lead to actions towards the sustainable financing of investments targeted as part of the overall plan. In recognition that the planning process will take time to implement, short term measures to generate the necessary capacities and to harmonize the same SLM concerns into poverty reduction projects that will target investments are considered. Ultimately, the use of an integrated resource planning process oriented to the sustainability of the land and to the livelihoods of the people to form the framework for the economic and financial development of the municipalities will be an innovation not only for the Departments of Leon, Chinandega, and Managua, but for Nicaragua in general. The municipal focus and the cadre of polices and structures created will be innovations in themselves, especially the public-private cooperation in financing SLM and strategies for inter-municipal cooperation in managing SLM will all contribute to the global and project objectives.

Key strategies to be applied are the following:

- Catalyzing the decentralization process by recognizing the Municipalities as a vehicle for participatory decision-making processes in the execution and evaluation of project activities.

- Linking SLM concepts to existing poverty reduction programs to attack the causes of land degradation in a cross-cutting and effective form while directly reducing poverty in the short-term while working towards an integrated territorial planning framework in the mid-term.

- Gradual transfer of responsibilities for environmental management from MARENA to the Municipalities as their technical environmental management capabilities increases.

- Development of public-private partnerships to share the costs and benefits of fundraising. Provide opportunities and technical information for project development to NGOs targeted to the priority areas based on the integrated territorial planning framework.

- Strengthening of the existing technical capacities for SLM at the national and local level through the consolidation of existing institutional and community institutional structures, improved efficiency, training and financing.

- Ensuring efficient inter-institutional coordination through the strengthening of local structures and strategic alliances in order to make progress in SLM and overcome poverty.

- Promoting a gradual change from present land use to more appropriate land use in the regions with land use discrepancies via targeted incentives to improved uses rather than by command and control strategies.

- Promoting the conservation and expansion of existing forests within the territorial planning system to the increase of the territories forest coverage and the development of environmental conscience within the target population[16].

- Introducing gender focus into the execution and evaluation of the project to ensure equity between men and women of rural areas in their access to resources, benefits and services offered by the project.

- View land tenure responses, such as land titling, as an incentive for SLM and not a prerequisite.

Outcomes and Outputs

65. The project is composed of five components: i) National and local policies, strategies and laws containing SLM applied; ii) Institutional and technical capacities for SLM installed at the national and local level; iii) SLM concerns incorporated into poverty reduction investments; iv) Financial plans generate new funds for SLM activities and to maintain municipal infrastructure; v) Municipalities address poverty and environmental degradation through learning, assessment and adequate land management. These components will ensure the elimination of the barriers against the implementation of SLM (see table on threats in Section IV: Part III), and will be co-financed by the GEF. These components will improve the living conditions of the farmers and their families, whose current state of poverty is also a limiting factor for the implementation of SLM.

Outcome 1*: Sustainable land management at the municipal and community level is applied through policies, strategies, national and local laws and structures*. (GEF contribution:$531,000.00 USD , Co-Financing $2,246,681.00 USD). *This component refers to barrier 1: Incomplete political framework to implement SLM at the local level.*

66. Building off the baseline municipal development activities (AECI, INIFOM) and activities to provide municipal environmental units (MARENA with IDB, WB, and DANIDA support), the GEF alternative developed in outcome 1 will provide key missing legislation needed to effectively mainstream SLM into national and municipal development plans , decentralization of environmental responsibilities and authority to municipalities, and local participatory processes and agreements for integrated participatory territorial management.

67. Outcome 1 unites all project activities related to political reform to facilitate decision making and all decision making processes at the national and local level related to decentralization of municipal environmental functions and on the political process related to the validation and ratification of the integrated territorial management plans. To do so, the project will respond in three areas of influence: In the first, **output 1.1**, a consciousness raising process that enables the political, technical and judicial decision-makers at the national and local level have to understand and identify with SLM concerns is a necessary first step. To do so seminars and workshops for key decision makers will be held during 2006 and 2007 at both the national and local levels, in addition to the production of support materials. Consciousness-raising at the early stage of the project will provide a favourable environment for the

[16] The project foresees to promote forest conservation within the framework of a future Payment of Environmental Services Strategy for the Dry Areas of Nicaragua. In this regard, MARENA (through its Clean Development Office) has obtained funding from the Global Mechanism to carry out a diagnosis of PES in the seven selected municipalities which the FSP will use to develop the Strategy. With this in mind, the project will guarantee that forest conservation will not lead to greater poverty or unsustainable practices. Also, the project will link forest conservation with other existing project being promoted, for example, by WFP in the target area.

forging of strategic alliances among all actors, and will facilitate the lobby for key legislation described below.

68. Output 1.2 will bring together all stakeholders at the local level in a participatory framework to modify, validate and ratify the integrated territorial management plan (produced under output 1.2) within each municipality. 7 working groups will be formed (1 per municipality) in 2006 and 2007 with representatives of stakeholder groups for the purpose of negotiation and consensus with relation to the territorial planning proposal. The product will be a ratified territorial management plan that identifies land-use zones and productive activities compatible with those zones. To complete the territorial organization process, the working groups will rely on tools produced by INETER, MARENA, and MAGFOR, such as updated geographic information produced as part of the technical capacity building process outlined in output 2 below. These actions will provide the model for making the national policy for territorial organization effective as it will contribute to local economic development, sustainable land use and the strengthening of the ecosystems' capacities for renewal and integration.

69. In output 1.3, SLM concerns will be harmonized into the national policies (strategies, laws and dispositions), programs and national and local planning, mainly in the National Development Plan (PND), the National Poverty Reduction Strategy (ERCERP), and the Municipal Development Plans (PDM). Under this output, a technical assistance plan will be implemented that is aimed at decision-takers in order to achieve a cross-cutting implementation of SLM in local and national planning. Two key pieces of legislation, one under development and another to be developed are the Territorial Organizational Law and the Soil Conservation Law. Under this output, the lobby for the design and passage of the laws will be undertaken under the direction of MARENA. The second policy aspect of importance to the decentralization process is the development of agreements between MARENA and the local governments for decentralized environmental management and the development of conditions and timetables for the transfer of environmental responsibilities to the local governments. The final political action related to mainstreaming SLM will take place at the municipal level. MARENA and INETER will work with municipalities to complete and pass ordinances that will enable the application of the integrated territorial management plans and that enable financing (from outcome 5) from municipal sources for the implementation of the plan.

70. MARENA, MAGFOR, INETER, and INIFOM participation in the decentralization process will provide counterpart funding in management, geographic information, and technical support to the process at both the national and local levels. A total of $550,000.00 U.S for political reform and development of local decision making processes will be received from the Political Development Fund (FONDEPOL) through an IFAD funded initiative implemented by IDR via the Programme for Rural Development of the Dry Lands of Nicaragua (PRODESEC). As PRODESEC is a principal partner to this project and counterpart to several outcomes, the program is described in detail as follows:

71. With co-financing from a variety of sources including IFAD and National Counterparts for a total of USD24 million, the fund will dedicate approximately $1.3 M U.S.D. to poverty reduction in the target area through: i) the promotion of local employment and businesses (USD 2,103,000), ii) the development of rural financial services, iii) and enhancement of the municipal political system. A competitive trust is established to finance each objective. The competitive trust fund for the financing of employment and businesses in known as FOPEN and will provide an estimated $7,507,000.00 U.S. Another additional fund FONDECA will channel $7,791,000.00 towards facilitating financial services to the rural poor; and yet another fund, FONDEPOL, will dedicate $500,000 U.S.D to the strengthening of policies and institutions related to rural development.

Outcome 2*: Institutional and technical capacities installed at the national and local level to implement SLM.* **(GEF contribution**: $938,950.00 USD **, Co-Financing:** $6,077,958.00 USD). *This component refers to barrier 2: Weak institutional capacity to implement SLM.*

72. Important baseline activities relevant to this outcome are the technical training and development provided by INIFOM to the municipal development process and by MARENA in the development of the municipal environmental units. MAGFORs Geographic Information System and existing geographic information generated to date is also an important baseline contribution. The TROPISEC programme developed many of the baseline technologies that will need to be transferred and validated in the target area. Within outcome 2, the GEF alternative the existing community and municipal development committees and technical units, and agency delegates will be strengthened with respect to SLM concerns and prepared to manage the integrated territorial management process and the information needed to make decisions. Additional geographic information will be generated to complete the information gaps in many of the municipalities, thus providing the skills and content for the local political process mentioned in outcome 1. To complete the capacity improvement scenario, models of appropriate new and indigenous technologies will be transferred from the regions of the TROPISEC project and new models generated through the identification of innovative farmers. These models will ultimately provide the input for the investment plan that will finance the integrated territorial management plan.

73. It is of key importance for the effective implementation of the project that the organizational structures of the communities be consolidated for political *and* technical SLM management (output 2.1); an indicator will be the full functioning of rural committees and CDMs, with knowledge on and responsibility for SLM and territorial organization. To this end, GEF will fund workshops training on territorial planning, sustainable land management, organization and management for CDC and MDC delegates. The purpose is to enhance the understanding of the delegates so that they may make informed choices during the territorial management process and so that they may better inform their communities (output 2.2). GEF will support technical training to the technical staff of the departmental delegations (MAGFOR, INTA, MARENA, INETER, INIFOM), and the local technical staff (Municipal environmental and technical units) will be trained so that they may work as multipliers in the training of the CDC and MDC's.

74. In addition, 7 municipal technical structures will be consolidated into 3 shared structures for the implementation of SLM (output 2.3), which will be reflected in the fact that all CDMs will receive technical support from the UAs and the UTMs; it will also be possible to share recurrent costs for these units and maintain technical staff on payroll. To these ends, the UA and the UTM will be better equipped to provide technical support to the CDMs and will enjoy more operational resources to fulfil their mandate. Based on an initial assessment during the PDF-B phase the existing 7 units could be consolidated into the following: Unit 1) the municipalities of Cinco Pinos and San Francisco del Norte, Unit 2) Achuapa and El Sauce, and Unit 3: Santa Rosa del Peñón, Jicaral and San Francisco Libre. At the present, five municipalities have developed Municipal Development Plans (PDMs), which signifies important progress in strategic planning, and offers a good opportunity for incorporating SLM. The environmental units will be supported by MAGFOR to complete the Geographic Information System for the municipality and update all of the territorial information. With respect to organizational development, Municipal Development Committees (CDMs) have been set up in each municipality, bringing together all local stakeholders from a total of 379 community and district committees. There is, however, weak participation from delegates. These structures have not been well consolidated, and have minimal management capacities and few operational resources. In response to the land tenure issue, the GEF project will support an existing Land Property Ombudsman's office to improve the quality and quantity of service in handling land claims. The technical development of that office is an integral part of the overall solution to land degradation.

75. INTA and FUNICA staff operating through the Agricultural Technology Fund (FAT) will develop a consolidated strategy to seek promising local and indigenous agricultural technologies, validate them, and support their dissemination to similar farmers in appropriate environs. The technologies identified will provide examples of successful local SLM that could form the basis for future investments (output 2.5). The strategy will create a synergy between the INTA and FUNICA initiatives and will provide cost effectiveness in the avoidance of overlap and duplication with respect to SLM technology and sharing of experiences. As part of the projects Annual Work Plan (AWP) both INTA and FUNICA staff will produce a joint strategy. Once identified, local farms with innovative technologies will become models, as will farms that invest in the development of the TROPISEC technologies. GEF will provide training to INTA and FUNICA extensionists (output 2.5) and on-the-ground development and scientific validation of the models.

76. The outputs 2.4 and 2.5 will be co-financed by INTA and by direct investment through the FAO PESA II program. The PESA II project will start mid June and directly affect (during 2005 San Francisco Libre and El Sauce) the project area. The second phase of this project has the same components as the initial one: small scale irrigation systems, commercialization, local organization and gender and small scale livestock. (Note, in outcome 3, under the GEF alternative, the PESA II project will strengthened to include SLM concerns as part of their total investment package).

77. INTA and FUNICA will support the development of 5 agriculture, forestry, and improved livestock management models (See Section IV part VI) planned to be developed with farmer participation in the seven municipalities (output 2.4). The IDR will provide resources to help cover the production costs and GEF will help with the incremental costs of switching to improved production practices, such as soil conservation, better ploughing methods, wind barriers, infiltration basins and others. In addition, the project will respond to the land tenure situation of the beneficiaries and increase access to programs by persons with an informal tenure arrangement. A participatory assessment will be carried out through workshops for the formulation of management plans for the productive systems and practices by INTA/FAT and the farmers themselves, who will determine which of the models are considered successful for replication. Once the technologies are validated by farmers, they will be qualified for broad scale application within the appropriate areas within the integrated territorial management plans and eligible for financing from the counterpart agencies. Information on the models will be disseminated through different channels (radios, rural committees and CDM) and through promoters and technical staff of NGOs, governmental and private institutions. Case studies will also be made on farms which make the most successful social, economic and environmental contributions to SLM.

Outcome 3. *Poverty reduction programs incorporate SLM into on-the-ground investments in agriculture, livestock management, and community forestry and alternative employment* ***(GEF contribution : \$186,650.00 USD , Co-Financing:*** *\$ 8,620,000 USD) This component responds to barrier 4: Financial schemes generate new capital for SLM and to maintain shared municipal technical support structures.*

78. In the absence of the integrated territorial planning process, poverty reduction programs underway will continue to invest in productive systems that are likely to continue or accelerate land degradation. The GEF alternative is to mainstream SLM into the planning and approval process of the principal poverty reduction and food security programs so that their investments will be models of investments oriented towards the bio-physical aspects of the land. For non-agricultural investments, an environmental analysis process guarantees that there will be no negative side-effects on the productivity of the land. First, the project will sign agreements with IDR-PRODESEC, FONDECA, FAT and PESA-INTA, so that the assignment of the planned resources for productive development include SLM in the planning process, in guidelines and investment criteria, and in the investment approval process (output 3.2). Direct technical backstopping, technical monitoring, and technical support, and *in situ* verification of the effectiveness of the output in the seven municipalities is contemplated. In addition, access by all farmers

using the land base to the programs regardless of their land title status will be negotiated at the start of the project with the purpose of eliminating an important obstacle to land improvements.. Once the agreements are reached, the technical teams, promoters, and agents of each institution will be strengthened to implement SLM in investments (output 3.1) and through the publication of guidelines and criteria, technical training, and technical assistance. The GEF will cover the direct costs of mainstreaming the SLM into the institutions while the mentioned institutions will provide the costs of the poverty reduction program.

Outcome 4: Financial schemes generate new capital for SLM activities and to maintain shared municipal support structures **(GEF: $290,200.00 USD, Co-Financing $550,000.00USD).** *This component refers to barrier 4. Limited financial resources to promote SLM.*

79. The baseline municipal financial structure in inoperative. Municipalities orient their transfers from the Nicaraguan government towards basic services and non-productive activities that could eventually create new opportunities and revenues for the municipality. The baseline investment is also incredibly small for the number of NGOs operating as public service contractors. Under the GEF alternative, outcome 4 will create new sources of capital by catalyzing the capacity of both Municipalities and NGOs to generate new revenues and target investments that are consistent with the integrated territorial management plan, thereby creating incentives for sustainable land use and management and to cover the recurrent costs of the municipal technic al units.

80. The project will assure the financial sustainability of the initiatives and increase new investments in SLM by developing the capacity to develop finance strategies and management in the territory for the actions planned in the municipal environmental agendas (output 4.1). To implement all of the outputs, a full-time financier will work on the financial issues throughout the project. The financier will work within a Municipal Funding Unit that will be co-financed through a cost sharing arrangement by Municipalities and NGOs. The financial unit will train municipalities and NGOs in proposal preparation and fundraising, and work directly in increase the portfolio of investments in the municipalities through outside donations (output 4.2) and to develop the internal financial structures (output 4.3) through municipal taxes and through water users fees. Plans have to be made for the collection of payments for irrigation and drinking water. To establish the financial mechanism, a payment acceptance survey and public negotiations for payment arrangements for these services will be undertaken. To support these activities, a water value study and a financial analysis will be completed.

81. Initially, local governments have to create the Municipal Financial Support Unit. GEF will cover the costs of the establishment of the unit and the costs of the financier on a transitory basis. In addition, an initial municipal financing strategy will be designed to support the consolidated municipal environmental units and the municipal environmental agendas. The strategy would be updated upon completion of the municipal integrated territorial management plans to include an investment strategy for the productive options within the various management categories. In that way, the investment strategy would become an integrated part of the overall Municipal Development Plan.

Outcome 5. Effective project management assured through *learning, assessment and adequate management* **(GEF contribution :**$ 1,053,200.00 USD **Co-Financing : $ 0.00 USD).**

82. Effective project and adaptive management will ensure effective project implementation. Workshops at the national level and the integration of project and agency staff and local leaders from the various community development committees and municipalities will facilitate the dissemination and exchange of lessons learned. The participatory evaluation process that as part of the development of model projects and the technology transfer process (output 2.4 and 2.5) will also contribute the sharing of lessons learned

at the rural level. Through adaptive management and execution of the scheduled monitoring and evaluation plan and disseminating lessons (**Output 5.2**), the results of the project should influence other initiatives in Nicaragua through the implementing partners and improve the adaptive management of the project.

Project indicators, risks and assumptions

83. The success of the project will be determined by the degree of regulation achieved by the municipalities which will indicate the level to which SLM concerns have been mainstreamed into the local territorial planning framework. The passage of municipal ordinances and the content thereof will make effective means of verification. When these ordinances are compared to the territorial management plan will indicate that the land use of the participating municipalities is actually regulated with SLM concerns. Agreements between municipalities will indicate that the process is systematized. The achievement of the project objective is subject to several *assumptions*: 1) that the objective is not affected by political and social instability, with negative effects on the support for the project and 2) that national and local governments maintain their support to the project. For the mentioned assumptions, there is little *risk* to the project neither in the long-term or in the short-term as the assumption has a low likelihood of occurring. Recently elected municipal officials will manage at the municipal level throughout the run of the project. National level officials at the operations level are unlikely to change as a result of the upcoming presidential elections. Regardless of the low risk level, effective and permanent communication will be upheld with key actors, both local and national decision makers to maintain the effectiveness of agreements and ordinances achieved. "…The relationship between land degradation and global benefits is not established for many land-use scenarios. For that reason, a proxy indicator is presented in the logical framework (Executive Summary, Annex 1). Specifically, the amount of increase of pasture/forest/brush cover are assumed to provide global benefits, such as carbon sequestration that later reduces atmospheric levels of CO^2. An increase in forest cover, from 4,900 Ha. to 18,175 Ha., is expected in the model projects with an estimated carbon capture of 2 M tonnes. The zoning and subsequent targeted investments will create an unspecified amount of cover. These amounts will be estimated as the mentioned activities are completed and evaluated in the final evaluation. Until those activities are established, the estimate of cover produced by the model projects will be the most reliable indicator. The same is true for the estimates of economic benefits and their impact on sustainable livelihoods for which increased in 40%, 70%, and 100% for agroforestry, forestry, and silvo-pastoral activities are expected.

84. The outcome 1 will be measured by the incorporation of environmental plans and agendas into the Municipal Development Plans by 2010 will indicate that policies from the national to the local level have enabled municipal action and that municipalities have transferred responsibilities from MARENA. Surveys will need to be conducted to determine the degree of change in attitudes of decision makers towards SLM. Those attitudes will be important in the passage of legislation and agency policies that will enable SLM at the municipal level. There is an assumption that MARENA will support the decentralization process in order to achieve the outcome. There is *low risk* to the project that the assumption will bear true as MARENA has maintained their position to decentralize environmental responsibilities and has articulated their position in several policy documents. To maintain a low risk, awareness-raising actions will need to be repeated at several times throughout the project, strategic alliances developed for the implementation of the project will maintain pressure on the stakeholders to cooperate.

