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GEF6

Supplemental Information on GEF-6 funded activities

Nicaragua

**Resilient Landscapes Management Project
(P160688)**



List of Acronyms

CBD	Convention on Biological Diversity
COP	Conference of Parties
CPS	Country Partnership Strategy
ENDE-REDD+	National Strategy for Avoided Deforestation
FAP	World Bank Group Forest Action Plan
FCPF	Forest Carbon Partnership Facility
GAFFSP	Global Agriculture and Food Security Program
GHG	Greenhouse gas
GoN	Government of Nicaragua
GRUN	Government of Reconciliation and National Unity
IFAD	International Fund for Agricultural Development
INAFOR	National Forestry Institute
INETER	Nicaraguan Institute for Territorial Studies
INIDE	Nicaraguan Institute for Development Information
INTA	Nicaraguan Institute of Agricultural Technology
INTUR	Nicaraguan Institute of Tourism
IPCC	Intergovernmental Panel on Climate Change
MAG	Ministry of Agriculture
MARENA	Ministry of Environment and Natural Resources
MEFCCA	Ministry of Family, Communal, Cooperative, and Associative Economy
MHCP	Ministry of Finance and Public Credit
NBSAP	National Biodiversity Strategy Action Plan
NHDP	National Human Development Plan
PAN	National Action Plan to Combat Desertification and Drought
PANCC	National Action Plan on Climate Change
PIU	Project Implementation Unit
SCCF	Special Climate Change Fund
SINAP	National System of Protected Areas
TA	Technical Assistance
UNCCD	United Nations Convention to Combat Desertification
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
WB	World Bank
WRI	World Resources Institute



INTRODUCTION AND CONTEXT

A. Country Context

- 1. Nicaragua remains one of the Latin America and the Caribbean (LAC) region's poorest countries, but recent strong economic growth has contributed to poverty reduction.** Since 2010, Nicaragua's dynamic economy has reduced poverty and strengthened shared prosperity. The Nicaraguan economy demonstrated favorable performance in 2015¹. GDP growth was 4.9 percent, 0.3 percentage points higher than the growth in 2014, and has maintained good momentum in the past five years, during which the average economic growth rate was 5.2 percent. This growth, together with an increase in expenditures in government priority areas, has resulted in a significant reduction in overall poverty (defined as people living under US\$ 1.6 per day), dropping to 42.5 percent by 2009 and further to 26.9 percent by 2014, according to the 2014 Living Standards Measurement Study. Meanwhile, in the same period, extreme poverty dropped 6 percent, from 14.6 percent in 2009 to 8.3 percent in 2014.
- 2. Despite of economy growth, poverty is still significant in the country and mainly in the rural area.** Nicaragua remains one of the least developed countries in Latin America, where access to basic services is still limited in different regions. Despite that poverty has declined steadily in recent years, about 1.7 million Nicaraguans (a third of the population) still lived below the overall official poverty line in 2014 and about 43 percent of the population live in rural areas and two out of three of said people (68 percent) are defined as living in poverty (World Bank 2015). Fifty-three percent (53 percent) of Nicaragua's municipalities are considered extremely poor, most of which are located in the Dry Corridor and the proposed project area.
- 3. Rural Development is high on the government's agenda, particularly in the context of increasing resilience of the Dry Corridor region.** The Dry Corridor has become a priority region for the GoN because of its importance in the national economy but also because of its vulnerability to natural hazards and increasing land degradation. The Dry Corridor covers the Pacific Coast lowlands and most of the central pre-mountain region. Extreme weather events such as droughts (influenced by El Niño), floods, hurricanes, and tropical storms are recurrent in this corridor. Nicaragua ranks fourth within the ten countries which suffers to most from extreme weather events, according to the German Climate Change Watch²
- 4. In the last five years, droughts have caused severe social, economic, and environmental impacts affecting ecosystems, agricultural production, food security, local livelihoods, and**

¹ Nicaraguan Central Bank. Economic database. <http://www.bcn.gob.ni>

² German Watch. GLOBAL CLIMATE RISK INDEX 2016. <https://germanwatch.org/fr/download/13503.pdf>



extensive damage to the rural economy of Nicaragua and other Central American countries³. It is considered that climate change variability has also influenced the increased occurrence of this region's extreme weather events.