85. For outcome 2, there are 2 indicators for developed capacity for implementing SLM: the first one determines whether the national institutions (MARENA, MAGFOR, INETER, INIFOM) and town

councils are applying regulatory instruments for SLM, once they are available and the second one measures how many sanctions for violations of the regulatory framework were applied and how often the law was applied. At the output levels, the completion of the technical structures such as the Community Development Committees, the development of technical skills by municipal and agency technicians, the completeness of the information base, and the ability of the municipalities to maintain qualified people to implement SLM are indicators of skill and ability and more importantly, that the technical capacity to satisfy MARENA's requirements to transfer environmental responsibilities would be arguably demonstrated. In terms of technology transfer, the degree of adoption of technology will be the best indicator of technology transfer, indicating that the process of drawing successful technologies from the local region and the transfer of technology from the TROPISEC region were attractive and financially viable for the farmers and that INTA and FUNICA have indeed developed the abilities to plan and execute extension programs. To achieve the outcome, the project *assumes* that the activities to strengthen the prosecutors office for the Environment will be sufficient at the national and local level enabling prosecutors to fulfill their role and that the members of the judicial system will have enough political and judicial will to sanction in cases that are remitted to the courts. In addition, the project also assumes that MARENA and the community development committees will adequately develop the capacity to exercise environmental surveillance as a result of the project. The potential to become a *risk* to the project is medium-high, especially for the will to prosecute. To mitigate, a package of training measures for the national and local level will be carried out and materials and basic equipment for local coordination structures provided. The project also assumes that technology transfer will not be hindered by climate, unforeseen pest of sanitary problems, and/or unstable markets. The *risk* to the project is moderate; therefore, these factors will be taken into consideration in the selection and the development of the models. The models should inherently minimize risks to the farmers in order to enhance acceptance.

86. To measure Outcome 3, the following indicators have been defined: the amounts of investments into productive systems considering the biophysical characteristics of the land and investments approved on the grounds of their environmental impact. The main risk would be a weak or non-existent political will on behalf of IDR, FIDA and FAO to include SLM into their financing projects. To avoid this risk, agreements shall be signed between participating institutions and projects, both local and national; in addition, direct training shall be offered to PESA and PRODESEC, and training actions implemented to their technical teams on aspects of eco-systems and environment.

87. The indicator of success for the development of Outcome 4 is directly related to not only the amount of funding generated by the financial schemes, but the number of municipal SLM projects financed directly, or co-financed by the financial plans, and by the amount of funds generated to cover operational costs of the environmental units. The risks are the breaking or non-fulfillment of agreements on the financing of initiatives and the existence of an unfavourable market conditions for local investment, such as inflation. These are not assumptions because we are certain that they will occur. Therefore, the creation of a semi-autonomous Financial Support Unit for the Municipalities will guarantee the availability of funds that are to finance the SLM projects. Other safeguards to risks are the checks and balances that will come from public-private partnerships and partnerships among municipalities to support SLM and payment plans for irrigation and drinking water payments.

88. Outcome 5 assures adequate project management, monitoring and evaluation, and dissemination and response to feedback. The indicators of success will be the successful execution of the annual work plans and budget, completion of the monitoring and evaluation plan, and finally, incorporation of the recommendations from mid-term and final evaluations. As this outcome will be managed by the project staff, there are no foreseeable assumptions or risks.

Expected global, national and local benefits

89. Expected benefits will be realized at the global, national, and local levels. At the global level, the project will result in improved ecosystem resilience and productivity in an important dryland ecosystem in the Meso-american corridor. Indirect benefits will also be generated through the increased quantities of woody perennials in permanent tree and crop systems and increased levels of soil organic matter, which will provide increased carbon storage and absorption. Reductions in burning will reduce CO_2 and will therefore mitigate GHG effects on climate change. The project will have incidental benefits for other global values (however, given the specific focus of this project on SLM, these benefits will not be measured as indicators of project success) such as the promotion of a spatially and structurally diverse landscape containing a large number of native woody perennials (for example in agro-forestry and silvo-pastoral systems) will result in biodiversity benefits through the improvement of habitat conditions for endemic and threatened migratory bird species. In the model projects, the amount of actual carbon capture will be determined for each of the 5 production models described in Section IV, Part VI. At present, a capture of 2 M tonnes is projected with reductions of soil loss of up to 58%. Stabilization of land use patterns will also result in reduced pressures on the remaining natural vegetation of the watershed, especially the 6% forested areas remaining. The quality and biodiversity of nationally and internationally important waters will be benefit as a result of increases in soil cover and the increased application of soil conservation and reduced use of pesticides that will affect Lake Managua, Estero Real (an important Pacific estuary), and the San Juan river.

90. Nationally, the decentralization of environmental responsibilities will create a model within Nicaragua of local control and responsibility that can be replicated throughout the country. Legislative reform and agreements for the decentralization of environmental responsibilities will enable decentralization and local environmental management in all of the nation's municipalities. The experience in generating local resources to finance SLM will alleviate the present dependence on the national budget and thus reducing paternalism as a paradigm for conservation.

91. At the local level, the population of the area will enjoy increased access to the natural capital on which the sustainability of their livelihoods depends, and will also receive direct economic and social benefits through the provision of compensation for the costs of carrying out sound land management that are coupled with rural investment programs that will directly reduce poverty. Investments in the planning process will ensure better management and decision-making beyond the scope of land degradation. The information and procedures for decision making will result in a municipal investment plan that will benefit all resident through increased and targeted investments in harmony with the landscape. The forging of relationships between the municipalities and NGOs will increase the flow of benefits and add creativity to municipal development and solution of land degradation problems. The mechanism to foment fundraising will benefit both NGOs and municipalities resulting in increased capital for productive and land degradation initiatives, leaving additional revenue from the tax base for service delivery to the poor and to municipal empowerment.

Country Ownership: Country Eligibility and Country Drivenness

92. Nicaragua subscribed to the UN Convention to Combat Desertification in October 1997, ratifying it in February 1998. The project has also been endorsed by the General Secretary of the Ministry of Environment and Natural Resources, as GEF focal point, and the Assessor to the Minister for Environment and Natural Resources as CCD focal point (see endorsement letters in Section IV Part I). In addition, Nicaragua is signatory of the following pertinent international conventions:

- United Nations Framework Convention on Climate Change (signed 13 June 1992, ratified31 October 1995 and entry into force 29 January 1996).
- Kyoto Protocol to the UNCCD (signed 7 July 1998 and ratified in 18 November 1999).
- Convention on Biological Diversity (signed13 June 1992, ratified 20 November 1995).

- Bio-safety Protocol (signed 26 May 2000 and ratified 11 September 2003)

Relationship to National Plans and Priorities

93. The project is consistent with and strengthens the impact of the principal environmental policies and poverty reduction strategies as listed in Section I Part I(see Political Context). This is the first project under the NAP[17], and is located in a priority area for desertification and social development and incorporates actions that respond to the following strategic objectives: i) reclamation of degraded soils in the dry lands of Nicaragua, ii) mitigation of the environmental and social impact of drought in the dry lands of Nicaragua, iii) protection of natural resources: soil, water, forests and biodiversity, iv) institutional strengthening at the national and municipal levels. The project will therefore be the first initiative to make operational the NAP.

94. The project will unite 2 national plans with parallel approaches to decentralized government and resource management. On one hand, the project will support INIFOM's efforts to provide technical support to the municipal decentralization process under the Municipal and Public investment law (290) and MARENA's strategy to divest responsibility for environmental management (PANic) by investing in the technical development of municipal environmental units and in targeted training and technical assistance to the CDM's and by the creation of financial mechanisms.

95. The project will respond the National Development Plans and to the National Poverty Reduction Strategy by supporting environmental sustainability and financial sustainability criteria for targeted investments. The present project has been developed in cooperation with the principal partners for rural investment in alternative economic opportunities, such as the Ministry of Agriculture, Livestock and Forestry (MAGFOR), the Rural Development Institute (IDR), the Ministry of Education (MED), the Ministry of External Relations (MINREX), FAO, IFAD and institutions and NGOs working in the field of sustainable land management.

96. At the national level, the project is consistent and complementary with the Small Grant Programme, which has designed a country strategy where for the next two years; the Program will concentrate its efforts in protecting biodiversity of the northern part of the country coinciding with the Project target area. This strategy was developed following the priorities identified in the National Biodiversity Strategy which identified the northern part of the country as the most important in terms of conserving biodiversity due to the existing threats and changes in land use. The program supports local NGOs and Community Based Organizations working in protected areas and their buffer zones. The project will also contribute to strengthen Nicaragua's participation and level of compliance with the United Nations Convention to Combat Desertification and Drought.

97. The Government of Nicaragua along with UNDP as its key partner have given new impulses to programs aimed at stemming the rampant levels of rural poverty, by generating employment and public/private partnerships. The country has a sound strategic framework on which to link up this capacity building project, which will enable the National Action Plan (NAP) to gain momentum and have a direct impact on local development processes. By working through incipient regional, departmental and local development committees, an emerging governance arrangement is currently being set up by UNDP in order to strengthen linkages between national strategies and local realities.

[17] MARENA 2003 Plan Nacional de Acción para la Lucha contra la Desertificación y la Sequía.

98. The proposed project is in line with the United Nations Development Assistance Framework (UNDAF), specifically its line of action "Social and environmental sustainability". Among the goals related to this area are: the promotion of policies of land use planning, with an integrated and cross-sector approach, and the reduction of environmental vulnerability through the promotion of practices for sustainable natural resource use. The project is also is in line with the UNDP Country Cooperation Framework (CCF) that states for the area of environment and energy states the following expected results: the integration of environmental policies into national and local development plans, the validation of innovative experiences of conservation and sustainable natural resource use; and the strengthening of local capacities to combat desertification processes and to mitigate the effects of drought in critical areas.

Sustainability

99. The project components are designed to achieve SLM and catalyze the sustainability of the initiative within the political, institutional, social, financial, and environmental realms.

100. **The political/institutional sustainability** will be guaranteed by the end of the project through the numerous political reforms proposed in Outcome 1. The creation of policies and strategies that ultimately empower territorial management at the local level will replace the one-dimensional centralized management of the land base that has resulted in land degradation. The political reforms, coupled with the capacity building components for the CDCs and MDCs and consciousness-raising will contribute to the sustainability formula. The development of partnerships between municipalities and NGOs will also aid in the sustainability of the mechanism. The integrated territorial management approach will facilitate the financial and environmental sustainability as described below. Upon completion of the project, the municipal governments and main partners will have taken responsibility for the environmental management of their territory, and will have been strengthened by the decentralization process promoted by MARENA and INIFOM. These governments will be able to develop Municipal Development Plans (MDPs) with crosscutting SLM contents, localize the productive systems and project investments according to maps on land use zones, and implement appropriately formulated municipal regulations to give orientations on adequate land use and the territorial ordering of productive activities. The effective implementation of these tools will be supported by a legal framework that has been strengthened as to its SLM contents, by the implementation of the Law on Territorial Ordering and the Law on Soil Conservation.

101. **Social sustainability** will be guaranteed by the project's impact on the improvement of the living conditions and health of the population. The spreading out of productive systems and sustainable practices (in agriculture, livestock farming and forestry) will increase harvests, reduce the local food deficit and improve drinking water availability and increase social capital. These social benefits will be key elements to support the project's sustainability, since they will motivate the population to implement SLM practices on their plots and to participate in the local management mechanisms (MDC, rural committee, etc), to achieve the incorporation of SLM in national and local policies and strategies. Social sustainability will also be assured by the public participation strategy at diverse levels. The public participation forum provides adequate checks and balances and opportunities for learning and adaptive management based on public content.

102. **Financial sustainability** will be guaranteed through the development of the local financial management capacities aimed at SLM. The effective functioning of the Semi-autonomous Municipal Financial Management Support Unit (UAFM) will be the cornerstone of financial sustainability in the continuity of the productive model developed by the project. The municipalities will be covering part of the costs and will assume all of the costs of the UAFM in the long term, thus guaranteeing its financial sustainability. In this regard, the shared environmental unit will also help reduce the staffing problem

since the total staffing will be reduced rather than augmented. A shared unit will be easier to financially sustain in the long term and is also a cost efficiency measure. This Unit will develop local capacities and promote the raising of both internal and external funds aimed at environmental agendas and the collection of financial resources through the payment of environmental services based on water user fees and local land taxes. Funds generated from land taxes and water-user fees will need to be re-invested in the farming systems within a given municipality. Although the environmental compensation packages will be designed during the full project with stakeholder participation, one of the strategies or incentives to be considered would be to lower these fees for users in exchange for proper system placement and good practices. The capacity building program at the municipal level would need to install the ability to do this.Besides financing environmental projects of the seven municipalities, the funds raised will cover the operational costs of the UAFM and the environmental units to guarantee their effective performance in the long-term. The lesson learned for all stakeholders will be that financial sustainability is a function of investment in fundraising and financial planning. As a result of the diagnosis presently being conducted by the ONDL on PES in the seven municipalities, the project will proceed to test it as an option to contribute to economic sustainability.

103. **Environmental sustainability** will be guaranteed by the cultural change as to the use of the land fostered by the project. Environmentally deteriorating systems and practices will be substituted by sustainable systems and practices that protect natural resources, biodiversity and the restoration of soil fertility, foster an increase in water resources and wildlife, the development of forest ecosystems and the improvement of the living conditions of the population, as well as provide more global environmental benefits. The key to environmental sustainability will be the establishment of the integrated territorial management plan that includes an investment plan that will target productive opportunities that are in harmony with the bio-physical characteristics of the land. The management plan at the municipal level will reduce the discrepancies through fiscal incentives and through the promotion of investment. Although private activities that differ from the plan will continue on private land, there will be fewer incentives for those types of activities. As all stakeholders validate the system, public support for the system will be generated.

Replicability

104. Sustainability will be the key to make the project replicable. The success of the project, when adjusted according to the results of mid-term and final evaluations will demonstrate that the political, technical, and financial barriers have been removed. These same barriers confront the remaining municipalities in Nicaragua's drylands, who will be provided with a formula for combating land degradation. The political reforms would have a multiplier potential for all municipalities in the country allowing that project actions in the development of local ordinances and territorial management planning would have a mandate to be replicated. Counterpart agencies, especially INIFOM, will immediately adopt the lessons learned into their existing programs throughout the remainder of the drylands. The mayors and the municipal development committees will be important ambassadors, who will be expected to share their experience with their counterparts at the departmental level. Authorities from other municipalities will be invited to receive the information and the experiences of the project. The aspects of territorial planning will reach beyond the drylands and become a model of integrated and participatory management that MARENA, MAGFOR, INETER, and INIFOM can apply in all municipalities throughout Nicaragua. The success of the financial mechanisms will also provide replicable models for application by other municipalities that could gradually help them pay for similar innovations. The model projects will also provide information on the most productive and profitable options for drylands that could be prioritized through the PESA and PRODESEC projects. Project publications will be an important mechanism for disseminating lessons learned and fomenting replicability (see Part IV, Monitoring and Evaluation).

105. The mentioned models could easily be replicated through the FAO/PESA network throughout the dry corridor, especially in Guatemala and southern Mexico. In addition, the lessons learned will be shared through the UNDP network of emerging OP-15 projects in Mexico, Venezuela, and the Dominican Republic, in addition to the South-south Cooperation Initiative of the Global Mechanism and FAO which will be used as a channel for international and inter-agency replication. The project will use seminars, media, publications, and printed materials to replicate the lessons learned for which a total of $ 263,400.00 USD has been budgeted (please refer to Section IV Part VII).

PART III. Management Arrangements

Consultation, coordination and collaboration between IA's, and IAs and EXAs

106. During the project design phase, there has been extensive consultation and coordination between IAs, specifically UNDP, FAO and IFAD to enhance stakeholder participation and to avoid overlapping and duplication of functions in the target area. As described, FAO, through INTA, is working on the second phase of the PESA project, which will impact Nicaragua's dry areas and IFAD is working with IDR and their PRODESEC project, also in the target area of the country. Several meetings with both IAs were conducted during the elaboration of the concept paper and PDF-B which were further extended to IDR and INTA during the execution of the PDF-B. All these IAs and EXAs will be invited to participate in the Project Coordination Committee to ensure ongoing coordination and thus avoid overlapping. It is important to mention that this full size initiative is also facilitating the coordination process between a wide range of national EXAs, more specifically, MARENA, MAGFOR, INTA, IDR, INETER AND INIFOM, all of which are related with land management and natural resources but have lacked the space to coordinate efficiently.

Implementation/execution arrangements

107. The Government of Nicaragua will execute the project during 5 years under the UNDP National Execution (NEX) mode. In its capacity as executing agency, the Ministry of Environment and Natural Resources (MARENA) will be responsible for directing the project, meeting the immediate objectives and projected outputs, making effective and efficient use of the resources allocated in accordance with this Project Document, and ensuring effective coordination between the Project and the other existing projects in the country dealing with land degradation and sustainable land management, including coordination with FAO and IFAD.

108. The Project will be coordinated through a **Project Coordination Committee (PCC),** which will serve as the operational entity for executing the project. The PCC is chaired by a senior level representative of MARENA, who is also the UNCCD focal point, UNDP-Nicaragua, and representatives of principal national level associates and co-financers: FAO, MAGFOR, INIFOM, INTA, INETER IFAD/IDR/PRODESEC, y FUNICA. Once the Project is in the process of being approved, MARENA, together with UNDP, will take on the responsibility of forming the Committee, ensuring the participation of all the interested sectors. The committee has been meeting on an informal, bi-monthly basis during the project development stage. During project implementation, the committee will meet quarterly.

109. The project staff structure will be comprised of a National Project Director (DNP) and a National Project Coordinator (NPC). The GEF National Focal Point will serve as the National Project Director, who is responsible for supervising the project for MARENA and works in a liaison capacity with the NPC. The DNP position is required within Nicaragua's protocol for managing external donations. The

NPC is the project manager of the administration and execution of the activities provided for in the project. The NPC will operate from the target area of the project with the support of a technical assistance team comprised of 3 promoters.

110. On a yearly basis, the PCC will report to an executive committee comprised of UNDP-Nicaragua, MARENA and the Foreign Affairs Ministry. The Executive Committee adopts strategic decisions, approves the project's operational plan and its budget. The Executive Committee meets yearly in a tripartite review meeting (See Monitoring and Evaluation, Section I, part IV).

111. MARENA will follow the norms and procedures specified in UNDP's NEX manual in the execution of the project. UNDP will track the direction and guidance of the project in order to contribute to maximize the scope, impact and quality of its outputs. In addition, as a GEF implementing agency, it will be responsible for administering the resources in accordance with the immediate objectives of the Project Document, and observing its own guiding principles of transparency, competitiveness, efficiency and economy. Financial management and accountability of resources as well as other project execution activities will be under UNDP country office direct supervision. Upon approval of project, and development of annual operative program, in cases agreed by project counterparts, the UNDP Nicaragua office will be able to charge the project directly for Implementation Support Services (ISS) on a transaction basis using a universal price list. If required, local NGOs might be sub-contracted by the project to carry out specific activities under their field of expertise in accordance with the CDMs.

112. MARENA, is the Project administrative and managerial body. The UNDP/PMU will implement the Project in accordance with UNDP's administrative procedures for National Execution (NEX) projects. The UNDP/PMU will carry out the internal project monitoring and evaluation activities, taking into consideration from the outset the local project management capability, the constraints and training needs, as well as the effectiveness and efficiency of communications between those ministries and institutions relevant to the Project.

113. MARENA, through UNDP/PMU, will prepare the Annual Work Plan reflecting the Project's activities and the outcomes to be achieved through their implementation. The Plan will indicate the implementation periods of each activity and the parties responsible for carrying them out. The first Work Plan will be completed and attached to the present Project Document no later than 30 days after its signing. During the elaboration of the AWP, the participation of the project partners will be essential for the success of the planning phase. These are FAO, IFAD as well as MAGFOR and IDR.

114. UNDP Nicaragua will be responsible to supervise and administer the full size phase of the programme. UNDP will closely coordinate with FAO and IFAD in terms of technical assistance and expert provision during the conformation of the PDFB executing unit. The PMU team will need to have sufficient authority in order to be able to negotiate with government bodies, and in particular with the programme's main partners (MARENA, MAGFOR and IDR) but also the required flexibility to discuss issues regarding the design of the bigger programme with donors, financial entities as well as with NGOs. UNDP will be responsible for the project's financial reporting and administrative controls during this preparatory phase and will hire the team of consultants to carry out the project.

115. Finally, in order to accord proper acknowledgement to GEF for providing funding, all projects documents will include a paragraph to explicitly require that a GEF logo appear on all relevant GEF project publications, including among others, project hardware and vehicles purchased with GEF funds. Any citation on publications regarding projects funded by GEF should also accord proper acknowledgment to GEF. The UNDP logo should be more prominent and separated a bit from the GEF logo if possible as, with non-UN logos, there can be security issues for staff.

PART IV. Monitoring and Evaluation

116. Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures and will be provided by the project team and the UNDP Country Office (UNDP-CO) with support from UNDP/GEF. The Logical Framework Matrix provides *performance* and *impact* indicators for project implementation along with their corresponding *means of verification* (Executive Summary Annex B). These will form the basis on which the project's Monitoring and Evaluation system will be built.

Monitoring and Reporting

Monitoring responsibilities and events

117. A detailed schedule of project reviews meetings will be developed by the project management, in consultation with project implementation partners and stakeholder representatives and incorporated in the Project Inception Report. Such a schedule will include: (i) tentative time frames for Tripartite Reviews, Project Coordination Committee Meetings, (or relevant advisory and/or coordination mechanisms) and (ii) project related Monitoring and Evaluation activities (See also Indicative Monitoring and Evaluation Budget, Section II, Part III). The project's M&E system will dispose of M&E municipal sub-systems to make it a more effective and participatory system and to ensure that local communities and partners participate in this process. The objective of the sub-systems is that the local stakeholders take ownership of the results of the project.

118. *Day to day monitoring of implementation progress* will be the responsibility of the Project Coordinator based on the project's Annual Work plan and its indicators. The Project Team will inform the UNDP-CO of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely and remedial fashion.

119. *Periodic monitoring of implementation progress* will be undertaken by the UNDP-CO through quarterly meetings with the project proponent, or more frequently as deemed necessary. This will allow parties to take stock and to troubleshoot any problems pertaining to the project in a timely fashion to ensure smooth implementation of project activities.

Project Monitoring Reporting

120. The Project Coordinator in conjunction with the UNDP-GEF extended team will be responsible for the preparation and submission of the following reports that form part of the monitoring process.

(a) Inception Report (IR)

121. A Project Inception Report will be prepared immediately following the Inception Workshop. It will include a detailed First Year/ Annual Work Plan divided in quarterly time-frames detailing the activities and progress indicators that will guide implementation during the first year of the project. This Work Plan would include the dates of specific field visits, support missions from the UNDP-CO or the Regional Coordinating Unit (RCU) or consultants, as well as time-frames for meetings of the Project Coordination Committee. The Report will also include the detailed project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan, and including any monitoring and evaluation requirements to effectively measure project performance during the targeted 12 months time-frame.

122. The Inception Report will include a more detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners. In addition, a section will be included on progress to date on project establishment and start-up activities and an update of any changed external conditions that may effect project implementation. When finalized the report will be circulated to project counterparts who will be given a period of one calendar month in which to respond with comments or queries. Prior to this circulation of the IR, the UNDP Country Office and UNDP-GEF's Regional Coordinating Unit will review the document.

(b) Quarterly Operational Reports

123. Short reports outlining main updates in project progress will be provided quarterly to the local UNDP Country Office and the UNDP-GEF regional office by the project team.

(c) Technical Reports

124. As part of the Inception Report, the project team will prepare a draft Reports List, detailing the technical reports that are expected to be prepared on key areas of activity during the course of the Project, and tentative due dates. Where necessary this Reports List will be revised and updated, and included in subsequent APRs. Technical Reports may also be prepared by external consultants and should be comprehensive, specialized analyses of clearly defined areas of research within the framework of the project and its sites. These technical reports will represent, as appropriate, the project's substantive contribution to specific areas, and will be used in efforts to disseminate relevant information and best practices at local, national and international levels.

(d) Project Publications

125. Project Publications will form a key method of crystallizing and disseminating the results and achievements of the Project. These publications may be scientific or informational texts on the activities and achievements of the Project, in the form of journal articles, multimedia publications, etc. These publications can be based on Technical Reports, depending upon the relevance, scientific worth, etc. of these Reports, or may be summaries or compilations of a series of Technical Reports and other research. The project team will determine if any of the Technical Reports merit formal publication, and will also (in consultation with UNDP, the government and other relevant stakeholder groups) plan and produce these publications in a consistent and recognizable format.(See table 12 for budget of publications).

(e) Mid term and Final Evaluation

126. The project will be subjected to at least two independent external. The first will be an independent **Mid-Term Review** (MTR), at 2.5 years after start-up. This will determine progress being made towards the achievement of outcomes and will identify course correction if needed, focusing on effectiveness, efficiency and timeliness of project implementation; highlight issues requiring decisions and actions; and present initial lessons learned about project design, implementation and management. The timing of the mid-term evaluation will allow coordinators to make any modifications necessary to incorporate improvements or changes in the project's activities for the remaining project period.

127. An independent **Final Evaluation** will take place six months prior to the terminal tripartite review meeting, and will focus on the same issues as the mid-term evaluation and will seek information specific to the re-engineering of the Master Plan. The final evaluation will also look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals.

Audit Clause

128. The Government of Nicaragua will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government. The project foresees an audit to be conducted at the end of the project by a recognized national firm.

Table 1. Indicative Monitoring and Evaluation Work Plan and Budget

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team Staff time*	Time frame
Inception Workshop	▪ Project Coordinator ▪ UNDP CO ▪ UNDP GEF ▪ UNCCD	1,250	Within first two months of project start up
Inception Report	▪ Project Team ▪ UNDP CO	None	Immediately following IW
Measurement of Means of Verification for Project Purpose Indicators	▪ Project Coordinator will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members	To be finalized in Inception Phase and Workshop. Indicative cost 7,500	Start, mid and end of project
Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis)	▪ Oversight by Project GEF Technical Advisor, Project Coordinator and Zone Coordinators. ▪ Measurements by regional field officers and local IAs	To be determined as part of the Annual Work Plan's preparation. Indicative cost 29,000	Annually prior to APR/PIR and to the definition of annual work plans
APR and PIR	▪ Project Team ▪ UNDP-CO ▪ UNDP-GEF ▪ UNCCD	None	Annually
TPR and TPR report	▪ Government Counterparts ▪ UNDP CO ▪ Project team ▪ UNDP-GEF Regional Coordinating Unit ▪ UNCCD	None	Every year, upon receipt of APR
Project Coordination Committee Meetings	▪ Project Coordinator ▪ UNDP CO ▪ UNCCD	None	Following Project IW and subsequently at least once a year
Executive Committee Meetings	▪ Project Coordinator ▪ UNDP-CO Resident Representative ▪ Foreign Affairs ▪ MARENA	None	Yearly
Municipal M&E sub-system reports	▪ Municipal Environmental Units	None	Every 6 months
Periodic status reports	▪ Project team	None.	To be determined by Project team and UNDP CO
Technical reports	▪ Project team ▪ Hired consultants as needed	$ 10,000	To be determined by Project Team and UNDP-CO
Mid-term External Evaluation	▪ Project team ▪ UNDP- CO	$ 20,000	At the mid-point of project implementation.

	▪ UNDP-GEF Regional Coordinating Unit ▪ External Consultants (i.e. evaluation team)		
Final External Evaluation	▪ Project team, ▪ UNDP-CO ▪ UNDP-GEF Regional Coordinating Unit ▪ External Consultants (i.e. evaluation team)	$ 30,000	At the end of project implementation
Terminal Report	▪ Project team ▪ UNDP-CO ▪ External Consultant	None.	At least one month before the end of the project
Publication of lessons learned *Note: replication is budgeted separately*	▪ Project team ▪ UNDP-GEF Regional Coordinating Unit (suggested formats for documenting best practices, etc)	$ 17,500 (average 3,500 per year)	Yearly
Audit	▪ UNDP-CO ▪ Project team	$ 35,000 (average 7,000 per year)	Yearly
Visits to field sites (UNDP staff travel costs to be charged to IA fees)	▪ UNDP Country Office ▪ UNDP-GEF Regional Coordinating Unit (as appropriate) ▪ Government representatives	$ 18,500 (average one visit per year)	Yearly
TOTAL INDICATIVE COST *Excluding project team staff time and UNDP staff and travel expenses*		**$ 168,750**	

Part V. Legal Context

129. The present Project Document will be the instrument referred to under Article 1 of the Basic Agreement for Technical Assistance between the Government of the Republic of Nicaragua and the United Nations Development Program (UNDP), signed by both parties on May 4, 1978. For purposes of the Basic Agreement for Technical Assistance, where the term "Government Executing Agency" is mentioned, it is understood to mean the host country's executing organization as described in said Agreement.

130. Any substantial revision of the Project Document that has significant implications for the contents of the Project, as well as the use of the allocated resources, will require the approval of the Project Steering Committee, the signature of the National Project Director, in representation of the Public Ministry, and the signature of the Executive Director of MARENA, who will accompany the direction and guidance of the Project.

131. The following budgetary revisions will require only the approval and signature of the Resident UNDP Representative:

- Compulsory annual revisions, reflecting the real expenses of the previous year, duly certified by the national counterpart, and the reprogramming of unused funds for subsequent years, based on the delivery of inputs as agreed upon in this Project Document.
- Revisions that do not entail significant changes in the immediate objectives, the project's activities or its outputs, but that result from a redistribution of the inputs agreed upon, or are due to increased expenses caused by inflation.

132. The substantial or budgetary revisions will be prepared by UNDP/PMU, in accordance with the requirements of the Project itself.

133. Furthermore, in case there are adjustments to the immediate objectives, the outputs or the activities proposed in the UNDP Project Document, substantial revisions will need to be made in advance, and must receive the signed approval of both UNDP and the Executing Agency

SECTION II: STRATEGIC RESULTS FRAMEWORK

PART I. Incremental Cost Analysis (See Executive Summary Annex A)

A. Project background

134. The project aims to integrate SLM concerns (land use analysis, land function analysis, inter-sector planning) within the context of a participative and integrated municipal territorial planning approach. Territorial planning will lead to the creation of "investment zones" that delineate areas for investment based on the functionality of the ecosystem and on municipal priorities. While building the territorial management process, short term measures to harmonize SLM concerns into existing poverty reduction projects will be implemented to immediately reduce land degradation. The innovative aspect of the strategy is that it will promote a gradual change from present land use to more appropriate land use where discrepancies exist via targeted incentives rather than by command and control strategies. The project design also seeks to recognize the extensive and well designed municipal participation framework as a vehicle for developing the territorial management plans. To complement that network, the financial component will generate new synergies between municipalities, agencies and NGOs in sharing the costs and revenues related to fundraising and cooperation in targeting their investments to generate synergies needed to support municipal development plans. Ultimately, the use of an integrated resource planning process oriented to the functionality of the land and to improving peoples' livelihoods for the purpose of economic development will be an innovation not only for the seven municipalities but for Nicaragua in general.

B. Incremental cost assessment

Baseline Assessment

135. Nicaragua has a legal/political structure that provides for the decentralization of political and environmental concerns that creates the potential for sustainable land management. At the municipal level, a multi-level participatory political structure has been developed by INIFOM with support through 2 separate projects: the Municipal Project Participation Initiative and the Municipal Development and Strengthening Program, which has invested an estimated $422,000.00 within the target municipalities, forming municipal processes, local development committees, technical units, and community training in the participatory process. Additional investments in the participatory system have been realized through World Bank, IDB, and DANIDA executed via MARENA to establish existing environmental units and technical units, taking the first step towards the decentralization of environmental responsibilities. The transfer of environmental responsibilities to the municipalities was not possible to complete due to missing legislation and policies that will provide the municipalities with due authorization. MARENA is now hesitant to transfer environmental responsibilities to the municipalities until their technical capacity increases.

136. In relation to the technical capacity to implement SLM at the ground level, the national agencies (MARENA, MAGFOR, INTA) maintain delegates at the departmental level and some delegates in the municipality of Sauce. None of the agency delegates has sufficient training to incorporate SLM concerns into their programs. MAGFOR has produced digital information for all of the municipalities and map sets. The data is territorial organization and management available in a scale required by the local technicians for operational programming. The municipal environmental units are staffed and have small offices provided by the municipalities and generally one computer. They lack training and practice in SLM themes and concerns for land use planning. The local capacity to plan for the management of municipal lands remains incomplete. The technical capability to generate digital information about land

use is installed in MAGFOR, and INETER. Digital information on land use is available for the target communities. That information has territorial organization and management has not been used for land use planning or as a basis for negotiation with rural people for training and for land use. Local input was not sought.

137. Important technologies have been developed in Nicaragua for environmentally sound soil, water, and environmental management at the farm level. A 24 M USD known as the TROPISEC program[18] dedicated an estimated $4 M USD to the development and validation of new and indigenous technologies that mitigate the effects of drought and poverty between 1996 through 2002. TROPISEC developed the dryland technologies through IDR in 20 municipalities within the provinces of Estelí, Madríz, y Nueva Segovia, which have remained un-transferred to producers in the remaining dryland municipalities. MAGFOR and INTA delegates are unaware and untrained in these technologies and are without a strategy to discover local technologies that will mitigate the effects of drought, are productive, and are environmentally sustainable.

138. Poverty alleviation programs to respond to the food security situation following the most recent El Nino phenomenon were implemented by FAO with additional support from AECI. The Special Food Security Program (PESA) was implemented in the drylands of Nicaragua, including the target Municipalities, to contribute to the availability and access to nutritious food for the families within the municipalities of Nicaragua's dry zone through extension and training, diversification and intensification of production systems, Natural resources and water management, and commercialization, financing, and marketing of rural micro-enterprises. Both projects were executed by INTA, who has an installed capacity of 24 technicians based in Leon y Chinandega in the departmental office, of which 13 extensionists support the target municipalities. The PESA II initiative is about to begin. Several important additional economic stimulus projects (described below) are near implementation. Those projects do not have a process for targeting their investments towards the bio-physical aspects of the land, or gauging the environmental impacts associated with their implementation, running the risk of intensifying present productive activities and thereby further degrading the land base.

139. There is no sustainable financing mechanism to maintain or equip the municipal environmental units or to implement on-the-ground investments in agriculture, grazing, or forestry. MARENA is launching an initiative with the support of the Global Mechanism to realize a diagnostic study to support environmental service payments. The study will identify obstacles and opportunities for the application of environmental service schemes in Nicaragua. Municipalities have the authority to finance their activities through the Land and land use taxes but lack the tools and planning experience to do so. In the absence of a comprehensive water law, MARENA has the authority to charge for irrigation water use. They likewise do not, however, have the operational tools to do so. ENACAL, the national water corporation, does not pay for the environmental aspects for water availability. The local NGOs do territorial organization and management operate in harmony with the municipality or respond to any systematically developed priorities, limiting their ability to generate fresh capital for the area.

Status Quo without the GEF alternative.

140. Without the GEF alternative, the baseline scenario will continue. At the national political level, MARENA and MAGFOR will continue to lack several key regulations that will enable them to effectively transfer environmental responsibilities to the municipalities, where land degradation actually occurs. In addition, the national and municipal institutions will be limited in their ability to generate revenues for programs via environmental service and compensation schemes. Under the baseline scenario, the participatory municipal structure will maintain itself at the present level of activity. The Municipal development committees, the environmental units, and the various technical committees working at the municipal level will not have the tools or training necessary to reduce land degradation by

[18] TROPISEC was financed by the UE, IFAD, World Food Program, and the government of Nicaragua

mainstreaming SLM into a holistic municipal planning framework, assuring that land degradation will continue to occur. Investments from economic stimulus packages and via NGOs, will not be targeted in accordance to the capability of the land, making it possible for investments without proper controls to exacerbate land degradation by supporting inappropriate practices or facilitating productive activities not appropriate for the characteristics of the land. The municipal environmental units and technical units will suffer for lack of investment and will ultimately close for financial reasons. Those that remain operative, will have only limited success planning and in responding to environmental problems. The geographic information generated will not be used for territorial planning. In the more advanced municipalities, the land-use planning process will remain at the technical level without public knowledge or comment that will assure future participation of the local population in the planning process. Sustainable land management will not be considered as part of the municipal planning process. Future investments by public and private sources will not be targeted or apply the appropriate controls, leaving doubt as to whether the investments will actually reverse land degradation or improve ecosystem structure and functions. Without the GEF alternative, land degradation will continue or increase in relation to the investments in the poverty reduction programs. Soil fertility and later productivity will continue to decline. People will continue to scavenge for firewood or other economically viable opportunities that extract from the land in an unregulated environment. Ecosystem stability and resilience will be further compromised and secondary effects to the global environment will continue unmitigated.

Global environmental objective

141. The project seeks to assure ecosystem resilience and stability by reversing the process of land degradation that leads to soil fertility loss and deforestation, which increase the vulnerability of the local population to the effects of drought and ultimately deepening the process of land degradation. The project will also have added global benefits in the focal areas of Biodiversity and Climate Change.

Alternative

142. The GEF alternative will add SLM concerns to the baseline situation by funding and/or co-financing activities that will remove the political, capacity, and financial barriers thus enabling sustainable land management through political reform, technical capacity building, technology transfer, mainstreaming SLM into local development programs, and sustainable financing for SLM.

143. Within the political realm, GEF will support the development of enabling legislation at the national level and will support the incorporation of SLM into policies, plans, and programs at the municipal level. Improved organizational capacities at community level will enable the various levels of local stakeholders to influence policies, plans and programmes, making them more appropriate for their lands and production systems, thus increasing their likely relevance and effectiveness. Mainstreaming SLM into the local planning framework will lead to environmentally sound investments that will reduce land degradation. Improved technical capacities of National delegates and municipal level technicians and the provision of tools will permit the design of municipal activities and programs that will reduce land degradation and the development of tools to make operational municipal finance schemes. Improved institutional capacities will permit better technical support to municipal planners, agency delegates working at the local level, and to community representatives involved in the political process. Increased awareness and knowledge of SLM by politicians, resource managers, community representatives, and producers will generate support the territorial planning process and enhance of the grass roots groups that are wary of the impacts of land-use planning. The mainstreaming of SLM and technical support to FUNICA and INTA in the development of environmental controls and environmental impact procedures will guide the management and approval process of FAT and PESA II funds, assuring that those

investments are in harmony with the bio-physical conditions of the land and reduce the root causes of land degradation. Increased access to finance will assure long term environmental planning at the municipal level, and resources to support future investments in on-the-ground actions as determined by the municipal development plan.

144. The GEF alternative will result in a combination of local, national and global benefits. Local benefits will be realized with the poverty reduction programs and the increase in organizational and planning abilities. Sustainable financing activities for SLM will also generate the expertise to finance a range of additional local development issues, thus contributing to the reduction of poverty in drought stricken areas. Nationally, the decentralization of environmental responsibilities will create a model within Nicaragua of local control and responsibility that can be replicated throughout the country. Through innovative structures, such as the creation of a municipal financial support unit, the experience in generating local resources from diverse schemes and sources to finance SLM will alleviate the present dependence on the national budget and thus reducing paternalism as a paradigm for conservation. Globally, the project will increase the capture and absorption of carbon by an estimated 2 M tonnes, increase the capture and yield of water, reduce soil erosion on the model sites by 58%, and reduce the pressure on sensitive and biodiversity rich dry ecosystems.

145. Co-financed incremental activities will complement the GEF increment by providing salaries, local and public infrastructure, funding and expertise in promoting new legislation and institutional reform at the national level, funding for productive agricultural projects and off-farm employment, and information for the development of financial schemes, and the local decision making forum.