- 5. Environmental costs and depletion of natural capital in the Dry Corridor may threaten the long-term sustainability of economic growth.** The Dry Corridor's agricultural production supports the entire country, since this area comprises more than 60 percent of the country's jobs and 55.8 percent of the total exports. This region produces 49 percent of the bean crop, 33 percent of corn, 100 percent of the nation's sorghum, and 80 percent of the beef production. Despite the abundant and rich volcanic soils found in this region, this severe degradation of natural resources has led to about 30 percent reduction in national agricultural production. Even though Nicaragua still has important forest cover (about 3,398,000 hectares or about 26 percent of the national territory)⁴, current land and forest practices in the Dry Corridor with the additional human pressure upon scarce water resources – as result of intense droughts – has increased deforestation and biodiversity loss. According to MARENA, about 70,000 hectares of forests are lost every year. Among the main drivers of deforestation are the expansion of agriculture, cattle ranching, illegal logging, fires, urbanization and the use of wood as a fuel source by the poor in rural areas.
- 6. Environmental land degradation in the Dry Corridor is also affecting biodiversity and ecosystems.** The dominant ecoregions in the Dry Corridor, according to WWF classification, are tropical dry forest, pine–oak forests, and humid forest. Fragmentation and deforestation have affected connectivity, and droughts have decreased river flows, thereby affecting the ecoregion's wildlife and ecosystems, as well as the living conditions of local communities. However, despite of all these drivers of biological degradation, Nicaragua hosts rich biodiversity from the many different types of ecosystems found in the Pacific and Atlantic regions. Biodiverse dry, pine–oak and humid forest from Nicaragua are recognized globally as centers of high endemism and ecosystem value as well as flora and fauna biodiversity.
- 7. The government of Nicaragua has taken a proactive role in the fight of land degradation and forest conservation in the Dry Corridor.** Nicaragua has requested the support from different agencies and donors to implement diverse instruments and strategies to improve conservation of protected areas, restore forestlands, increase connectivity, and support livelihoods of local communities dependent on forest and family agriculture. Nicaragua also recognizes the threat of climate change to its development and has been very active in international climate change negotiations and public policy formulation. Despite the fact that

³ Van der Zee, A., J. Meyrat, C. Poveda, and L. Picado. 2012. *Estudio de caracterización del Corredor Seco Centroamericano*. FAO.

⁴ Forestry coverage estimated for 2009. Source: Government of Nicaragua. 2011. *Propuesta de Preparación del Proceso REDD+ en el Marco de la Estrategia Nacional para la Reducción de la Deforestación y la Degradación Forestal. Versión Borrador 2*. RPP/ENDE.



Nicaragua did not sign the Paris Agreement in the COP 21, but the GoN is fully on board in the preparation of its ENDE-REDD+ strategy.

8. **The government has secured financial support to tackle the current social and environmental challenges affecting the Dry Corridor.** Those sources of support include (a) Swiss Cooperation (COSUDE) for the Communal Management Plan for the Dipilto River Basin Project (US\$6.7 million); (b) European Union for the Protection and Conservation of the Headwaters of the Rio Coco River Basin for Climate Change Adaptation and Community Partnership Project (US\$20 million); and (c) BCIE and FIDA for the Sustainable Development of Rural Families Living in the Dry Corridor of Nicaragua – Program Nicavida (US\$35 million). Two of these projects (COSUDE and EU) will provide cofinancing to the proposed investments of this project.
9. **Additionally, the GoN requested the World Bank’s support** to prepare an IDA operation – Dry Corridor Climate Resilient Agriculture Project (P162982) – and technical assistance for developing a Strategic Development Framework for the Nicaraguan Dry Corridor to support sustainable land management, and thereby increase resilience of agriculture, forest, and landscape; and promote sustainable local economies. This project will contribute to increase resilience of local communities by conserving forestland, promoting more sustainable land use practices (at farm level) and protecting riparian areas of watercourses.