Systems boundary

146. The time boundary for the project is a 5 years, sufficient time to properly carry out the project taking into consideration the favourable conditions present in the country and the strategic partnerships developed during the preparatory phase. The system boundary for political and financial activities will benefit all municipalities in nation by creating a political-legal model for that will enhance replication of the project in all municipalities throughout the drylands. The model of territorial organization will provide a model for municipal management that could also be applied nationwide, but will affect directly the 7 target municipalities of Cinco Pinos, Santo Francisco del Norte, Achuapa, Santa Rosa del Peñón, San Francisco Libre, El Jicaral and El Sauce. The area of intervention of the project that will directly address land degradation is the Municipal system and the productive landscape within the target municipalities where land degradation processes occur. The project will engage municipal and agency authorities to promote and finance SLM while involving community representatives and stakeholder groups in the territory planning process and as a result, engage them in the political process. Within this area, a partnership between government agencies, municipalities, national and international programs will work together to transfer technology and create opportunities for farmer participation is the solution of land based problems at the community level.

C. Summary of Costs

147. The full cost of the project is $20,835,339, of which $340,700 has already been granted by the GEF in the form of a PDF B for project preparation support. The cost of the full project will be met by a GEF grant of $3,000,000 and $17,494,639 in co-financing of which $12,583,000 is from Bi-lateral donors (IFAD, FAO, AECI, ACDI, USAID, and others), $4,761,639 is from the Nicaraguan government, and $150,000 from UNDP. The co-financing ratio for the full project is 5.8:1.

148. The amount of GEF funding requested for the full project is greater than that originally estimated. The PDF-B design team and stakeholders identified additional project interventions in the political and financial realms and the costs of producing the integrated territorial management plans are much higher than the original expectations because the participation of the local stakeholders was much less than expected. In fact, no stakeholders had been consulted on any territorial management issues, thus raising the costs of consciousness raising and grass roots development for the integrated territorial management plan. Note that the Co-financing presented is within the expected range for the higher project total submitted.

Table 2: Indicative Outputs, Activities and Semester-based Work plan

Outputs	Activities	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Output 1.1: Political, technical, and judicial decision-makers develop effective attitudes with respect de sustainable land management.	1.1.1. Hold 4 seminars for 150 key national officials.	X	X	X	X						
	1.1.2. Hold 21 local workshops for 350 leaders and technicians.	X	X	X	X						
	1.1.3. Implement a Strategy of conscientiousness about SLM.	X	X	X	X						
	1.1.4. Establish strategic alliances between national and local participants for and efficient articulation of the SLM	X	X	X	X	X	X	X	X	X	X
Output 1.2: Integrated territorial management plan is validated/ratified at the national and community level in each of 7 municipalities.	1.2.1. Complete the instruments for territorial organization	X	X	X	X	X	X				
	1.2.2. Do national and local negotiations and agreements for territorial organization and management	X	X	X	X						
	1.2.3. Divulge the agreements reached in general assent regarding the territorial organization and management instruments	X	X	X	X						
	1.2.4. Apply the completed instrument to territorial organization		X	X							
Output 1.3: SLM is mainstreamed in public policy (strategies, laws, and regulations), programs, and in national and local planning structures	1.3.1. Achieve agreements between MARENA and local governments for the management of decentralized environments	X	X								
	1.3.2.Technical assistance plan directed to the makers of decisions for the crosscutting of SLM.	X	X	X	X						

Outputs	Activities	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
	1.3.3. Complete, together with SLM, existing laws and regulations and apply them in the 7 municipalities while incorporating the already designed gender policies.	X	X								
	1.3.4. Design and approve the ordinances for the 7 municipalities and territorial organization plans.	X	X	X	X						
	1.3.5. Lobby in favor of the approval of the territorial organization and management law (N C)	X	X	X	X						
	1.3.6. Design the SLM law for the Conservation of Land and obtain its approval	X	X	X	X						
	1.3.7. Apply the territorial organization to municipalities and towns as well as the law for conservation of the land and SLM	X	X	X	X						
	1.3.8. Develop a model for technical and legal support aiming towards the practical implementation of the SLM at the level of the 7 municipalities.	X	X	X	X						
Output 2.1: Participative community organizational structures fortified for political and technical management of SLM initiatives.	2.1.1. Carry out 70 training workshops on territorial planning, sustainable management of the land, organization and negotiation for 1000 participants of the CDM town committees.	X	X	X	X						
	2.1.2. Provide education materials to the CDM and town committees for the reproduction of knowledge.	X	X	X	X						
	2.1.3. Equip the CDM and provide them with educational material for their appropriate performance	X	X								
	2.1.4. Guarantee the integration and participation of the town committees in the CDM and provide them with educational material.	X	X	X	X	X	X	X	X		
Output 2.2: National and local technical capacity to promote and apply SLM	2.2.1 Carry out an SLM survey of the training needs of local and national technicians from the departmental delegations.	X									

Outputs	Activities	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
fortified	2.2.2. Carry out 9 theme and methodology workshops for national technicians and department delegations on the implementation and participative planning of SLM and territorial organization and management	X	X								
	2.2.3 Carry out 9 theme and methodology workshops for the local UA, UTM and NGO's on the implementation and participative planning of SLM and territorial organization and management	X	X								
	2.2.4. Carry out 7 workshops on methodology reproduction conducted by trained technicians and directed to the CDM on SLM and integrated territorial organization and management.			X	X						
	2.2.5. Carry out 35 workshops on SLM and territorial organization and management participative planning, reproduced by the CDM and directed to producers.			X	X						
Output 2.3: Municipal technical capacity to implement SLM developed.	2.3.1 Evaluate the technical and economic feasibility of installing an Intra-municipal Environment Unit	X	X								
	2.3.2. Strengthen the 7 EU of the Mayoralties	X	X	X	X	X	X	X	X		
	2.3.3. Guarantee the endowment of the CDM by the municipalities of enough trained and qualified technicians and of the operation of financial resources.	X	X								
	2.3.4. Provide basic equipment for SLM and territorial organization and management to the local instances responsible for local coordination.	X	X								
	2.3.5. Establish an updated digital information system about the territory and municipalities			X	X						
	2.3.6. Support MAGFOR with the performance of SIG in municipalities.			X	X						
	2.3.7. Support the Land Property Ombudsperson with the application of the law	X	X	X	X	X	X	X	X	X	X

Outputs	Activities	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Output 2.4. Models of new and indigenous Technologies to mitigate drought and maintain the ecosystem integrity and soil fertility are validated and adopted by producers	2.4.1. Technically and materially support the 14 reference farms identified in each municipality for their generation and validation through the support of INTA and FUNICA.			X	X	X	X				
	2.4.2. Implement 56 workshops on participative evaluation focused on generated and validated technologies.	X	X	X	X	X	X				
	2.4.3. Supervise the elaboration of management plans for systems and practices between INTA, FUNICA and farmers.	X	X	X	X	X	X				
	2.4.4. Systematize the production processes and practices which have been promoted in dry land and micro-irrigation					X	X	X	X	X	X
	2.4.5. Publish the successful technologies of the reference farms					X	X				
	2.4.6. Massively transfer the successful technologies with calculated costs and clearly defined economic and environmental benefits.	X	X	X	X						
	2.4.7. Document successful adoption of technology for dry land, micro-irrigation and environmental, social and economic impact.					X	X				
Output 2.5. INTA – FUNICA are strengthened for SLM technology generation, validation, and transfer.	2.5.1.Design the GVTT strategy	X	X	X	X	X	X				
	2.5.2. Jointly work with INTA and FUNICA in the POA 2006 and in the coming years to incorporate the GVTT	X	X	X	X	X	X	X	X		
	2.5.3. Carry out 6 training workshops for the technical staff at INTA and FUNICA on GVTT for SLM	X	X	X	X						
	2.5.4. Carry out two participative self-evaluations on the strategy, one at mid-term and a final one with recommendations					X	X			X	X

Outputs	Activities	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Output 3.1. IDR-PRODESEC, FUNICA and PESA - INTA strengthened to implement their programs with ecosystem focus	3.1.1 Carry out 9 theme and methodology workshops directed to the IDR-PRODESEC, PESA – INTA, FUNICA technicians for the implementation of environment criteria, methodology study of environmental impact for future investments and ecosystem focus.	X	X	X	X						
	3.1.2. Carry out 9 workshops on environmental criteria, and methodology study of environmental impact directed to the IDR-PRODESEC promoterritorial organization and managers for the selection of projects and ecosystem focus.	X	X	X	X						
	3.1.3. Carry out 15 on site training tours for promoters and technicians.	X	X								
Output 3.2. Agency procedures and guidelines mainstreaming SLM established for the project approval process	3.2.1. Sign agreements between the IDR-PRODESEC-FUNICA project and PESA-INTA to incorporate the ecosystem focus on the programmed financing for production development.	X	X								
	3.2.2. Provide direct environmental advice to IDR-PRODESEC-FUNICA, PESA - INTA	X	X	X	X	X	X				
	3.2.3. Review the environmental criterion for the selection of the projects to be benefited by INTA and FUNICA throughout the dry zone	X	X	X	X						
	3.2.4. Develop a strategic joint intervention with INTA and FUNICA in the 7 municipalities, which incorporates as parameter for intervention, the restoration and conservation of the ecosystem.	X	X								
	3.2.5. Carry out technical monitoring to verify the effectiveness of the implementation in situ of the SLM environmental component in the 7 municipalities	X	X	X	X	X	X	X	X	X	X
Output 4.1. Capacity to develop financial strategies and finance actions within the municipal environmental agendas developed	4.1.1. Create the Municipal Financial Support Unit (MFSU)	X	X	X	X						
	4.1.2. Technical assistance for the (MFSU) to capture funds.	X	X	X	X	X	X	X	X	X	X

Outputs	Activities	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
	4.1.3. Elaborate a financial strategy for the administration and operation costs of MFSU's	X	X								
	4.1.4. Elaborate a financial requirement plan for the municipal environment agendas.	X	X	X	X	X	X	X	X		
Output 4.2. SLM is financed through projects funded through outside donations.	4.2.1. Promote negotiations with "twin towns" in order to get support for SLM	X	X	X	X	X	X	X	X		
	4.2.2. Promote the support of the private capital for SLM projects in each municipality	X	X	X	X	X	X	X	X	X	X
	4.2.3. Give Advice and Involve the 7 mayoralties and local NGO's in the formulation of projects and other initiatives to negotiate external and internal funds for SLM	X	X	X	X	X	X	X	X		
Output 4.3. SLM is financed through compensation for environmental services.	4.3.1. Design and apply the payment strategy for payments of environmental services	X	X	X	X						
	4.3.2. Establish plans for recharging irrigation and drinking water services.			X	X						
	4.3.3. Carry out a survey for the acceptance of payments.	X	X								
	4.3.4. Carry out negotiations for the payment of services.	X	X								
	4.3.5. Carry out a water value study	X	X								
	4.3.6. Elaborate a financial investment plan for SLM			X	X	X	X	X	X		

Outputs	Activities	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Output 5.1. Adaptive management determines the next development phase of municipal development.	5.1.1. Carry out a mid-term and a final evaluation with recommendations for the integrated territorial management plan, PDM and Environmental Plan systems.	X	X	X	X	X	X	X	X	X	X
	5.1.2. Carry out 7 mid-term and final participative self-evaluations, which must generate proposals to strengthen the SLM in the territorial organization and management system, PDM and Environmental Plans from the viewpoint of producers.									X	X
	5.1.3. Edit and publish a document of the systematization of the most successful experiences to be used at the national and international levels									X	X
	5.1.4 Strategy for the replication of models and lessons learnt									X	X
Output 5.2. Project execution through adaptive management	5.2.1. Effective project management	X	X	X	X	X	X	X	X	X	X
	5.2.2. Dissemination for replication of the information									X	X

SECTION III: TOTAL BUDGET AND WORKPLAN

TOTAL BUDGET AND WORKPLAN

Award:

Award Title: PIMS 3008/LD/FULL/Capacity Building for Sustainable Land Use

Project ID:

Project Objective (Atlas Output/Project) Sustainable Land Management in Drought Prone Degraded Areas of Nicaragua

Project Outcomes/Atlas Activity	Responsible Party	Source of Funds	PLANNED BUDGET & WORKPLAN						
			ERP/Atlas Budget Code	ERP/Atlas Budget Description	2006 US$	2007 US$	2008 US$	2009 US$	2010 US$	Total Amount
1. Sustainable land management at the municipal and community level is applied through policies, strategies, national and local laws, and structures.	UGP	62000	74500	Miscellaneous Expenses	3,600.00	3,600.00	3,600.00	3,600.00	3,600.00	18,000.00
			71300	Local Consultant	156,250.00	12,450.00	14,200.00	10,000.00	10,000.00	202,900.00
			71400	Contractual Services-Individuals	25,000.00	10,000.00	10,000.00	12,000.00	10,000.00	67,000.00
			74200	Audio Visual Printing Produc. cost	80,000.00	16,200.00	11,800.00	13,000.00	12,100.00	133,100.00
			72100	Contractual Services-Companies	30,000.00	20,000.00	20,000.00	20,000.00	20,000.00	110,000.00
				Sub-total Act.1 GEF	**294,850.00**	**62,250.00**	**59,600.00**	**58,600.00**	**55,700.00**	**531,000.00**
		PASOLAC/COSUDE			5,000.00	5,000.00	5,000.00	5,000.00	0.00	20,000.00
		ACDI			100,000.00	100,000.00	100,000.00	50,000.00	0.00	350,000.00
		AECI			30,000.00	30,000.00	20,000.00	20,000.00	20,000.00	120,000.00
	IDR/PRODESEC	Government of Republic of Nicaragua			150,000.00	185,000.00	120,000.00	80,000.00	15,000.00	550,000.00
	MARENA				145,000.00	153,000.00	165,000.00	103,000.00	0.00	566,000.00
	MAGFOR				100,000.00	100,000.00	100,000.00	75,000.00	45,681.00	420,681.00
	INETER				20,000.00	0.00	0.00	0.00	0.00	20,000.00
	INIFOM				20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	100,000.00
	Municipalities Government				20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	100,000.00
				TOTAL OUTCOME COST	**884,850.00**	**675,250.00**	**609,600.00**	**431,600.00**	**176,381.00**	**2,777,681.00**
2. Institutional and technical capacities installed at the national and local level to implement SLM	PMU	GEF	74500	Miscellaneous Expenses	3,600.00	3,600.00	4,000.00	4,000.00	2,800.00	18,000.00
			71300	Local Consultant	87,000.00	35,000.00	35,000.00	20,000.00	20,000.00	197,000.00
			71400	Contractual Services-Individuals	15,0000.00	15,000.00	5,000.00	3,000.00	3,000.00	41,000.00
			74200	Audio Visual Printing Produc. cost	10,000.00	5,000.00	22,000.00	10,000.00	13,000.00	60,000.00
			72300	Materials and goods	4,500.00	250,000.00	250,000.00	8,450.00	0.00	512,950.00
			72500	Stationary and other office supplies	14,000.00	10,000.00	8,000.00	12,000.00	10,000.00	54,000.00

Project Outcomes/Atlas Activity	Responsible Party	Source of Funds	PLANNED BUDGET & WORKPLAN						
			ERP/Atlas Budget Code	ERP/Atlas Budget Description	2006 US$	2007 US$	2008 US$	2009 US$	2010 US$	Total Amount
			72800	Information technology equipment	20,000.00	10,000.00	10,000.00	8,000.00	8,000.00	56,000.00
				Sub-total Act.2 GEF	**154,100.00**	**328,600.00**	**334,000.00**	**65,450.00**	**56,800.00**	**938,950.00**
		FAO			250,000.00	250,000.00	250,000.00	250,000.00	0.00	1,000,000.00
		PASOLAC/COSUDE			40,000.00	40,000.00	0.00	0.00	0.00	80,000.00
		AECI			90,000.00	90,000.00	0.00	0.00	0.00	180,000.00
		FUNICA- FAITAN			140,000.00	140,000.00	140,000.00	140,000.00	140,000.00	700,000.00
		ACDI			150,000.00	150,000.00	43,000.00	0.00	0.00	343,000.00
		USAID			200,000.00	200,000.00	200,000.00	0.00	0.00	600,000.00
		UE			140,000.00	180,000.00	180,000.00	0.00	0.00	500,000.00
	MARENA	Government of Republic of Nicaragua			100,000.00	100,000.00	100,000.00	52,000.00	52,000.00	404,000.00
	MAGFOR				250,000.00	250,000.00	250,000.00	250,000.00	99,319.00	1,099,319.00
	INTA				190,500.00	160,500.00	157,756.00	155,500.00	127,383.00	791,639.00
	INETER				115,000.00	115,000.00	0.00	0.00	0.00	230,000.00
	INIFOM				30,000.00	30,000.00	30,000.00	30,000.00	30,000.00	150,000.00
				TOTAL OUTCOME COST	**1,849,600.00**	**2,034,100.00**	**1,684,756.00**	**942,950.00**	**505,502.00**	**7,016,908.00**
3. Poverty reduction programs incorporate SLM into on-the-ground investments in agriculture, livestock management, and community forestry and alternative employment	UGP	GEF	74500	Miscellaneous Expenses	3,600.00	3,600.00	4,000.00	3,600.00	3,200.00	18,000.00
			71300	Local Consultant	50,000.00	35,000.00	35,000.00	10,000.00	10,000.00	140,000.00
			71400	Contractual Services-Individuals	15,000.00	13,650.00	0.00	0.00	0.00	28,650.00
				Sub-total Act.3 GEF	**68,600.00**	**52,250.00**	**39,000.00**	**13,600.00**	**13,200.00**	**186,650.00**
		FAO			250,000.00	250,000.00	250,000.00	250,000.00	0.00	1,000,000.00
		FUNICA- FAITAN			600,000.00	600,000.00	700,000.00	800,000.00	600,000.00	3,300,000.00
		FUNICA/PRODESEC			300,000.00	250,000.00	250,000.00	250,000.00	250,000.00	1,300,000.00
		USAID			150,000.00	150,000.00	100,000.00	0.00	0.00	400,000.00
		ACDI			150,000.00	100,000.00	90,000.00	0.00	0.00	340,000.00
		PNUD			50,000.00	50,000.00	50,000.00	0.00	0.00	150,000.00
		UE			150,000.00	150,000.00	150,000.00	50,000.00	0.00	500,000.00
	IDR/PRODESEC	Government of Republic of Nicaragua			300,000.00	200,000.00	200,000.00	250,000.00	50,000.00	1,000,000.00
	MARENA				140,000.00	140,000.00	140,000.00	140,000.00	70,000.00	630,000.00
				TOTAL OUTCOME COST	**2,158,600.00**	**1,942,250.00**	**1,969,000.00**	**1,753,600.00**	**983,200.00**	**8,806,650.00**
4. Financial schemes	UGP	GEF	74500	Miscellaneous Expenses	3,200.00	3,500.00	4,000.00	4,000.00	3,300.00	18,000.00