Sectoral and Institutional Context

10. **Growth and Natural Resources.** In order to sustain the economic growth the country has experienced in the last years, Nicaragua needs sound, environmental management of its natural capital and it needs to integrate it into its development agenda. Deforestation, land degradation, fires, erosion and water sources deterioration are affecting soil productivity, biodiversity and livelihoods of rural communities.
11. **Forest.** Between 1983 and 2000, approximately 1.2 million ha of forest cover was lost in Nicaragua. This ranges from 66,000 to 80,000 ha per annum⁵. In only five years between 2010 and 2015, 35,161 ha of forest were lost in Nicaragua; this represents 25 percent of the forest that existed in 2010.⁶ According to the latest FAO Forest Resources Assessment, Nicaragua reported a forest cover of 26 percent in 2015. The key challenge is to reverse the process of conversion of forests to other land uses; the deforestation rate is estimated at 2.1 percent (74,700 ha) annually. Out of the total forest loss, 45 percent was lost due to expansion of livestock, 40 percent due to expansion of agriculture, and 15 percent due to expansion of agroforestry (coffee, cocoa, and basic grains). As forest loss continues, biodiversity becomes more fragmented and

⁵ GRUN/MARENA. 2015. REDD Readiness Preparation Plan, R-PP, 2012.

⁶ MARENA. 2015. *Corredor Biológico del Pino*. Estimation of carbon emission and sequestration for the proposed GEF project.



threatened, since only 18 percent of Nicaragua’s total land area has legal status for management and protection.

- 12. Conservation of Biodiversity.** Nicaragua contains a diverse geography of extensive lowlands in the Pacific and Atlantic versants, numerous wetlands and lakes, an impressive volcanic chain composed of 25 volcanoes (top sites are protected areas), and the most southerly extension of lowland pine forest in the hemisphere. Nicaragua is home to a rich biodiversity of species including 6,014 species of vascular plants, 765 species of fish, 754 species of birds, 300 species of reptiles and amphibians, 215 species of mammals, and 12,230 species of invertebrates (snails, arthropods, and corals).
- 13. Ecoregions.** In the Nicaraguan forestland, there are 28 documented forest types, grouped in 12 ecoregions, among these: tropical dry forests, tropical humid forests and pine–oak forest (the target ecoregion in this project) which are critical for conserving biodiversity and for delivering of multiple environmental benefits to local communities and the country. In addition, Nicaragua has declared 19 corridors that seek to connect forested areas and protected areas. This project targets protected areas in a corridor in the pine-oak ecoregion (Table 1).
- 14. Pine–Oak Forest Ecoregion.** The Nicaraguan Pine–Oak Corridor is part of the Central American pine–oak forests ecoregion (according to the global ecoregions defined by the WWF)⁷ which extends from the southern Mexico, through the southern highlands of Guatemala, reaching most of Honduras and El Salvador, and ending in the west central Nicaragua (Annex 1). The most outstanding characteristic of the pine–oak forests ecoregion is the richness of trees of the genus *Pinus* and *Quercus*. In Nicaragua, the pine–oak forests are only found in the mountainous terrain of the North–Central region in approximately 971,315 ha (9,713 km²). Pine–oak forests lie between 600–1,800 meters (2,000–5,900 feet) elevation; at lower elevations, tropical dry forests (Pacific) and tropical moist forests (Atlantic) surround those forests. The pine–oak forests are found in the provinces of Nueva Segovia, Estelí, Madriz, and Matagalpa, which are part of Nicaragua’s central region and part of the Dry Corridor.
- 15. Importance.** This ecoregion is very important since it represents the last territory of the *Pinus* species in the Central American region and it is rich in flora and fauna biodiversity. Some of the distinct communities include coniferous forests of *Pinus oocarpa*, *P. maximinoi* and *P. patula tecunumanii* and mixed forests of pine and oak species (*Quercus oleoides*). Pines trees represent an important source as firewood to local communities and in commercial logging operations. Despite of the biological diversity of these forests very few are protected, despite

⁷ Olson, D. M., and E. Dinerstein. 1998. “The Global 200: A Representation Approach to Conserving the Earth’s Most Biologically Valuable Ecoregions.” *Conservation Biol.* 12: 502–15.



being threatened by logging, deforestation, forest fires, land conversion for agriculture and livestock. Of all protected areas in the country, only 11 reserves protect the pine and oak forest, which represents approximately 8.2 percent of this important ecoregion's total area. Eight of these reserves are included in this project (Table 1).

- 16. Ecosystems Services.** Poor rural households in Nicaragua are heavily dependent on natural resources including timber, fuel wood, forest products, food, land for cattle ranching and agriculture, placing natural resources under enormous pressure, and this is particularly affecting the Nicaraguan dry corridor. Ecosystem services associated with these ecosystems, such as water balance (air moisture, rainfall, river flow), carbon balance (global warming), nutrient balance (biogeochemical cycles, gases and aerosols from burnings) and sediment balance (erosion and siltation downriver and in coastal zones) are important for sustaining these assets and activities.

Baseline

- 17. Government Efforts to Protect Forests and Biodiversity.** The GoN has enacted more than 20 policies, programs, plans, and extensive regulations to protect natural resources and biodiversity, reduce degradation and increase resilience to climate change (see Annex 3 for detail). Among the most important instruments is the Nicaragua National Biodiversity Strategy Action Plan (NBSAP) 2015–2020.⁸ This plan contains eight strategic lines to which this project is aligned. Furthermore, the proposed project will significantly contribute to NBSAP (Annex 2), which is aligned with the CBD and global Aichi targets⁹, the National Environmental Strategy for Climate Change 2010–2015, and the National Strategy for Avoided Deforestation 2016.
- 18. National Protected Area System.** The Ministry of Environment and Natural Resources (MARENA) administers the National System of Protected Areas (SINAP). There are 74 public and private protected areas (66 terrestrial and 8 coastal marine) whose total area amounts to 2,341,000 ha. This includes four biosphere reserves recognized by the United Nations Educational, Scientific and Cultural Organization (UNESCO): (a) the Bosawas Biosphere Reserve, (b) Island of Ometepe, (c) Rio San Juan, and (d) the Sea Flower Biosphere Reserve. Further, Nicaragua has nine RAMSAR site wetlands of international importance for migratory birds and waterfowls. Among these, the Estero Real Natural Reserve included in this project. There are also 93 private wildlife reserves (9,900 ha) and three municipal ecological parks (51,000 ha). In 2013, MARENA created seven Water Reserve Zones (7,000 ha) for the conservation of water resources for human consumption, biodiversity, cultural values.

⁸ MARENA. 2015. National Strategy for Biodiversity. <http://www.cbd.int>. See Annex 2 for further information on the project's alignment with the NBSAP.

⁹ <https://www.cbd.int/>



19. Project area. 7 protected areas were selected for this project which are located within the Dryland Corridor, including ecosystems of the pine-oak ecoregion. As described before, in the Dry Corridor lives about 80 percent of country population and it is the economic motor of the country and where most ecosystems and protected areas are under higher threat of conversion. The protected areas in this project were selected based on the less degraded of fragmentation, habitat importance for endangered or threatened species, presence of forest land around that can increase connectivity through the corridors, and threats affecting the territory. The project proposed will support conservation of biodiversity of the protected areas and its corridors, promote more sustainable practice of forest management and reduce carbon emissions while protecting the local livelihoods of about 85,000 people (See Table 1, Map 1 and further bio-physical details in Annex 1). Land tenure and inhabitants within the targeted protected areas will be analyzed further during the Project preparation.