Project Outcomes/Atlas Activity	Responsible Party	Source of Funds	PLANNED BUDGET & WORKPLAN						
			ERP/Atlas Budget Code	ERP/Atlas Budget Description	2006 US$	2007 US$	2008 US$	2009 US$	2010 US$	Total Amount
generate new capital for SLM and to maintain shared municipal technical support structures.			74200	Audio Visual Printing Product Cost	10,000.00	8,000.00	5,000.00	0.00	0.00	23,000.00
			71300	Local Consultant	190,000.00	23,000.00	20,100.00	16,100.00	0.00	249,200.00
				Sub-total Act.4 GEF	**203,200.00**	**34,500.00**	**29,100.00**	**20,100.00**	**3,300.00**	**290,200.00**
		ACDI			120,000.00	120,000.00	60,000.00	0.00	0.00	300,000.00
	MARENA	Government of Republic of Nicaragua			50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	250,000.00
				TOTAL OUTCOME COST	**373,200.00**	**204,500.00**	**139,100.00**	**70,100.00**	**53,300.00**	**840,200.00**
5. Effective project management through learning, evaluation, and adaptive management.	UGP	GEF	71300	Local Consultant	30,500.00	21,950.00	50,700.00	20,700.00	85,700.00	209,550.00
			71400	Contractual Services-Individuals	102,000.00	102,000.00	102,000.00	102,000.00	102,000.00	510,000.00
			72200	Equipment and furniture	16,750.00	1,000.00	1,000.00	1,000.00	1,000.00	20,750.00
			72400	Audio Visual and Comunic. Equipment	5,000.00	1,000.00	1,000.00	1,000.00	1,000.00	9,000.00
			73105	Rent	8,400.00	8,400.00	8,400.00	8,400.00	8,400.00	42,000.00
			72500	Stationary and other office supplies	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	50,000.00
			73400	Rental n maintenance other equipment	61,900.00	24,700.00	21,400.00	21,400.00	21,400.00	150,800.00
			71600	Travel	4,320.00	4,320.00	4,320.00	4,320.00	4,320.00	21,600.00
			74200	Audio Visual Printing Produc. cost	2,500.00	2,500.00	2,500.0	2,500.00	11,500.00	21,500.00
			74500	Miscellaneous Expenses	4,000.00	4,000.00	3,000.00	3,000.00	4,000.00	18,000.00
				Sub-total Act.5 GEF	**245,370.00**	**179,870.00**	**204,320.00**	**174,320.00**	**249,320.00**	**1,053,200.00**
				TOTAL OUTCOME COST	**245,370.00**	**179,870.00**	**204,320.00**	**174,320.00**	**249,320.00**	**1,053,200.00**
TOTAL BUDGET					**5,511,620.00**	**5,035,970.00**	**4,606,776.00**	**3,372,570.00**	**1,967,703.00**	**20,494,639.00**
TOTAL by Source of Fund/Donor				**GEF**	**966,120.00**	**657,470.00**	**666,020.00**	**332,070.00**	**378,320.00**	**3,000,000.00**
				FAO	**500,000.00**	**500,000.00**	**500,000.00**	**500,000.00**	**0.00**	**2,000,000.00**
				PASOLAC/COSUDE	**45,000.00**	**45,000.00**	**5,000.00**	**5,000.00**	**0.00**	**100,000.00**
				AECI	**120,000.00**	**120,000.00**	**20,000.00**	**20,000.00**	**20,000.00**	**300,000.00**
				IDR/PRODESEC	**450,000.00**	**385,000.00**	**320,000.00**	**330,000.00**	**65,000.00**	**1,550,000.00**
				FUNICA/PRODESEC	**300,000.00**	**250,000.00**	**250,000.00**	**250,000.00**	**250,000.00**	**1,300,000.00**
				FUNICA-FAITAN	**740,000.00**	**740,000.00**	**840,000.00**	**940,000.00**	**740,000.00**	**4,000,000.00**
				USAID	**350,000.00**	**350,000.00**	**300,000.00**	**0.00**	**0.00**	**1,000,000.00**
				ACDI	**520,000.00**	**470,000.00**	**293,000.00**	**50,000.00**	**0.00**	**1,333,000.00**

Project Outcomes/Atlas Activity	Responsible Party	Source of Funds	PLANNED BUDGET & WORKPLAN							
			ERP/Atlas Budget Code	ERP/Atlas Budget Description	2006 US$	2007 US$	2008 US$	2009 US$	2010 US$	Total Amount
				PNUD	50,000.00	50,000.00	50,000.00	0.00	0.00	150,000.00
				UE	290,000.00	330,000.00	330,000.00	50,000.00	0.00	1,000,000.00
				MARENA	435,000.00	443,000.00	455,000.00	345,000.00	172,000.00	1,850,000.00
				MAGFOR	350,000.00	350,000.00	350,000.00	325,000.00	145,000.00	1,520,000.00
				INTA	190,500.00	160,500.00	157,756.00	155,500.00	127,383.00	791,639.00
				INETER	135,000.00	115,000.00	0.00	0.00	0.00	250,000.00
				INIFOM	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	250,000.00
				M. G.	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	100,000.00
				GRAND TOTAL	5,511,620.00	5,035,970.00	4,606,776.00	3,372,570.00	1,967,703.00	20,494,639.00

SECTION IV. ADDITIONAL INFORMATION

PART I. Other Agreements

1. Letters of Endorsement (separate file)
2. Letters of financial commitment will be added once the GEF Council has approved the project.

PART II. Terms of Reference

This Part will be added after the GEF has approved the project, and before requesting CEO endorsement.

PART III: Data on the condition of Natural Resources in the project area.

Table 3. Socio economic and environmental information about the seven municipalities in the Project Area

Concept	Cinco Pinos	San Francisco del Norte	Achuapa	El Sauce	El Jicaral	Santa Rosa del Peñón	San Francisco Libre
Founded	1840	1889	1870	N/D	1834	N/D	1961
Extension	60.38 kms^2	120.31 kms^2	416.24 kms^2	629.97 kms^2	434.0 kms^2	276.6 kms^2	756.0 kms^2
Population INEC-2004	6,659	6,693	14,069	32,798	13,788	9,740	10,019
Coordenates	13° 13' N 86° 52' W	13° 12' N 86° 46' W	13° 03 ' N 86°35' W	12° 53' N 86° 32' W	12° 43' N 86° 22' W	12° 48' N 86° 22' W	12° 30' N 85° 18' W
Limits: North	San Pedro del Norte	Honduras	San Juan de Limay	Achuapa Estelí	Santa Rosa del Peñón	San Nicolás	Ciudad Darío
South	Somotillo	Somotillo Villanueva	El Sauce	Larreynaga	Managua Lake	El Jicaral	Managua Lake
East	San Fco. del Norte	Cusmapa San Juan de Limay	Estelí	San Nicolás Santa Rosa del Peñón El Jicaral	Ciudad Darío San Isidro San Francisco Libre	San Isidro	Tipitapa
West	Sto Tomás del Norte	Cinco Pinos San Pedro del Norte	Villanueva	Villanueva	Larreynaga El Sauce	El Sauce	El Jicaral
Weather	Tropical of Sabanna	Tropical of Sabanna	DryTropical	DryTropical	Tropical of Sabanna	DryTropical	DryTropical
Summer	Nov-April	Nov-April	Nov-April	Nov-April	Nov-April	Nov-April	Nov-April
Winter	May-Oct	May-Oct	May-Nov	May-Oct	May-Oct	May-Oct	May-Oct
Dog Days	Jul-Ago (Irregular y moderated)	Jul-Ago (Irregular y moderated)	Jul-Ago (Irregular y severe)	Jul-Ago (Irregular y severe)	Jul-Ago (Irregular y severe)	Jul-Ago (Irregular y severe)	Jul-Ago (Irregular y severe)
Precipitation	900-1,400 mm	900-1,400 mm	800-1400 mm	1,000-1,400 mm	800-1,200 mm	800-1,400 mm	800-1,200 mm
Water Sources (* Dry in the summer)	Unevens, manantials and Gallo river	Unevens, manantials and Gallo and Ubate* rivers	Unevens, manantials and Grande, Achuapita and Varela* rivers	Unevens, manantials Varela*, Grande, Salale*, Mescales* and Malacatoya* rivers	Unevens, manantials and Ojoche*, Sinecapa, Talista* and Viejo (Grande) rivers	Unevens, manantials and Sinecapa, Guacalpisque* y Los Limones* rivers	Unevens, manantials Río Viejo andTelpochapa* rivers
Historic Average Temperature	28ºc	29ºc	29ºc	30ºc	31ºc	32ºc	32ºc
Economy	Basisc Grains Agriculture and Forestal Products	Basisc Grains and Milk and meat in a low scale cattle raising	Basisc Grains, Benne, Milk and meat cattle raising	Basisc Grains, Benne, Milk and meat cattle raising, commerce	Basisc Grains, Rice, Mangoes, and milk and meat in a low scale catttle raising	Basisc Grains, gysump minnin,and milk and meat in a low scale cattle raising	Basisc Grains, firewood extraction and Meat cattle raising Carne

Sources: Proper elaboration from MAGFOR, INIFOM, INETER e INEC (2004) data base

Table 4. Land Use in the Seven Municipalities in the Project Area (1963 – 2001)

Municipalities	% Annual Crops	% Perennial Crops	% Idle Land	% Pas-tures	% Fore-stry	% Other Land
San Francisco del Norte						
1963	12.0	0.0	9.0	44.0	30.0	4.0
2001	21.0	0.0	20.0	49.0	5.0	5.0
Cinco Pinos						
1963	21.0	3.0	17.0	41.0	14.0	5.0
2001	34.0	3.0	17.0	34.0	7.0	6.0
El Sauce						
1963	12.0	2.0	4.0	60.0	17.0	6.0
2001	19.0	0.0	14.0	54.0	9.0	5.0
Santa Rosa del Peñón						
1963	17.0	1.0	4.0	27.0	49.0	3.0
2001	21.0	0.0	35.0	28.0	5.0	10.0
Achuapa						
1963	11.0	2.0	7.0	60.0	17.0	3.0
2001	12.0	1.0	17.0	61.0	5.0	5.0
El Jicaral						
1963	13.0	0.0	3.0	41.0	40.0	2.0
2001	14.0	1.0	29.0	44.0	5.0	7.0
San Francisco Libre						
1963	7.0	0.0	1.0	62.0	24.0	5.0
2001	8.0	0.0	29.0	48.0	6.0	9.0

Sources: Agricultural Censuses, 1963 and 2001.

Table 5. Comparison of Uses in Land for Cattle against Maximal Volumes of Microbasins in the seven Muncipalities in the Project Area, 1963 – 2002

Municipalities	Microbasin	Idle. %	Volume (m3/sec) 72mm '63	Volume (m3/sec) 72mm '03	Increase %
Achuapa	Los Guasimos	84.0	35	75	114
	Grande	82.6	27	64	137
	Achuapita	96.4	41	90	120
	Los Quesos	95.9	35	80	128
Cinco Pinos	El Gallo	92.6	40	90	125
El Jicaral	La Jicaral	92.4	28	96	242
	Talista	50.7	26	49	88
	Sinecapa	38.2	5	11	120
El Sauce	Tecomapa	57.2	27	50	85
	Nispero	94.9	51	118	131
	Petaquilla	99.9	26	60	131
	Las Garzas	90.3	-	-	-
	La Guaruma	70.2	45	100	122
	La Palma	69.2	40	91	128
	El Portillo	66.1	46	109	137
	Malacatoye	85.7	30	65	117
	Mescales	92.0	25	50	100
S.F. del Norte	Negro	94.7	25	80	220
	Ubuto	95.2	14	46	228
S.F. Libre	Pacora	19.9	20	130	550
	S. Francisco	9.5	35	110	214
	Est. S. Antonio	15.6	17	56	229
	San Ramon	1.3	31	100	222
	Rio Viejo	43.8	95	95	0
Sta. Rosa	Sta. Rosa	98.5	140	140	0
	Cruz de la India	97.4	18	80	344

Source: Based on maps of Real Use 1:40,000 MAG-FOR (1996)

Note: The land changes use have their consequences for the hydrologic regime, there's an increment in the volume of the maximum flow of the drainage basins. This increment varied between 1963 and 2003, from 85% to 550% with an average between 120 and 130%. It has been estimated that in the municipalities of project influence, the areas with declivity of 0-8% under pasture, longitude declivity of 150-300m, erosion is under 25t/mz/year, for declivity of 8-15% and a Longitude declivity of 60-150m, erosion oscillate in 25-50t/mz/year and in declivity of 30-50% with longitude of 60-150m, this will be 50-150/mz/year.

Table 6. Land Potential Use in the seven municipalities in the Project Area

Category (ha)	San José Achuapa	El Jicaral	El Sauce	Santa Rosa del Peñón	Cinco Pinos	San Fco. del Norte
Temporal and annual cultivations	3,723	4,827	5,499	3,178	1,541	2,265
Permanents and semi permanent crops	157	586	235	37	122	31
Tacotals reposed lands	5,225	10,089	7,095	5,348	786	2,181
Natural Pastures	5,827	12,611	12,819	2,449	338	4,280
Sown ground or cultivated pasture	12,979	2,793	9,583	1,833	1,190	1,136
Forests	1,496	1,879	3,585	801	288	484
Stony grounds swamps, other lands	300	653	1,096	411	52	36
Affected lands by natural phenomenon	880	1,673	728	917	162	404
Installations and lanes	472	308	7,977	169	55	132
Total	31,059	35,420	48,616	15,143	4,534	10,545

Source: INEC, 2001 Agriculture and cattle National Census

Table 7. Land Use by Tenure Strata in the seven Municipalities in the Project Area
(Data in percentages 2001)

Strata	< 3 Mzs	3-5 Mzs	5.1-10 Mzs	10.1-20 Mzs	20.1-50 Mzs	50.1-100 Mzs	> 100 Mzs	Total
Annual or Temporary Crops	61.7	52.0	41.1	27.8	17.4	11.4	7.1	13.5
Perennial or Semiperennial Crops	2.4	1.3	0.9	0.7	0.5	0.3	0.7	0.6
Idle Land (*tacotales*)	7.4	14.5	19.4	22.2	23.6	24.3	24.4	23.7
Natural Pastures	7.9	13.2	17.2	23.2	25.0	26.9	34.4	29.2
Cultivated or Planted Pastures	5.1	7.3	11.1	16.5	21.9	24.6	18.1	19.7
Forests	1.3	2.3	2.8	3.2	5.2	6.0	7.4	6.1
Facilities and Roads	12.6	7.3	4.6	2.8	1.7	1.0	0.4	1.3
Swamps, Stony Grounds, other Lands	0.5	0.4	0.7	1.4	1.9	2.5	3.6	2.7
Land affected by Natural Phenomena	1.2	1.6	2.2	2.1	3.0	3.1	3.9	3.3
%	100	100	100	100	100	100	100	100
Total Area	1,544	2,053.8	8,069.1	19,413.5	51,747	49,311	115,949	248,088

Source: Authors´Calculations based on CENAGRO III (2001). INEC
NOTE: Mzs. = *manzanas* (0,75 Ha.).

Table 8. Land Tenure Structure in the seven Municipalities in the Project Area

Strata	1971					2001				
	Farm Units	%	Area	%	Average Area	Farm Units	%	Area	%	Average Area
Less than 5 Manzanas[NOTE]	1,459	28.2	2,530	1.2	2	1,200	20.0	6,543	2.6	5
5 – 10	599	11.6	3,144	1.5	5	997	16.6	8,069	3.2	8
10 – 20	863	16.7	8,754	4.1	10	1,224	20.4	19,414	7.7	16
20 – 50	1,212	23.4	27,365	12.9	23	1,507	25.1	51,747	20.6	34
50 – 100	551	10.6	27,495	13.0	50	669	11.1	49,312	19.6	74
100 – 200	235	4.5	21,619	10.2	92	279	4.6	40,144	16.0	144
200 – 500	125	2.4	31,099	14.7	249	95	1.6	29,823	11.9	314
More than 500	130	2.5	89,796	42.4	691	35	0.6	45,984	18.3	1,314
Total	**5,174**	**100**	**211,802**	**100**	**41**	**6,006**	**100**	**251,034**	**100**	**42**

Sources: Agricultural Census 1971, DIPSA, Study of 104 Variables and CENAGRO 2001.
[NOTE]: *Manzanas* = 0.75 Ha.

Table 9. Ecosystems Reported in the seven Municipalities in the Project Area

Municipalities	Ecosystems Found *	Area (%)**
Cinco Pinos	Agricultural Systems with 25-50% of Natural Vegetation	76
	Intensive Agricultural Systems	24
Sn. Fco. Del Norte	Agricultural Systems with 25-50% of Natural Vegetation	100
Achuapa	Agricultural Systems with 25-50% of Natural Vegetation	78
	Latifolliatum (Broad-Leafed)Tropical Deciduous Forest of Low Lands or Mid Altitude Vegetation Moderately Intervened	7
	Broad-Leafed mainly Deciduous Bush	5
	Agricultural Systems with 10-25% of Natural Vegetation	4
	Tropical Evergreen Seasonal Mid altitude Pine Forest	3
	Tropical Evergreen Seasonal Mid altitude Pine Forest Heavily Intervened	3
El Sauce	Agricultural Systems with 25-50% of Natural Vegetation.	62
	Agricultural Systems with 10-25% of Natural Vegetation	22
	Latifolliatum (Broad-Leafed)Tropical Deciduous Forest of Low Lands or Mid altitude Vegetation Moderately Intervened	16
Sta. Rosa Del Peñón	Agricultural Systems with 25-50% of Natural Vegetation	81
	Agricultural Systems with 10-25% of Natural Vegetation	19
El Jicaral	Agricultural Systems with 25-50% of Natural Vegetation.	30
	Short Graminoids Savanna with Deciduous Bushes	40
	Intensive Agricultural Irrigated Systems	20
	Tropical Semideciduous Broad-Leafed Swampy Forest	10
San Francisco Libre	Short Graminoids Savanna with Deciduous Bushes	35
	Agricultural Systems with 25-50% of Natural Vegetation	25
	Agricultural Systems with 10-25% of Natural Vegetation.	20
	Intensive Agricultural Systems	15
	Tropical Semideciduous Broad-Leafed Swampy Forest	10
	Tropical Broad-leafed Semideciduous Alluvial Gallery Forest	5

(*): Based on Meyrat (2003)
(**): Approxímate Percentage.

Table 10. Forestry and Silvicultural Practices by Strata of Farms in the seven Municipalities in the Project

Area (Data in percents)

Strata	< 3 Mzs	3-5 Mzs	5.1-10 Mzs	10.1-20 Mzs	20.1-50 Mzs	50.1-100 Mzs	>100 Mzs	Total Cases	%
Silvo-pastoral	3.1	2.8	8.4	14.4	32.8	20.2	18.3	644	**10.7**
Agroforestal	2.9	5.4	10.8	17.5	34.6	16.8	12.1	315	**5.2**
Silvo-pastoral Alleys	0	1	3.8	14.4	31.7	30.8	18.3	104	**1.7**
Agroforestal Alleys	0	3.5	9.4	15.3	40	24.7	7.1	85	**1.4**
Silvipast. Trees incorporated	5.4	4.4	11.3	13.2	30.9	18.1	16.7	204	**3.4**
Agroforestal Tree Incorporated.	0	6.3	9.8	11.6	35.7	22.3	14.3	112	**1.9**
Cleared Spaces against Silvipatural Fires	3.2	2.9	8.5	14.4	32.5	20.5	18.1	625	**10.4**
Cleared Spaces against Agroforestal Fires	2.9	4.8	10.6	19	34.8	15.4	12.5	273	**4.5**
Silvo-pastoral Plague Control	4.9	1.1	7.1	13.1	33.3	23	17.5	183	**3.0**
Agroforestal Plague Control	3.1	5.4	9.3	20.9	33.3	14.7	13.2	129	**2.1**
Silvo-pastoral Cleaning and Pruning	3.6	2.6	9.2	14.5	32.7	19.5	17.9	532	**8.9**
Agroforestal Cleaning and Pruning	2.8	6.3	10.3	18.3	35.7	15.5	11.1	252	**4.2**
Silvo-pastoral FruitTrees	7.4	6.6	14	14.7	28.7	14.7	14	136	**2.3**
Agroforestal Fruti Trees	2	9.8	13.7	17.6	33.3	13.7	9.8	51	**0.8**
Silvo-pastoral Plantains and Banana Trees	0	3	3	12.1	33.3	18.2	30.3	33	**0.5**
Agroforestal Plantains and Banana Trees	0	0	12	16	48	12	12	25	**0.4**

Fuente: Tabulaciones del Censo Agropecuario 2001

Note: Mzs. = *manzanas* (0.75 Ha.)