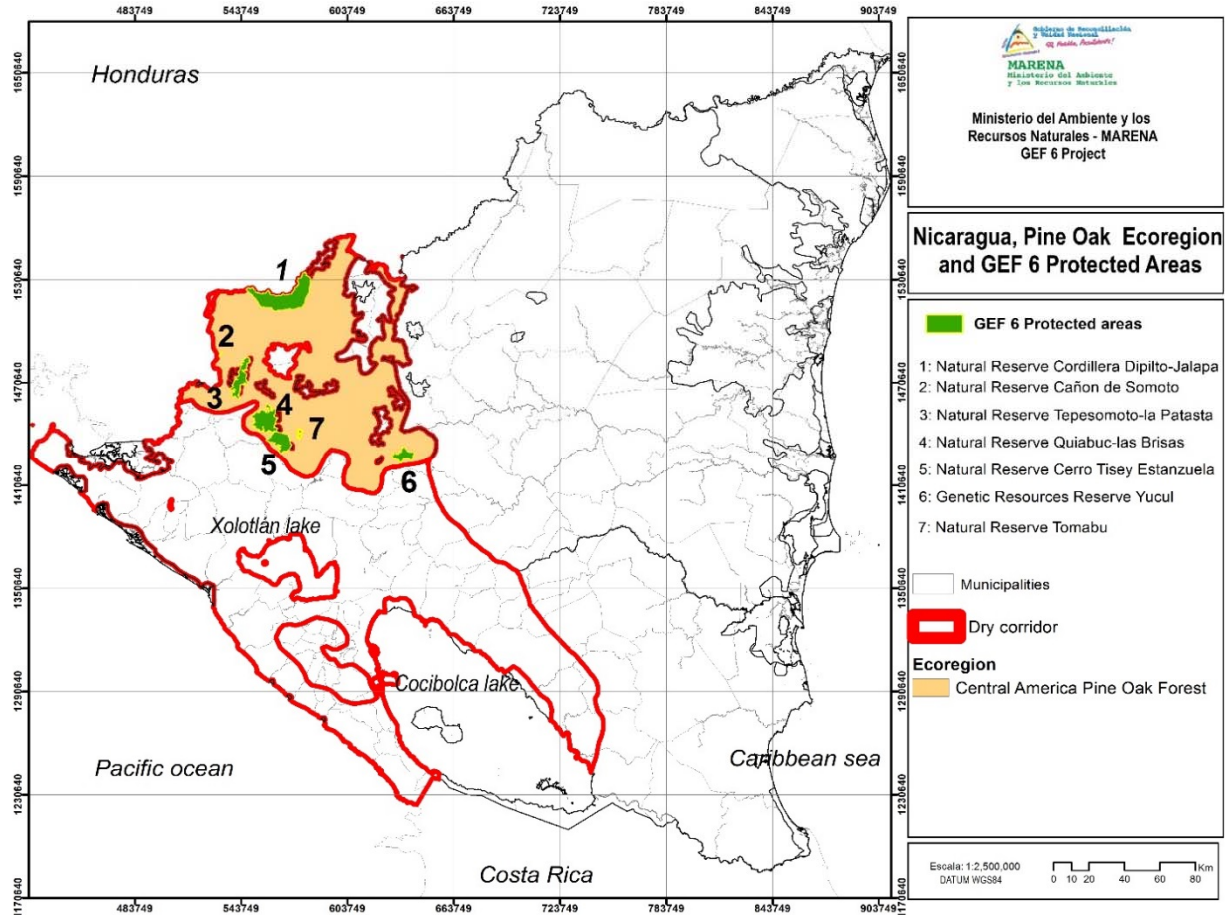
Table 1. Basic Information on the Seven Protected Areas that this Project (GEF 6) will support within the Pine and Oak Forest Corridor in Nicaragua.

No.	Protected Area	Extent of area in ha (core area and buffer zone)	Number of inhabitants	Department	Municipalities
1	Natural Reserve Cordillera Dipilto y Jalapa	52,449	60,652	Nueva Segovia	Dipilto, Jalapa, San Fernando, Mozonte
2	Natural Reserve Cañón de Somoto	644	78	Madriz	San Lucas
3	Natural Reserve Tepesomoto–Patasta	21,674	7,879	Madriz	Somoto, San Lucas, Las Sabanas, San José de Cusmapa
4	Natural Reserve Cerro Quiabuc – Las Brisas	25,031	4,636	Esteli	La Trinidad, Esteli
5	Natural Reserve Cerro Tisey Estanzuela	21,680	6,754	Esteli y Leon	Esteli, San Nicolas, El Sauce
6	Genetic Resources Reserve Yucul	5,714	3,897	Matagalpa	San Ramon
7	Natural Reserve Cerro Tomabú	2,125	1,498	Esteli	Esteli
Total		129,317	85,394	6	14

Source: MARENA.



Map 1. Project area: seven protected Areas in the Pine-Oak Ecoregion and the Dryland Corridor.



20. Management of Protected Areas and Biodiversity – The Challenge

- a. MARENA is the national agency responsible of the protected areas and the SINAP. However, private owners or local communities own and manage 80 percent of Nicaragua’s protected areas. MARENA, SINAP, and municipalities lack the necessary staff, budget, and tools for protecting, monitoring, planning, and development of initiatives that address the causes of biodiversity loss, forest cover, and soil degradation because of unsustainable current agriculture, forests, and landscapes.
- b. There is a need for economic alternatives and incentives or mechanisms that can promote sustainable land-use practice, but also lead to successful livelihoods models or projects among producers living in protected areas and along the biological corridors. This project will test different initiatives such as agroforestry and agrosilvopastoral projects or biodiversity-friendly pine-oak forest production models to foster certification standards,



ecotourism micro-initiatives around protected areas, and payments for results (carbon sequestration and watershed protection), among others.

- c. The Dry Corridor (where the targeted protected areas and corridors are found) is an active agricultural region that is the economic motor of the country. Different institutions, development plans, and productive activities interact in this region. The project will support the mainstreaming of biodiversity into other institutions' sectoral plans, and provide biodiversity information and capacity building to public officials regarding the importance of this natural capital to the country's economic growth.

- 21. Financial Support for Protected Areas.** The SINAP is financed through the national treasury and international cooperation, the latter mainly through project grants from bilateral and multilateral sources. Fourteen percent of the SINAP finance has been funded by the national treasury, 78 percent by international cooperation, and 8 percent by local sources. Between 2012 and 2016, the GoN doubled its annual allocation for SINAP management from approximately US\$1 million to US\$2.1 million; roughly 30 percent of the national budget allocated to MARENA. Funds from the national treasury mainly cover staff salaries at managerial and technical levels and some operating expenses. The planned 2017–2020 national budget foresees annual allocations of US\$4.1 million to SINAP, including US\$2 million for infrastructure investments.
- 22. Future Sustainability of Protected Areas System.** Enhanced policy and legal frameworks is needed to improve SINAP management. The GoN considers that SINAP financing mechanisms should be based on partnerships that include families and producers living in the protected areas, municipal governments, and local private sector as the main protagonists of a new model of protected areas' management. With support from different donors, including GEF, Special Fund of Climate Change, GTZ, COSUDE, EU, the GoN has piloting different financial mechanisms and technical tools to support protection of protected areas, forest, and increasing resilience of local communities to climate change. This project will use lessons learned from these pilots to design the interventions to be supported in this project.
- 23. Resilient landscape and connectivity.** The proposed project will also contribute to reducing the degradation of critical habitats and loss of the pine–oak forests in Nicaragua by strengthening management of protected areas; consolidating a biological corridor that promote ecological connectivity between existing protected areas and pine-oak forests remnants; implementing a pilot ENDE–REDD+ project; and promoting sustainable land and forest management of Nicaragua. The project will work on protected areas, forested land, and agriculture land to achieve a triple win of environmental, social and economic benefits using a landscape approach. Resilient forest and landscapes within protected areas and corridors are needed to improve management of protected areas, implement initiatives that support conservation of biodiversity, but also local development of communities within and around protected areas and to allow different stakeholders involvement in the country land management.



24. **Landscape approach.** The landscape scope is especially important in Nicaragua where most the protected areas and about 80 percent of the country forestland are private or community owned. Thus, to ensure conservation of natural resources and protect the resources of forest dependent communities, Nicaragua must ensure proper land use and zoning and restore degraded areas by adopting an Integrated Landscape Management approach that integrates sustainable development plans with conservation goals and increasing resilience.¹⁰
25. **Climate Change.** In 2007, the GoN formulated the first National Action Plan on Climate Change (PANCC) to establish adaptation measures. In 2010, the GoN approved a National Strategy on Environment and Climate Change that includes the following strategic guidelines aimed at adapting to climate change for the period of 2010–2015: (a) environmental education for life; (b) protection of natural resources (c) water conservation, recovery, collection and harvesting; (d) climate change related mitigation, adaptation, and risk management; and (e) sustainable land management. In 2013, the Ministry of Agriculture launched the first National Climate Adaptation Framework for the sectors of agriculture, forestry, and fisheries.¹¹
26. The Third National Communication under preparation, to the United Nations Framework Convention on Climate Change (UNFCCC) will report the greenhouse gas (GHG) inventories and national efforts in mitigation and adaptation during 2000–2005 and 2005–2010. Finally, Nicaragua has finalized the National Strategy for Avoided Deforestation (ENDE–REDD+)¹², with support of the Forest Carbon Partnership Facility (FCPF) and is preparing an Emissions Reduction Program for the Caribbean Coast to be proposed to the FCPF Carbon Fund.
27. Since 2007, the GoN launched a National Reforestation Campaign with the aim to address adaptation to climate change and also recover forests as key ecosystems for water conservation, soils and biodiversity, to strengthen livelihoods depended on natural resources and are fighting poverty. The Campaign seeks to address the threats to water and increase the adaptation capacity to climate change by reforesting an average of 20,000 hectares (ha) annually, complemented by an estimated natural regeneration of 139,000 ha of forest.¹³