Table 11: Preliminary estimate summary of environmental benefits for productive models

Environmental Benefits	Area	Actual		Alter treatment		Increment	
		%	Ha	%	Ha	%	Ha
	Ha						
Agroforestry System							
GBA	2000	10	200	40	800	30	600
GBCC	1500	0	0	25	375	25	375
	3500		200				
Silvo-pastoral system							
Hillside shrub recovery	5000	10	500	60	3000	50	2500
	5000						
Forestry systems							
Water protection	4000	30	1200	100	4000	70	2800
Broadleaf forest mgmt.	10000	30	3000	100	10000	70	7000
	14000						
Forest cover increment	**22500**	**22**	**4900**	**81**	**18175**	**59**	**13275**
Carbon sequestation	**22500**	**100**	**1.8 M**	**211**	**3.8**	**111**	**2.0 M**
Erosion reduction		**100**	**2.8 M**	**42**	**1.2 M**	**58**	**1.6 M**

Table 12: Preliminary estimate of economic benefits of production models

Financial Benefits	Yield (est.) before treatment	Yield (est.) alter treatment	Benefits befote treatment (USD)	Benefits alter treatment (USD)	Difference	**% estimated increase**
Agroforestry modules						
GBA	16 qq/mz	30qq/mz	54	75.6	22	**40**
GBCC	16 qq/mz	35 qq/mz	54	121	67	**55**
Silvopastoral models	4,500 liters/año	18,000 liters/año	380	723	343	**80-100**
Forestry Models	1m3/ha/año	1.5 m3/ha/año	2/m3	3-4/m3	1-2	**70-100**

Note: 1) Yield and income estimates are for post establishment with technical support of the Project Implementation Unit and with support from the beneficiaries.
2): GBA and GBCC estimates sum the early and late harvest periods (spring and autumn).
3) Based on the baseline inputs of 10 cows on 20 Ha. with milk yields of 2.5 lt./cow/day with an expected yield increase to 5 lt/cow/día, with a 180 day milk flow.
4) For forestry management, an estimated mean annual increment of 1 to 1.5 m3/ha/year. The value of sawtimber for certified wood has the highest local value.

PART IV. Problem, Threats, and Barrier Analysis Table.

Problem	Threats	Causes	Barriers	Solutions
Degradation of soil and loss of forest cover produces: • Vulnerability to effects of climate change. • Reduction in agriculture and livestock production. • Demographic instability • Expansion of the agricultural frontier. • Reduction in carbon reserves • Loss of ecosystem resiliency.	Application of non-sustainable production practices • Burning to remove debris and prepare fields • Hillside tillage • Over-grazing • Deforestation • Monoculture • Tree loss for firewood. • Excessive use of fertilizers and agrochemicals. Overuse and irregular land use compared o the bio-physical characteristics of the land. s	Unmanaged and extensive agriculture, grazing, and forestry activities. Unregulated land use, such as deforestations for income generation prompt changes in land use. Farmers trust traditional agricultural and livestock management technologies that match their risk and time requirements Land tenure problems. Lack of information and knowledge of SLM for drylands on the part of farmers, local technicians, and local authorities. Sector focus rather than a territorial focus in planning that takes into account the bio-physical aspects of the land results in fragmented policies and programs Limited alternative on and off-farm sustainable economic opportunities	*1. Political Barrier: Gap between the national political initiatives and implementation of policies at the local level.* • Policies related to SLM are incomplete and do not permit adequate control by local authorities and municipal committees • The process of territorial zoning is incomplete without a participatory political process at the local level rendering investments in technology for that purpose ineffective. *2. Institutional Barrier: Gaps between the local and national technical capacity and human capital that affect the planning and implementation of SLM as an integral part of the municipal planning approach.* • Weak technical capacity at the municipal level and in the agency delegates at the local level to implement SLM causes fragmentation between the two levels that impedes policy implementation. • Agency human capital is not developed to implement SLM. • Local social capital (such as the environmental units and CDMs and CDCs are undeveloped and ineffective due to the lack of support and limited economic opportunities, which leave organizations with little capacity to	*Output 1.1*: Effective attitudes towards SLM developed by lawmakers, technical, and judicial decision makers. *Output 1.2.* Integrated territorial management plan is is completed and ratified at the national and community levels *Output 1.3.* SLM is mainstreamed into public policy (laws, regulations, and strategies), programs, and in national and local planning structures. *Output 2.1*. Participative community organizational structures fortified for political and technical management of SLM initiatives. *Output 2.2*. National and local technical capacity to promote and apply SLM fortified. *Output 2.3*: Municipal structures are consolidated and fortified for the technical implementation of SLM. Output 2.4: Models of new and indigenous technologies to mitigate drought and ecosystem integrity and soil fertility are validated and adopted by farmers

Problem	Threats	Causes	Barriers	Solutions
			plan and implement SLM or access available resources. • Low generation validation, dissemination for replication, and transfer of technologies and information about successful indigenous and innovative sustainable production practices geared to the drylands. • Misunderstanding of the characteristics, processes of deterioration, and values of the land by producers, community leaders, rural youth and other local and national actors evolved in development. • Complete gap between positive experiences in SLM oriented to drylands in Nicaragua and producers in similar areas due to problems in access, information exchange, and capacity within agencies. • Risk avoidance by farmers is a strong motive to maintain the status quo. Validity of models and returns on investment must be demonstrated. *Barrier 3: Economic development initiatives not oriented to SLM.* • Economic stimulus packages are fragmented and not oriented to the productive functionality of the land. • Economic stimulus without environmental controls or impact assessments. *Barrier4: Limited financial resources to*	INTA and FUNICA are strengthened for technology generation, validation, and transfer *Output 3.1*: Agencies are strengthened to implement poverty reduction programs with a SLM focus *Output 3.2:* Agency procedures and guidelines for mainstreaming SLM established for the project approval process. Output 5.1. Capacity to develop financial strategies and actions within the scope of the municipal environmental

Problem	Threats	Causes	Barriers	Solutions
			promote SLM • Credit institutions are scarce in the region and do not recognize SLM as worthy of subsidies or incentives. • Sustainable financing in not available to maintain the technical support structures at the municipal level.	agendas developed. Output 5.2: SLM is financed through projects funded through outside donations. Output 5.3: SLM is financed through compensation for environmental services.

PART V. Stakeholder Analysis and Participation Plan

149. The current multi-layered structure has been useful to reach the large group of stakeholders and has helped to prioritize the project actions and achieve the validation by a substantial group of partners who participated in its different stages along with the Project Management Unit (PMU).

150. The following methods were used to foster information exchange, consultation and participation:

- Key meetings with government offices and agencies with the purpose of introducing the project. Discussing activities related to the project of these institutions and organizing them to participate with key informants. The existing project committee assisted to define the criteria necessary for the selection of the municipalities where the project will take place in order to join common efforts in the same territory.

- The Conformation of an Institutional Committee made up of all strategic partners: MARENA (included the CCD Focal Point), UNDP, IDR-FIDA-PRODESEC, MAGFOR, PESA-FAO and INTA and to develop a close relationship with INIFOM and INETER who are key implementing partners. The partners also held meetings with the Project Advisor to learn about the synergy related to the Land Sustainable Management project . The CID and its individual members, UNDP and MARENA have participated in the revision of the design for the project.

- Meetings with the grass roots community organizations and municipal leaders for the purpose of developing the project and its contents. This was done to facilitate the participation of locals who could provide key information for the design of the project as well as to learn about the expectations of the people, and how they perceived their role and benefits. 21 workshops and 14 meetings were held at the community, town and municipal levels, NGO's and projects of the area of influence of the SLM project.

- Five meetings were held with participation of local producers, technicians from INTA and community organizations to make the diagnosis of the existing production models (including agricultural, livestock and forestry) and assist the team of consultants develop the proposed production models to be implemented with all the actors during the FSP.

- Local visits and meetings with the UGP advisor which counted with the participation of the representatives of AMULEON (Association of Municipalities of Northern Leon) and AMUNORCHI (Association of Municipalities of Northern Chinandega). Also present were the representatives of City Halls. The needs of the participants were discussed and the project was presented, focusing on how it relates to other initiatives happening in the rest of the territory. The new municipal authorities have expressed their support to the SLM project and will provide feedback for the design of the project. Inter-institutional consultation workshops were also held by technicians to discuss the vision, objectives and strategies of the project.

- Meetings to discuss the most relevant lessons learned from the sustainable and integral management of land, from those related to the government, from incentives promoted by NGO's, and from projects developed in the area (Rural Municipalities Projects/Socio-Environmental Project, etc.)

- Workshops and discussion groups with the team of consultants of PDF-B, MARENA, UNDP and the Advisor to provide follow-up to the progress and to guarantee the requested products according to the TORs

- Presentation of the project, for which a brochure and a pamphlet were designed in order to be delivered to the municipalities, institutions and agencies.

- Meetings to negotiate with donors to participate in the support of the SLM Project: PASOLAC-COSUDE, USAID, European Community, AECI, WB, ACCDI, and DANIDA-FINLAND.

- Aspects to be undertaken are more negotiations with new municipal authorities, who were elected at the beginning of the year 2005 and related logistics.

Table 13. Summary of stakeholder groups and potential involvement in Project implementation

Category/Unit	Function	Represented by	Involvement
Local Level			
Municipal Council	Responsible for the socioeconomic development of the municipality	Mayor	Support to the execution of the Project (enforcement of laws, ordinances, etc.) and local coordination.
"Little Mayors"	Problem solving and the application of regulations within the community	Mayor	Support to the communitarian execution and coordination of the Project.
Municipal Development Committee	Coordinate the implementation of the socio-economic and environmental aspects at the municipal level..	Mayor	Support to the execution of the Project and the coordination at the municipal level through environmental units.
Community Based Organization	Coordinate the implementation of the socio-economic and environmental aspects at the community level.	Municipal Development Committee	Coordinate the Project at the community level.
Small Farmers	Growing of basic grains for subsistence	UNAG	Fire control and prevention and application of SLM practices.
Medium Farmers	Production of basic grains and cattle raising	UNAG	Protection of forests and improvement of production systems and SLM practices
Large Farmers	Cattle Raising	Association of Cattle Raisers	Protection of forests and improvement of production systems and SLM practices
NGO	Promotion of farm production among small and medium farmers.	Municipal Development Committee	Training, technology transfers, negotiation of resources for SLM and for the execution of projects.
Department / Zone Levels			
AMULEON	Coordination and negotiation in the interests of the Municipalities in Northern Leon	Participating of Municipal Governments	Support to the promotion of the project and the negotiation of resources for the execution of the SLM

Category/Unit	Function	Represented by	Involvement
AMUNORCHI	Coordination and negotiation in the interests of the Municipalities in Northern Chinandega	Participating of Municipal Governments	Support to the promotion of the project and the negotiation of resources for the execution of the SLM
UNAG	Promotion of farming and strengthening of local capabilities	Municipal Development Committee	Sensitization, training and technology transfer
FUNICA	Promotes technological research in the agriculture and forest areas as well as the improvement and production capacity of producers.	General Manager	Support to the financing of projects and to generation, validation and transfer of technology.
National Level			
DIRECTION COMMITTÉE	Direct the inter-institutional participation for the execution of the project.	Main government offices, PNUD, FAO y FUNICA.	Coordinate policies and project related activities, formulate regulations related to SLM and to the improvement of the living conditions of the people in the area of the project.
MARENA	Main institution executing the project. Environment issues	Minister and Vice Minister	Responsible for guaranteeing the proper execution of the project and the inter-institutional coordination.
MAGFOR	Implementation of policies as well as agriculture and forest activities	Minister	Implementation of policies as well as agriculture and forest activities for the SLM (training, SIG and information for the early prevention in the negotiation of resources).
INETER	Territorial Organization	Director	Training, information supply, about OT and the negotiation of resources fro SLM
IDR	Promotion of rural development	Director	Financing of sustainable production systems and SLM practices

Category/Unit	Function	Represented by	Involvement
INIFOM	Municipal strengthening	Director	Support to the OT, SLM training and the strengthening of communitarian capabilities
INTA	Generation, validation and transfer of agriculture technology	Director	Improvement of the production systems and practices for the SLM.
INAFOR	Manages forest development	Director	Fire control and prevention, forest control and regulation, training
MECD	Formal Education	Minister	Sensitization, environment education with SLM contents
INATEC	Vocational Education	Director	Training on SLM

Table 14. Stakeholders Participation Plan including roles, responsibilities and their potential for cooperation in the Project implementation.

Category/Unit	Roles	Responsibilities	Potential Cooperation
Local Level			
Municipal Council	Coordination and Facilitation for the project's execution.	Approve the project's the Municipal Operative Annual Work Plan. Elaboration and implementation of SLM ordinances.	Provide municipal information. Support for local summons. Space for municipal headquarters. Technical assistance.
District Mayor' delegated officials	Facilitator and community level coordinator.	Monitor and guarantee Project activities.	Support for producers summons.
Municipal Development Committee	Coordinate at municipal level the project execution.	Coordinate the execution of the Municipal Operative Annual Work Plan. Monitor the Municipal Operative Annual Work Plans. Support the land use planning implementation.	Provide local information. Support for summons.
Community Base Organizations.	Coordinate at the community level the execution of the project.	Coordinate the project's execution of the community annual work plans. Monitor the community annual work plans. Support the evaluation of the community annual work plans.	Space for meetings. Support for summons.
Small Producers Medium Producers Large Producers	Increase sustainable agricultural, livestock and forestry production.	Implement production and SLM practices. Promote SLM culture. Promote producer's organization.	Labour. SLM Validation and technology transfer areas. Seeds and vegetative material.
NGOs	Facilitators for project execution.	Co-finance production systems and SLM	Co-financing. Technical assistance.

		practices. Support capacity building and sensitization on SLM. SLM fund raising. Implementation of land use planning.	Logistics support. Agricultural, livestock and forestry products. Local information
Zonal / Departmental Level			
AMULEON AMUNORCHI	Facilitate the project execution at the regional level.	Monitor the execution of the municipal annual work plans. SLM fund raising. Promotion of SLM culture.	Local information. Co-Financing Technical Assistance
UNAG	Promote SLM culture	Promote implementation of SLM models and practices. Support SLM capacity building and sensitization. SLM Fund raising.	Co-Financing Technical assistance. Local information Logistic support Silvopastoral and forestry products.
FUNICA	Promote SLM technological research.	Finance the SLM generation, validation and technological transfer. Promote SLM capacity building and sensitization. Participate in the Project's Steering Committee. Coordinate their activities with the SLM project.	Financing. Technical assessment. Technical assistance. Provide information. Logistic support. Space for organization of project events. Silvopastoral and forestry products.
National Level			
PROJECT COORDINATION COMMITTEE	Operational entity for executing the project	Inter-institutional coordination for the project execution. Monitor the effective running of the project. Approve the overall work plans of the project. Approve substantive	

		changes in the project execution.	
MARENA	Responsible Government institution for project execution.	Guarantee the adequate inter-institutional coordination and the transparent and effective management of the project resources. Participate in the project's Coordination Committee. Coordinate its activities with the SLM project.	Technical assessment. Technical assistance. Space for local events. Logistic support Material for capacity building. GIS information.
MAGFOR	Formulate and implement SLM silvopastoral and forestry policies and strategies.	Support land use planning process. Participate in the elaboration of the SLM operative plans. Support SLM capacity building and sensitization. Provide GIS information for SLM. Participate in the project' Coordination Committee. Coordinate its activities with the SLM project.	Technical assessment and assistance. Provide information. Materials for capacity building. Silvopastoral and forestry products.
INETER	Promote and implement land use planning.	Support land use planning capacity building and sensitization. Implement land use planning policies, norms, methodological criteria and laws. Support the elaboration of land use planning municipal strategies. Provide thematic information for land use planning. Participate in the project' Coordination Committee.	Provide personnel for land use planning capacity building. Provide materials for capacity building and sensitization. Transport support.

		Coordinate its activities with the SLM project.	
IDR-PRODESEC	Promote rural development with SLM focus.	Finance production taking into consideration SLM. Co-finance transfer of productive modules. Support SLM capacity building and sensitization. Participate in the Project Coordination Committee. Coordinate its activities with the SLM project. Spread the SLM lessons learnt.	Finance agricultural production. Silvopastoral and forestry products. Technical assessment and assistance.
INIFOM	Strengthen SLM strategic municipal planning process.	Support to the land use planning as well as SLM capacity building and sensitization. Elaboration of municipal development plans with SLM contents. Strengthen community organization for SLM. Participate in the project' Coordination Committee. Coordinar sus actividades con el proyecto MST.	Materials for capacity building and sensitization. Logistic support. Technical assessment and assistance.
INTA	Responsible for the generation and validation of technological transfer.	Validate and transfer of production models. Capacity building to producers on SLM. Sistematization and spreading of lessons learnt on SLM. Support land use planning and municipal development plans. Participate in the project's Coordination Committee. Coordinate its	Technical assessment and assistance. Capacity building and sensitization. Researchers. Logistic support Space for events. Silvopastoral and forestry products.

		activities with the SLM project.	
INAFOR	Responsible for forestry development.	Validate and transfer forestry models. Implement and spread policies and forestry norms. Sistematization and spread the SLM lessons learnt. Support to the forestry planning. Capacity building and SLM sensitization.	Forestry technical assessment and assistance. Forestry products. Capacity building and sensitization.
MECD	Responsible for formal education on SLM.	Support the SLM Capacity building and sensitization. Incorporate SLM contents into curriculum.	Teachers. Space for capacity building. Materials for capacity building and sensitization.
INATEC	Responsible for technical capacity building on SLM.	Support the SLM Capacity building and sensitization campaign. Incorporate in their technical curriculum SLM contents.	Teachers. Space for capacity building. Materials for capacity building and sensitization.

Mechanisms and Strategies for Promoting Stakeholder Participation

151. The current participation structure that currently exists in each municipality for socioeconomic and environmental development will be used to put the project into practice. This model is conformed by a higher negotiating structure known as the Municipal Development Committee (MDC), its labour commissions, and territorial organizations (town committees and communitarian committees. No new structures will be created for the execution of the project; however, the existing ones will be strengthened to improve their functionality and to promote the effective participation of partners.

152. Town Committees and Community Committees will manage the economic, social and environmental aspects of their areas. Within those areas we will seek the participation of the deputy mayors, who are important representatives of the Municipal Government.

153. People present their demands to these committees. The demands are received by each committee chair and are forwarded to the Municipal Government and to the Municipal Development Committee. These committees constitute the key territorial structures to promote the participation of communities in the development initiatives of a municipality. Consequently, they will serve a similar function in the implementation of the policies and strategies for the current SLM project.

154. The Municipal Development Committee, it is an active participation forum for the different actors of the municipal communities. It is a non-profit organization which provides complementary support to the municipal government. It is in charge of fostering and promoting the socio-economic and environmental development of the municipality. It is comprised by the representatives of the government institutions, members of the civil society and by the different stakeholders from municipal society. It works in coordination with the local government on the execution of actions, plans, programs and projects which lead to the proper administration and rational use of the existing natural resources. The MDC will be the main forum of discussion and canalization of the current initiatives of the SLM project and of the participation of partners in order to execute the project correctly and in response to the short, mid and long term interests of the municipality.

155. For its operation, the MDC is structured into commissions, which are participation and sector groups between the municipal actors. The committees are: 1) production and economy, 2) social and infrastructure and 3) environment (MEC). Representatives of the interests of each committee participate in them. The production and economy commission will be a forum to discuss and orient economic and production aspects related to the production an practice systems of the SLM, agriculture, cattle raising and forest.

156. Municipal Environment Commission (MEC): It counts with the participation of the government institutions representatives, NGO's, communitarian organizations at the territorial level, producers and production associations. The MEC's are a part of the Municipal Development Committee and take care of topics related to environmental problems, programs and environmental projects executed in the municipality. The MEC's will also be important mechanisms for the participation of the project partners; particularly to take care of the SLM aspects and the strengthening of the structures, integrity and function of ecosystems.

157. Inter-institutional Management Committee, highest structure conducting the project. It will be the higher steering committee where the project partners will participate. It will be where the demands of the beneficiaries and the policies and activities of the project will be integrated.