¹⁰ *Integrated Landscape Management (ILM)* provides a context to spatially target and harmonize investments so that they can efficiently yield public goods and private financial returns while mitigating investment risks. A pressing challenge of landscape management is to link agriculture with the other inter-related needs from the landscape including provision of ecosystem services, protection of biodiversity, local livelihoods, and human health and well-being. ILM describes long-term collaboration among different groups of land managers and stakeholders to achieve the multiple objectives required from the landscape. (Shames, S., M. Hill Clarvis, and G. Kissinger. 2014. *Financing Strategies for Integrated Landscape Investment: Synthesis Report*).

¹¹ <http://www.magfor.gob.ni/prorural/IIMesa2012/PlanAdaptacion2013.pdf>

¹² http://enderedd.sinia.net.ni/Docs/AnexoRMT/Anexo_percent20RMT_percent20No._percent2022_percent20-percent20Perfil_percent20de_percent20la_percent20ENDE-REDD+.pdf

¹³ MARENA.



- 28. Fire Control.** A significant challenge for the GoN is the control of forest fires, since the use of fire is a cultural tradition of the rural farmers (slash/burn/cultivation). After many campaigns and more controls applied, forest fires have been reduced from 4,765 in 2000 to 259 in 2015.
- 29. Economic Incentives.** One of the main activities promoted by the GoN to address the threat of deforestation is provision of financial incentives to small producers with plantations of 1 to 10 ha. These forest incentives aim at promoting forestry development, incorporating civil society in sustainable management of forest resources to increase national forest cover. Incentives include exemption from income tax and immovable property, among others. Since 2012, the National Forestry Institute (INAFOR) has implemented monetary incentives for promoting forestry through the National Fund for Forest Development (FONADEFO). Forest incentive projects are aimed at small producers in the northern, central and southern parts of Nicaragua. Under these projects, the recipients receive 100 percent of monetary incentives for the first three years. It is estimated that agroforestry and silvopastoral systems and energy plantations promoted between 2007 and 2014 contributed about 145,000 ha to increase the national forest cover.

Theory of change and Project Alternative

- 30.** Deforestation, loss of biodiversity and loss of ecosystem services have significantly impacted the Dry Corridor of Nicaragua, especially the central region where the pine and oak forest ecoregion is found. This region contains important protected areas that are protecting a rich flora and fauna biodiversity, but the oak-pine forests are currently weakly represented in the System of Nationally Protected Areas (SINAP). In order to increase conservation of the pine and oak forest, protected areas management need to be strengthened and conservation measures are required on lands inside and outside of the protected and buffer areas. The best alternative to protect these protected areas and increase connectivity of these with forest patches in the rural landscape is through and landscape management framework which strengthens protected area management and which engages with landowners by improving their incomes and livelihoods in return for strengthening conservation and natural resource management activities on their land. Various forms of stewardship programs can be used to achieve this as is commonly practiced in many parts of the World.
- 31. Drivers of losses.** The underlying causes of the losses include the low value of subsistence agriculture and an associated growing population, insufficient incentives to landowners and productive sectors of the economy to protect the natural assets, weak institutions to manage protected areas and support changes in landowner's behavior and climate change and natural disasters^[1]. Higher temperatures more extreme weather events (hurricanes, temperature highs, heavy rainfall and drought)^[2] are predicted (World Bank 2016).

^[1] Hurricane Mitch caused \$1 billion in damage in 1998, killed 3,800 people in floods and landslides with over 70,000 landmines dispersed to new areas.