158. The structures of the current model will be strengthened in order to guarantee the effective execution of the SLM project and its long term sustainability. The human resources that will participate in these structures will be trained on technical topics for SLM. They will also be strengthened in their organization and negotiation capabilities. Emphasis will be made on the strengthening of capabilities to promote sustainable production systems, their practices and the generation of environmental services in order to support the productive rehabilitation of the land and to improve the living conditions and income of producers. This will generate local funds which will support the economic sustainability of the project. At the same time the participants will be trained to negotiate external resources for SLM in order to consolidate the training schemes of these resources and to guarantee the financing of the SLM initiatives once the first phase of the project is completed.

PART VI. Executive Summary of the Proposed Production Models

Executive Summary

Needs Assessment and Proposal for On-the-Ground Investments in Productive Systems and Sustainable Land Management Practices

1. Study objective

By means of a joint effort with all actors, the objective of the study has been to identify the optimal productive models for the dry zone in Nicaragua from a financial and environmental perspective, taking as a point of departure the pilot area in which the Sustainable Land Management Programme is to be implemented. Once the models are validated by the programme, they will serve as a guide for future investments in environmentally sustainable and financially safe systems.

2. Introduction

In the area in which the Sustainable Land Management (SLM) project is to be implemented, agricultural, cattle-raising and forestry activities take place in a context of low-yield productive systems with a strong negative impact upon the environment. These practices have upset the delicate balance between different ecosystems and drained the productivity of the land, the availability of water and the wealth in biodiversity.

The SLM models proposed herein are geared toward reversing these environmental problems, in particular regard to land degradation, while substantially increasing production in agriculture, cattle-raising and forestry. They have been designed based on lessons learned by local producers and technicians during the implementation of numerous projects implemented by local NGOs and government institutions, as well as the knowledge of experts and specialists in research centres such as the Nicaraguan Institute for Agricultural Technology (INTA), the National Agrarian University (UNA) and the Water Resources Research Centre (CIRA). The models will advance the creation of a new productive culture that is environmentally healthy and financially profitable. Their validation will provide valuable experiences to SLM in other dry zones in Nicaragua. They will further contribute to diminish the economic and ecological deficiencies found in the investments being made in the municipalities in which SML project partners are working.

Of nine models identified, five have been selected for implementation: two in agroforestry (basic grains in association with trees; improved alley cropping with basic grains), two in forestry (water sources protection and gallery forests in zones with potential forestry use; sustainable forest management in broadleaved dry forests), and one silvo-pastoral model (forest combined with pasture on tree and shrub-covered slopes). The land coverage to be reached during the model validation phase is of 6,410 hectares. During the transfer phase this is to increase to 16,090 ha, for a total goal of 22,500 ha over the project's planned five-year life span (see table below).

Land surface coverage goals in the validation and transfer for proposed models (ha).

Productive Models	No. of Models	Surface by Model (ha)	Validation goal	Transfer goal	Validation and Transfer*
Agroforestry models					
Alley cropping w/ basic grains	90	1	90	1410	1500
Basic grains in assoc. w/ trees	100	1	100	1900	2000
Subtotal	**190**	**2**	**190**	**3310**	**3500**
Silvipastoral					
Tree and shrub-covered slopes	11	20	220	4780	5000
Subtotal	**11**	**20**	**220**	**4780**	**5000**
Forestry models					
SLM in broadleaved forests	2	2500	5,000	5000	10000
Protection of water sources in forested areas	20	50	1,000	3000	4000
Subtotal	**22**	**2550**	**6,000**	**8000**	**14000**
Total	**223**	**2572**	**6,410**	**16090**	**22500**

* **Goal for the five-year life-span of the SLM project.**

The verification and establishment of the productive models will be carried out jointly with INTA, FUNICA, IDR-PRODESEC and PESA-FAO, as well as producers, local institutions and municipal governments, farmer organizations and the SLM technical team. Their participation ensures the adequate location of parcels and involves suitable producers, who are interested in learning and transmitting their experience to others.

3. Productive model validation costs

The total cost of validating the models being proposed is of US$ 976,344. The highest validation cost is that for the sustainable dry broadleaved (deciduous) forest management model at U$ 358,523, while the two agroforestry models are the least costly. The conservation costs are incurred mainly by innovative practices. These are practices that producers do not habitually implement on their parcels because they lack knowledge regarding their benefits in terms of production and conservation. Investments in transfer of knowledge and practices will depend upon the operational strategies to be practiced by SLM project partners.

Total costs for validating productive models (in US$)

Productive models	Cost/Model (US$)	Total Cost US$		
		Conservation	Production	Validation
Agroforestry models				
Alley cropping w/ basic grains	700	39,150	23,850	63,000
Basic grains in assoc. w/ trees	875	61,000	26,500	87,500

Subtotal	**1,575**	**100,150**	**50,350**	**150,500**
Silvipastoral models				
Tree and shrub-covered slopes	21,711	98,560	140,261	238,821
Subtotal		**98,560**	**140,261**	**238,821**
Forestry models				
SLM in broadleaved forests	179,262	168,905	189,618	358,523
Protection of water sources in forested areas	11,425	127,980	100,520	228,500
Subtotal	-	**296,885**	**290,138**	**587,023**
Total	-	**495,595**	**480,749**	**976,344**
Contribution (%)		**51**	**49**	

4. Applied research

It is also proposed that applied research be carried out on eight subjects. The research is intended to produce key information for consolidating the concepts that underpin the models and the process of transferring results.

Proposed research issues and their cost by productive model.

Productive Models	Research subject	Cost in US$
Agroforestry		
Basic grains in association with trees	Determine the most suitable tree species for optimal development of the model.	**8,000**
Alley cropping with basic grains	Genetic improvement of native basic grain varieties (maize, beans).	**10,000**
	Contribution of compost to soil improvement and basic grains production.	**5,000**
	Contribution of the model to the reduction of soil erosion.	**4,000**
	Contribution of infiltration basins to groundwater recharge.	**4,000**
Silvipastoral		
Tree and shrub-covered slopes	Determine biomass production and carbon sequestration as a result of the increase in soil humidity generated by the digging of infiltration ditches.	**8,000**
Forestry		
SML in broadleaved forests	Average annual increase in biomass and carbon binding in dry forest under management.	**6,500**
Protection of water sources in forested areas	Increase in biomass and the water flow in forested areas in which water sources (springs) are protected.	**6,500**
TOTAL		**52,000**

4. Costs summary

The total cost of the proposed investments is of US$ 1,028,344.00. Of these, US$ 512,595.00 (49.8%) are to be contributed by GEF, with the remaining US$ 515,749.00 (50.2%) to be provided by the SLM project partners.

Productive Models	Production	Conservation	Validation
Agroforestry	100,150	50,350	150,500
Silvipastoral	98,560	140,261	238,821
Forestry	296,885	290,138	587,023
Research	17,000	35,000	52,000
Grand Total	512,595	515,749	1,028.344
Contribution %	49.8	50.2	100

5. Environmental benefits of the productive models

The benefits of the productive models being proposed will be of significant importance in the environmental restoration of the territory and improving living conditions for the local population. The models to be introduced during the project lifespan will increase the forest surface by 59% (13,275 ha) in relation to the overall goal (22,500 ha). In the selected territories there is currently a forest cover of 22% (4,900 ha), which is to reach 81% (18,175 ha) by the conclusion of the project five years hence. With regards carbon binding, it is estimated there will be an increase of 2 million tons (111%), while soil erosion is reduced by 58% compared to current erosion levels.

Environmental impact in the validation area and transfer (22,500 ha)

	M/U	Before		After		Difference	
Benefits		%	Area	%	Area	%	Area
Increase in forest cover	ha	22	4,900	81	18,175	59	13,275
Carbon binding	ton/ha	100	1.8 M	211	3.8	111	2.0 M
Reduction in erosion	ton/ha	100	2.8 M	42	1.2 M	58	1.6 M

6. Economic benefits of the productive models

With the agroforestry models participating families will experience a 40% increase in income; those participating in the forestry models will see an increase of 70%; and those families working with the silvo-pastoral model will more than double their income.

DESCRIPTION OF MODELS TO BE IMPLEMENTED

7. Basic grains in association with trees

7.1 Justification: The association of basic grains or staple foods such as maize, beans and sorghum with tree cover will provide the population with a profitable productive system that will foster land use in the selected territory that is congruent with its productive capacity, strengthened further by innovative agricultural practices. It will also allow for reverting the process of environmental degradation by cutting back on the levels of erosion, favouring the infiltration of rainwater and contributing to the recovery and stabilization of the river flows. This in turn will allow for increasing agricultural production and strengthening ecosystems.

7.2 Biophysical conditions for establishing the model: The minimum area is 15 ha belonging to a producer, with a slope from 5% to 40% and soil cover of at least 40 cm. Any soil texture is acceptable except heavy black clay (vertisol) and the ground may be stony up to 70% (both on the surface and in profile). It should have average temperature and rainfall for the area in which it is located.

7.3. Model structure: To be made up of the following elements: the productive system and innovative / complementary practices.

7.3.1 Productive system: To be made up of basic grains in association with dispersed valuable timber-producing species obtained by natural regeneration or by means of direct planting. The recommended species are Laurel, Cedar, Mahogany, White Conacaste, Genízaro (*Samanea saman*) and others. The basic grains to be sown are maize, beans and sorghum or different combinations thereof, such as maize + beans or maize + sorghum. These should be planted with a handspike, with the crowns of the trees being pruned, depending upon the requirements of the crops in association.

7.3.2. Innovative practices:

Physical practices: Terraces or dead barriers, terrace-fixing plants, water infiltration basins, shelterbelts, current retards built with stones and root-taking posts.
Agronomic practices: Compost and the incorporation of stubble to the soil.

7.3.3 Complementary practices: fire control measures.

7.4 Recommendations for model validation and implementation: The training plan will include the following: soil and water conservation; crop management; basic grains seed production; post-harvest management; agroforestry systems; integrated pest management; manufacture and use of organic products for insect and disease control; and farm management.

7.5 Location and selection of participating communities: A total of 53 communities at which the model will be validated and / or transferred have been chosen, as follows: Municipality of Cinco Pinos: Cinco Pinos sector; municipality of San Francisco del Norte: El Coyol, Lagartillo and El Valle; municipality of Achuapa: Planes Los Matus, San José, Santa Cruz, Caperanal, Santa Rosa, La Perla, Los Chagüitillos, San Antonio and Ojo de Agua 1; municipality of El Sauce: Río Grande, Las Pilas, La Herradura, Hato Nuevo, El Sauce, Hato Viejo, Santa Rita, Los Limones, Los Panales, Pavones, Bejucos, El Campamento, Los Tololos, Los Vásquez, San Martín 1, Tempisque, El

Campamento, Las Limas, Esquipulas and Cofradías; municipality of Santa Rosa del Peñón: Santa Cruz de la India and Santa Rosa del Peñón; municipality of El Jicaral: El Socorro, Casa Nueva, Río Grande, Dos Montes, Los Zarzales, El Tule and El Roble; municipality of San Francisco Libre: La Majada, Las Mercedes, Las Delicias, Brasil Blanco, Laurel Galán, San Benito, Barrio Bonito, La Platanera, Tierra Blanca, Primero de Mayo and San Rafael.

7.6 Model implementation cost: US$ 875.00 per ha over a one-year period.

8. Improved alley cropping with basic grains

8.1. Justification: The model is intended to reverse the processes of environmental degradation and the ongoing deterioration of ecosystem stability, integrity, and functioning when subject to conditions of extreme drought. This situation of vulnerability can be mitigated by improving the land's productive capacity, creating more humid conditions, increasing the production of basic grains, and contributing to local food security and higher incomes for producer families. It is necessary to forge an opening for a new productive culture that is environment-friendly and capable of relieving the effects of drought.

8.2. Biophysical conditions for establishing the model: Producers with less than 5 ha (Minimum area 1 ha), a 5% to 30% slope and a friable clayey and/or clayey loam and/or loam soil cover of at least 40 cm. The ground may be stony up to 50% (both on the surface and in profile), and the temperature and rainfall should be average for the area in which the model is located.

8.3 Model structure: To be made up of the following elements: the productive system and innovative / complementary practices.

8.3.1 Productive system: Non-associated planting (in alleys) of basic grains such as beans, maize and sorghum, or in association by sowing different combinations, such as maize + beans, beans + sorghum, and so on.

8.3.2 Innovative practices:

Physical practices: Stone barriers or bench terraces, terrace-fixing plants, water infiltration basins, live fences, current retards built with stones and root-taking posts.
Agronomic practices: Compost and the incorporation of stubble to the soil.

8.3.3 Complementary practices: fire control measures.

8.4. Recommendations for model validation / implementation and selection of communities: The same recommendations and location of communities are valid as for the basic grains in association with trees model (see above).

8.4 Model implementation cost: US$ 700.00 per ha over a one-year period.

9. Pasture on tree and shrub-covered slopes

9.1 Justification: The pasture on tree and shrub-covered slopes ecosystem is of importance mainly to cattle-raising. This is an activity whose productivity and profitability has been diminishing over the years due to the continuous degradation of the natural base. This progressive deterioration is

reflected in the low productive and reproductive figures. It is calculated that average weight loss among cattle is over 10%, milk production is of only two to three litres per day during the dry season, only half the cows are calving, while the intervals between calving is of 24 months and there is a high mortality rate (10% among calves and 3% among adults). All of this has a negative repercussion on the economy in these areas as it contributes to increase the levels of poverty, unemployment and migration. It is therefore urgent to validate forage producing models that rehabilitate the shrub-covered slopes ecosystem in order to maximize its productive capacity and make it profitable again.

9.2 Biophysical conditions for establishing the model: Minimum area 20 ha with a 15% to 30% slope and a friable clayey and/or clayey loam and/or loam soil cover of at least 40 cm. The ground may be stony up to 50% (both on the surface and in profile), and the temperature and rainfall should be average for the area in which the model is located.

9.3 Model structure: To be made up of the following elements: the productive system and innovative / complementary practices.

9.3.1 Productive system: This is made up of three ecological strata or tiers: the first is made up of grasses and leguminous plants, the second consists of shrubs and the third of tall trees. The shrubs and trees will make important contributions in terms of food security during the dry season as their twigs can be lopped and they produce fruit, seeds and provide shade. *Leguminosae* should predominate in order to ensure that the model has a high protein contents, which is key to calving, milk production and in general to the healthy development of cattle (see table below).

Strata of a grass / shrubs / trees system planted on slopes and recommended species.

Strata	**Height**	Recommended species
1- Grasses *	Less than 1 metre.	Improved: Angleton and Gamba grasses and *leguminosae*.
2- Shrubs	Less than 6 metres.	Drumstick Tree, Madero Negro (*Gliricidia sepium*), Tigüilote (*Cordia sp.*) and Guácimo (*Guazuma ulmifolia*).
3 – Trees	Twenty or more metres.	Genízaro (*Samanea saman*), Conacaste, Carao *(Aramus guarauna)*, Nacascolo *(Caesalpinia coriaria)*, Quebracho (*Pentaclethra macroloba*) Vanilla, Tamarindillo (Aeschynomene sp.), Chilamate *(Sapium aucupariom)* and Mango.

* Half of the parcels proposed must be covered with each of the recommended grasses in association with ground cover (runner) legumes. If needed, Environmental Impact Assessments will be conducted by the project prior to introducing improved or foreign grass species prior to validating them in the selected areas.

9.3.2 Innovative practices: Repopulation of the slopes with shrubs and trees, making of natural concentrate, building of ponds with filters and rainwater infiltration ditches.

9.3.3 Complementary practices: growing of improved fodder maize, improved stubble, supply of mineral salts and attention to animal health.

9.4 Recommendations for model validation / implementation and selection of communities: Support materials for the transfer of models must be evaluated in focus groups with producers in easy-to-understand sessions. It is recommended to develop training activities on the following subjects: establishment of nurseries and plant production, dry tropics ecology, soil and water conservation, silvo-pastoral systems, making of natural concentrates, management of grass and legume species in dry tropical areas, pasture management under silvo-pastoral systems; and water storage techniques in dry zones.

9.5 Location and selection of communities: A total of 24 communities at which the model will be validated and / or transferred have been chosen, as follows: municipality of Cinco Pinos: Las Pozas, El Buey, El Jícaro and El Pavón; municipality of San Francisco del Norte: Naranjo and El Nancital; municipality of Achuapa: Valle San Nicolás, Buena Vista, El Lagartillo and El Limón; municipality of El Sauce: Los Encuentros, Los Loros, El Alboroto, El Porvenir and Quiebra Huevo; municipality of Santa Rosa del Peñón: Talolinga and El Confite; municipality of El Jicaral: El Tamarindo, El Empalme and San Juan de Dios; and municipality of San Francisco Libre: Villa San Francisco, Trapiche, Valle San José and Las Lomas.

9.6 Model implementation cost: US$ 21.711 per ha over a five-year period.

10. Sustainable Forest Management in broadleaved dry forests

10.1. Justification: The irrational extraction of timber for commercial purposes in areas with good forestry potential continues to be an activity that further degrades the by now scarce tracts of broadleaved forests, thus contributing to changes in soil use and deforestation. This practice has an impact upon a total of 135,187 ha (51.9%) of land that has forestry potential in the seven municipalities. The most negatively affected of these are El Sauce, Achuapa, San Francisco Libre and Santa Rosa del Peñón.

The extraction of timber from gallery forests and the last remaining tracts of dry tall forest has a particularly deleterious effect upon land whose slope is of more than 50%.[19] Several such areas in the territory are the object of general forest management plans (PGMF[20], by their initials in Spanish), some of which have already been approved by the National Forestry Institute (INAFOR). This corroborates the intense pressure being placed upon the scarce forest resources still existing in the zone. The remaining stands serve to protect the ecosystem and constitute a barrier against natural disasters and risks.

10.2 Biophysical conditions for establishing models: There should be 2,500 ha per model with a maximum of 50 owners, based on a 25-year rotation (blocks of annual extraction), land with and without forest cover of any age, with a 30% to 50% slope. Any soil texture is acceptable except black clay and the ground may be stony up to 70% (both on the surface and in profile). The temperature may be within the high range in the zone and rainfall should reach between 900 – 1,000 mm per annum. Needed are medium and large owners willing to embark upon a sustainable forest management scheme.

[19] Of the total land area of the seven municipalities, 133,196 ha (51.17%) have slopes on them of between 50% and 75%, while 1,451 ha (0.56%) have steep slopes higher than 75% (Ministry of Agriculture and Forestry Relief Map, 2002, quoted by the MST BIDE LA Socio-economic Diagnostic 2004).

[20] The forest management plans approved by INAFOR under the Minimum Plan category do not allow for the felling of trees except for purposes of amelioration in areas not superior to 50 ha.

10.3 Model structure

10.3.1 Productive system: The model is designed to develop the sustainable production of broadleaved species timber for industrial and artisan consumption. It is based on the implementation of good sustainable forest management practices, with a view toward the certification of forests with a minimum area of 2,500 ha and a 25-year cutting cycle. The PGMF must evaluate and establish the current situation of the resource and indicate the most appropriate level of intervention, intensity and cutting cycle, based on a forest inventory. The areas of intervention and the sustainable practices to be implemented therein must be detailed in their respective Annual Plans of Operation (APOs). A preliminary agreement on Forest Use in the Area and No Change in Soil Use will be signed between the owners involved, INAFOR and the pertinent mayor's office.

10.3.2 Basic practices contemplated in the model include a forest management plan and payment for permits to be granted by INAFOR.

10.3.3 Innovative practices: Agreements + ordinances, forest fire prevention and control (surveillance, firebreaks and fire control), planned tree felling operations, building of access roads to bring timber to market, tree-marking, and low-impact timber extraction techniques, such as controlled felling, gathering of forest species seeds, freeing of trees from parasitic vines, conservation works, residue management and permanent measurement parcels (PMP).

10.3.4 Complementary practices: Forest certification.

10.4. Recommendations for model validation and implementation: At project onset, and in the framework of the CDM, the partners, INTA, MAGFOR and the Ministry of the Environment and Natural Resources (MARENA), with the participation of producers, local institutions, mayor's offices, small farmer organisations and the project technical team, must participate in the identification of the precise delimitation of the area and the formulation of municipal ordinances, which will specify the permanent forestry uses allowed and the commitments taken on by the owners and the institutions. The commitments made in the municipal ordinance will be made public by means of posters and signs indicating the borders of the areas subject to forest management and the institutions in charge of follow-up. Technical assistance must be provided throughout the five-year period of activities related to implementation of the model. Support materials for the transfer of models must be evaluated in focus groups with producers in easy-to-understand sessions. It is recommended that as the project is implemented there be training activities held on the following subjects: sustainable forest management, natural regeneration management, coal production techniques, forest fire prevention and fire-fighting, forest environmental services and low-impact forest exploitation.

10.5 Location and selection of communities: A total of 18 sites in three municipalities where the two models being proposed are to be established, as follows: municipality of Achuapa: El Limón, La Calera, El Pajarito, Guanacaste, El Waylo, El Pajarito, El Arenal, Wisquili, El Cuyal, Los Araditos, La Flor, El Caracol and El Cangrejo; municipality of El Sauce: Colinas de Hato Viejo, Los Loros, Chagüite Grande, El Panamá, La Pita, Las Limas, La Chácara, El Aguacate, Agua Fría, La Ramada, Las Cañas, La Leonera, El Jobo, El Palmar, El Nacascolo, La Placa and La Aceituna; municipality of San Francisco Libre: El Laurel Galán, San José de la Serranía, El Pilón, La Uva, La Cueva, Telpochapa, San Jorge and La Trinidad.

10.6 Model implementation cost: US$ 179,261.50 over a five-year period, with a moderate unit cost of US$ 71.70 / ha at the current dollar value.

11. Water sources protection and rehabilitation of the gallery forests in areas with potential forestry use

11.1 Justification: Ecological degradation is very much advanced in the area, and forest cover has been reduced to a mere 6% of the territory. Some rivers and water points (springs) have dried up, soil erosion has reached alarming levels and water infiltration capacity has been reduced by 40% to 60%. Water scarcity for agricultural production and human consumption is one of the most serious problems in the area[21] and the demand for investment in infrastructure by the population centres on the drilling of wells, the protection and management of water sources, and the improvement of supply networks. All seven municipalities are highly vulnerable to natural events such as drought, mudslides and soil slippage.

11.2 Biophysical conditions for establishing the model: Fifty Ha. in water recharge zones and gallery forests, land used for forestry for at least five years, any current coverage or no coverage, and slopes of up to 50%-75% on terrain with forestry potential. The land must be appropriate for protecting the area from land slips and contribute to the protection of springs in areas that are apt for forestry. Soil cover can be in any range, and any type of soil is acceptable, as long as the amount of stones is low to moderate. Temperature may be that which is typical in the zone, and rainfall should range from 800 mm to 1,200 mm in the high part of the watersheds in the seven municipalities. Any land extension is acceptable, though it is important that the owners be willing to join together and form blocks of areas under protection.

11.3 Model structure

11.3.1 Productive system: This is based on the implementation of forest protection practices (surveillance, firebreaks, fencing) and conservation works in areas of potential use in forestry. Particular attention will be given to the protection of water points and/or gallery forests in areas of at least 50 ha and over a five-year period. At the beginning no forest management plan is required, but an agreement on Forest Use in the Area and No Change in Soil Use must be reached for the period during which the management plan is in effect. Said agreement is to be signed between the owners involved, INAFOR and the pertinent mayor's office.[22] This initiative is applied regardless of the area in which there are broadleaved or pine forests to be found.

This model is geared towards the recovery and restoration of the ecosystem and is intended to diminish environmental fragility, while generating environmental services (protection, water, CO^2).

11.3.2 Basic practices: The model includes a total of ten practices that are based on proper forest management and soil conservation works.

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[21] In San Francisco Libre, of 350 wells drilled currently only some 200 still have water; in the province of Estelí, of 516 wells drilled 112 have run dry, while 248 yield only half as much water as before. In that same area, of 47 streams and rivers 12 no longer have any water flow, and 24 are dry during the summer months (see "Mujeres gritan por escasez de agua" in *La Prensa*, 10 March 2005 and "El Río Coco se seca" in *Nuevo Diario*, 11 April 2005)

[22] The Forestry Act authorises the mayor's offices to exercise responsibility and surveillance in areas with slopes greater than 75%, as well as in the vicinity of lakes and rivers (up to 50 metres on either side), article 27 of Law 462, 2003.

11.3.3 Innovative practices: Agreements + ordinances, PGMF and APOs, forest fire prevention and control (fire breakers, surveillance), fencing in of the perimeter, natural regeneration management and PMP.

11.3.4 Complementary practices: conservation works (contention dikes, stone barriers, infiltration ditches).

11.4 Recommendations for model validation and implementation: The project implementation strategy is based on the capacity of partner institutions (INTA, MARENA, INAFOR) and the mayor's offices to bring in interested and willing producers, in the framework of the CDM. Beneficiaries include small, medium and large producers who are able to assume the collective commitment to use the forest in such a manner that the area is protected for a period of at least five years. The publicizing of the commitments made and the technical assistance to be provided will be similar to the sustainable forest management model described above (see pg. 10). During project implementation it is recommended to hold training activities on the following issues: management of natural regeneration, prevention and fighting of forest fires and environmental services provided by managed forests. There should be a strategy of using incentives to reward good work.

Location and selection of communities: A total of 25 sites have been identified, of which 20 will ultimately be selected, as follows: municipality of Achuapa: Río Arriba, El Lagartillo, La Guaruma, El Limón, Las Tablas, El Pajarito, El Waylo and Valle San Nicolas; municipality of Santa Rosa del Peñón: El Trapiche, La Piñuela, La Mora, Talolinga, El Regadio, El Coyol, El Charco, El Chaparral, El Confite and Tierra Blanca; municipality of El Jicaral: El Censo, La Montaña de los Cachorros, La Calera, Las Pilitas and Cerro El Chaperno; municipality of El Sauce: El Borbollón, El Campamento, El Cubano, Petaquilla, Los Loros, Chagüite Grande, El Papalón, Río Grande, Puente Ocho and Las Pilas; municipality of San Francisco Libre: El Pilón, San José de la Serranía (micro-watershed of the Grande or Viejo River), La Uva, La Cueva, El Pochotillo and La Trinidad (micro-watershed of the Pacora River); municipality of San Francisco del Norte: Agua Buena, Jocomico, los Arados and El Zamorano (micro-watershed of the Ubuto River); municipality of Cinco Pinos: El Cerro, Los Araditos, El Puercal (headwaters of the Pavón River), La Fosa, La Honda and the headwaters of the Gallo River.

11.6 Model implementation cost: US$ 11,424.5, with a unit cost of US$ 228.49 / ha at the current dollar value.

PART VII. Cost of Dissemination for Replication

Table 12. Cost of Replication

ACTIVITY	DESCRIPTION	AMOUNT U$
1.2.1	Reproduction of instruments for territorial organization	5,000.00
1.2.3	Divulgement of agreements on Territorial organization	15,000.00
1.3.1	Reproduction of MARENA agreement documents	5,000.00
1.3.3	Complete laws and regulations with SLM	15,250.00
1.3.4	Publication and implementation of workshops on ordinances	11,650.00
1.3.5	Publication of Territorial Organization law	5,000.00
1.3.6	Publication of soil conservation law	5,000.00
1.3.8	Design of technical support model	14,100.00
2.1.2	Deliver educational material to CDMs and regional committees	10,000.00
2.2.1	Needs Assessments	2,500.00
2.2.4	Workshops on method reproduction	3,500.00
2.2.5	Participative planning workshops	17,500.00
2.3.7	Support to rural prosecutor/land court	3,250.00
2.4.4	Systematize productive systems	12,000.00
2.4.5	Dissemination of successful technologies to farms	20,000.00
2.4.6	Transfer of successful technologies	9,000.00
2.4.7	Document adoption of successful technologies.	19,400.00
2.5.1	Publish GVTT strategy	3,000.00
4.1.3	Elaboration of financing strategy	27,750.00
4.3.1	Publication of payment for environmental services schemes.	3,000.00
5.1.3	Edit and disseminate systematized experiences	44,000.00
Management	Document reproduction costs	12,500.00
	TOTAL U$	**263,400.00**

PART VIII. CO-FINANCING

Table 13. Detailed description of estimated co-financing sources

Name of Co-financier (source)	Classification	Description	Type	Amount (US$)	Status*
FAO	Agency	Models of new and indigenous Technologies to mitigate drought and maintain the ecosystem integrity and soil fertility are v validated and adopted by producers (Output 2.4)	Cash	700,000	Commitment received
		INTA-FUNICA are strengthened for SLM technology generation, validation and transfer (Output 2.5)	Cash	300,000	
		IDR-PRODESEC, FUNICA and PESA - INTA strengthened to implement their programs with ecosystem focus (Output 3.1)	Cash	600,000	
		Agency procedures and guidelines mainstreaming SLM established for the project approval process (Output 3.2)	Cash	400,000	
		Sub-total FAO		**2,000,000**	
PASOLAC-COSUDE	Agency	Political, technical, and judicial decision-makers develop effective attitudes with respect de sustainable land management. (Output 1.1)	Cash	10,000	Commitment received
		Integrated territorial management plan is validated/ratified at the national and community level in each of 7 municipalities. (Output 1.2)	Cash	10,000	
		National and local technical capacity to promote and apply SLM fortified.(Output 2.2)	Cash	20,000	
		Municipal technical capacity to implement SLM developed**.** (Output 2.3)	Cash	20,000	
		Models of new and indigenous Technologies to mitigate drought and maintain the ecosystem integrity and soil fertility are v validated and adopted by producers (Output 2.4)	Cash	30,000	

Name of Co-financier (source)	Classification	Description	Type	Amount (US$)	Status*
		INTA-FUNICA are strengthened for SLM technology generation, validation and transfer (Output 2.5)	Cash	10,000	
		Sub-total PASOLAC-COSUDE		**100,000**	
AECI	Agency	Integrated territorial management plan is validated/ratified at the national and community level in each of 7 municipalities. (Output 1.2)	Cash	80,000	Commitment received
		SLM is mainstreamed in public policy (strategies, laws, and regulations), programs, and in national and local planning structures (Output 1.3)	Cash	40,000	
		National and local technical capacity to promote and apply SLM fortified.(Output 2.2)	Cash	30,000	
		Municipal technical capacity to implement SLM developed**.** (Output 2.3)	Cash	30,000	
		Models of new and indigenous Technologies to mitigate drought and maintain the ecosystem integrity and soil fertility are v validated and adopted by producers (Output 2.4)	Cash	80,000	
		INTA-FUNICA are strengthened for SLM technology generation, validation and transfer (Output 2.5)	Cash	40,000	
		Sub-total AECI		**300,000**	
USAID	Agency	Participative community organizational structures fortified for political and technical management of SLM initiatives. (Output 2.1)	Cash	150,000	Commitment received
		Municipal technical capacity to implement SLM developed**.** (Output 2.3)	Cash	150,000	
		Models of new and indigenous Technologies to mitigate drought and maintain the ecosystem integrity and soil fertility are v validated and adopted by producers (Output 2.4)	Cash	200,000	
		INTA-FUNICA are strengthened for SLM technology generation, validation and transfer (Output 2.5)	Cash	100,000	

Name of Co-financier (source)	Classification	Description	Type	Amount (US$)	Status*
		Agency procedures and guidelines mainstreaming SLM established for the project approval process (Output 3.2)	Cash	400,000	
		Sub-total USAID		**1,000,000**	
PNUD	Agency	IDR-PRODESEC, FUNICA and PESA - INTA strengthened to implement their programs with ecosystem focus (Output 3.1)	Cash	75,000	Commitment received
		Agency procedures and guidelines mainstreaming SLM established for the project approval process (Output 3.2)	Cash	75,000	
		Sub-total PNUD		**150,000**	
UE	Agency	Participative community organizational structures fortified for political and technical management of SLM initiatives. (Output 2.1)	Cash	150,000	Commitment received
		Municipal technical capacity to implement SLM developed. (Output 2.3)	Cash	150,000	
		Models of new and indigenous Technologies to mitigate drought and maintain the ecosystem integrity and soil fertility are v validated and adopted by producers (Output 2.4)	Cash	130,000	
		INTA-FUNICA are strengthened for SLM technology generation, validation and transfer (Output 2.5)	Cash	70,000	
		Agency procedures and guidelines mainstreaming SLM established for the project approval process (Output 3.2)	Cash	500,000	
		Sub-total UE		**1,000,000**	
ACDI	Agency	Political, technical, and judicial decision-makers develop effective attitudes with respect de sustainable land management. (Output 1.1)	Cash	100,000	Commitment received
		Integrated territorial management plan is validated/ratified at the national and community level in each of 7 municipalities. (Output 1.2)	Cash	100,000	
		SLM is mainstreamed in public policy (strategies, laws, and regulations), programs, and in national and local planning structures (Output 1.3)	Cash	150,000	

Name of Co-financier (source)	Classification	Description	Type	Amount (US$)	Status*
		Participative community organizational structures fortified for political and technical management of SLM initiatives. (Output 2.1)	Cash	100,000	
		National and local technical capacity to promote and apply SLM fortified.(Output 2.2)	Cash	100,000	
		Municipal technical capacity to implement SLM developed. (Output 2.3)	Cash	143,000	
		Agency procedures and guidelines mainstreaming SLM established for the project approval process (Output 3.2)	Cash	340,000	
		SLM is financed through compensation for environmental services. (Output 4.3)	Cash	300,000	
		Sub-total ACDI		**1,333,000**	
MARENA	Government	Political, technical, and judicial decision-makers develop effective attitudes with respect de sustainable land management. (Output 1.1)	Cash In kind	120,000 63,000	Commitment received
		Integrated territorial management plan is validated/ratified at the national and community level in each of 7 municipalities. (Output 1.2)	Cash In kind	165,000 63,000	
		SLM is mainstreamed in public policy (strategies, laws, and regulations), programs, and in national and local planning structures (Output 1.3)	Cash In kind	115,000 40,000	
		Participative community organizational structures fortified for political and technical management of SLM initiatives. (Output 2.1)	Cash In kind	70,000 30,000	
		National and local technical capacity to promote and apply SLM fortified.(Output 2.2)	Cash In kind	50,000 20,100	
		Municipal technical capacity to implement SLM developed. (Output 2.3)	Cash	233,900	
		Agency procedures and guidelines mainstreaming SLM established for the project approval process (Output 3.2)	Cash In kind	330,000 300,000	

Name of Co-financier (source)	Classification	Description	Type	Amount (US$)	Status*
		Capacity to develop financial strategies and finance actions within the municipal environmental agendas developed (Output 4.1)	Cash	250,000	
		Sub-total MARENA		**1,850,000**	
IDR-PRODESEC	Government	Political, technical, and judicial decision-makers develop effective attitudes with respect de sustainable land management. (Output 1.1)	Cash	250,000	Commitment received
		SLM is mainstreamed in public policy (strategies, laws, and regulations), programs, and in national and local planning structures (Output 1.3)	Cash	300,000	
		IDR-PRODESEC, FUNICA and PESA - INTA strengthened to implement their programs with ecosystem focus (Output 3.1)	Cash	500,000	
		Agency procedures and guidelines mainstreaming SLM established for the project approval process (Output 3.2)	Cash	500,000	
		Sub-total IDR-PRODESEC		**1,550,000**	
FUNICA-PRODESEC	Government	IDR-PRODESEC, FUNICA and PESA - INTA strengthened to implement their programs with ecosystem focus (Output 3.1)	Cash	650,000	Commitment received
		Agency procedures and guidelines mainstreaming SLM established for the project approval process (Output 3.2)	Cash	650,000	
		Sub-total FUNICA-PRODESEC		**1,300,000**	
FUNICA-FAITAN	Government	Models of new and indigenous Technologies to mitigate drought and maintain the ecosystem integrity and soil fertility are v validated and adopted by producers (Output 2.4)	Cash	1,100,000	Commitment received
		INTA-FUNICA are strengthened for SLM technology generation, validation and transfer (Output 2.5)	Cash	2,200,000	
		IDR-PRODESEC, FUNICA and PESA - INTA strengthened to implement their programs with ecosystem focus (Output 3.1)	Cash	350,000	
		Agency procedures and guidelines mainstreaming SLM established for the project approval process (Output 3.2)	Cash	350,000	
		Sub-total FUNICA-FAITAN		**4,000,000**	

Name of Co-financier (source)	Classification	Description	Type	Amount (US$)	Status*
MAGFOR	Government	Political, technical, and judicial decision-makers develop effective attitudes with respect de sustainable land management. (Output 1.1)	Cash In kind	100,000 50,000	Commitment received
		Integrated territorial management plan is validated/ratified at the national and community level in each of 7 municipalities. (Output 1.2)	Cash In kind	100,000 50,000	
		SLM is mainstreamed in public policy (strategies, laws, and regulations), programs, and in national and local planning structures (Output 1.3)	Cash	120,681	
		Participative community organizational structures fortified for political and technical management of SLM initiatives. (Output 2.1)	Cash	80,000	
		National and local technical capacity to promote and apply SLM fortified.(Output 2.2)	Cash	80,000	
		Municipal technical capacity to implement SLM developed. (Output 2.3)	Cash In kind	439,319 500,000	
		Sub-total MAGFOR		**1,520,000**	
INTA	Government	Participative community organizational structures fortified for political and technical management of SLM initiatives. (Output 2.1)	Cash	80,000	Commitment received
		National and local technical capacity to promote and apply SLM fortified.(Output 2.2)	Cash	57,256	
		Models of new and indigenous Technologies to mitigate drought and maintain the ecosystem integrity and soil fertility are v validated and adopted by producers (Output 2.4)	Cash In kind	300,000 154,383	
		INTA-FUNICA are strengthened for SLM technology generation, validation and transfer (Output 2.5)	Cash	200,000	
		Sub-total INTA		**791,639**	

Name of Co-financier (source)	Classification	Description	Type	Amount (US$)	Status*
INETER	Government	Integrated territorial management plan is validated/ratified at the national and community level in each of 7 municipalities. (Output 1.2)	Cash	10,000	Commitment received
		SLM is mainstreamed in public policy (strategies, laws, and regulations), programs, and in national and local planning structures (Output 1.3)	Cash	10,000	
		Participative community organizational structures fortified for political and technical management of SLM initiatives. (Output 2.1)	Cash	40,000	
		National and local technical capacity to promote and apply SLM fortified.(Output 2.2)	In kind	40,000	
		Municipal technical capacity to implement SLM developed. (Output 2.3)	Cash In kind	75,000 75,000	
		Sub-total INETER		**250,000**	
INIFOM	Government	Political, technical, and judicial decision-makers develop effective attitudes with respect de sustainable land management. (Output 1.1)	Cash	35,000	Commitment received
		Integrated territorial management plan is validated/ratified at the national and community level in each of 7 municipalities. (Output 1.2)	Cash	35,000	
		SLM is mainstreamed in public policy (strategies, laws, and regulations), programs, and in national and local planning structures (Output 1.3)	Cash In kind	10,000 20,000	
		Participative community organizational structures fortified for political and technical management of SLM initiatives. (Output 2.1)	Cash	25,000	
		National and local technical capacity to promote and apply SLM fortified.(Output 2.2)	Cash	25,000	

Name of Co-financier (source)	Classification	Description	Type	Amount (US$)	Status*
		Municipal technical capacity to implement SLM developed. (Output 2.3)	Cash In kind	50,000 50,000	
		Sub-total INIFOM		**250,000**	
MUNICIPIOS	Government	Political, technical, and judicial decision-makers develop effective attitudes with respect de sustainable land management. (Output 1.1)	In kind	35,000	Commitment received
		Integrated territorial management plan is validated/ratified at the national and community level in each of 7 municipalities. (Output 1.2)	In kind	35,000	
		SLM is mainstreamed in public policy (strategies, laws, and regulations), programs, and in national and local planning structures (Output 1.3)	Cash	30,000	
		Sub-total MUNICIPIOS		**100,000**	
TOTAL CO-FINANCING				**17,494,639**	

PART IX . MAPS (Separate File)