^[2] <http://www.worldbank.org/en/news/feature/2016/07/18/america-latina-llego-hora-adaptarse-calentamiento-global>



- 32. Causes of losses.** The drivers of the natural resource and ecosystem losses are agricultural and livestock expansion, illegal logging, fires and burning to increase area under agriculture, and the demand/ unsustainable use of natural resources including timber, fuel wood, food, etc.
- 33. Proposed Intervention.** In order to change this cycle, four broad areas of intervention are proposed:
- i. *Strengthen protected area management and conservation of biodiversity:*** The first key intervention is to strengthen protected area management to lead them onto a sustainable footing – ecologically, financially and institutionally and ensuring that communities understand their relevance and benefit from them. Also to develop baseline studies to measure the current status of critical habitats and of forest conservation.
 - ii. *Landscape Restoration for Biodiversity, Resilience, and Local Livelihoods.*** The second intervention seeks strengthening and linking biological corridors with protected areas. Supporting sustainable production practices within the pine and oak forest through i) landscape restoration and ii) Sustainable land use, will increase livelihoods resilience (food production, income, information) and biodiversity conservation. Conserving and rebuilding ecosystems and forest outside of the protected areas and in buffers and corridors requires the strengthening of landowner incomes in return for reforesting their lands and rehabilitating ecosystem services (e.g., supporting innovative mechanisms for conservation and sustainable land use agreements with landowners and productive sectors of the region). The intervention will include the implementation of an ENDE-REDD+ pilot.
 - iii. *Mainstreaming biodiversity and restoration for resilient landscapes at the institutional and development sectors.*** To influence a wider landscape management approach for the pine–oak protected areas and corridors, is necessary to mainstream biodiversity and landscape restoration in key government and private sectors strategies, practices and planning. Resilient landscape management planning will increase biodiversity conservation; consolidate and strengthen institutional capacity and disseminate quality biodiversity information within government sectors for better decision making.
 - iv. *Project management:*** Project management reporting and evaluation is needed to keep the process on track.

B. Relationship to Government Policies and the Country Partnership Framework (CPF)

- 34. Country Partnership Framework.** The proposed project is consistent with the World Bank Country Partnership Strategy (CPS) for Nicaragua for the period of fiscal years (FY) 2013–2017 (Report No. 69231–NI). One of the two strategic objectives of Nicaragua’s CPS is to raise incomes by sustainably improving productivity, competitiveness, and diversification. By seeking to improve management effectiveness in the project area through the implementation of activities that aim to improve practices to reduce pressures on deforestation and biodiversity, while helping



create economic opportunities for vulnerable local communities, including small farmers and indigenous peoples, the project is responsive to all three themes.

35. The GoN and the World Bank have a strong and deep engagement on biodiversity, forests and climate change and in addressing the environmental challenges in the Dry Corridor.
- i. The **Corazon Transboundary Biosphere Reserve Project** (P085488) financed by GEF was key in Nicaragua to lead MARENA in the implementation of first international strategy to protect global biodiversity of a large regional corridor (Mesoamerican Biological Corridor), invest in the protection of protected areas (Bosawas), engaged with local and indigenous communities through agroforestry and conservation activities.
 - ii. Currently, the Bank is also supporting the country with the preparation of the **ENDE-REDD+ Strategy, financed by the FCPF**¹⁴, in defining the priority areas and strategic actions to help reduce emissions from deforestation, forest degradation, and land use change. This project will support the first ENDE-REDD+ pilot to implement a result-based payment mechanism in the Peñas Blancas-Kilambé Corridor (north-central Nicaragua). The pilot will promote Sustainable Forest Management (SFM) and Sustainable Landscape Management (SLM) and improve the management effectiveness of buffer zones of protected areas and corridors (Component 2).
 - iii. The World Bank's **Adaptation of Nicaragua's Water Supplies to Climate Change Project** (P127088), financed by the Special Climate Change Fund, supports the GoN's agenda on forest protection and conservation in critical areas of the Dry Corridor which serve to local communities, which is laying out a new methodology for payment of environmental services by the Bank.
 - iv. In addition, the Bank is supporting the GoN agenda in the Dry Corridor with the preparation of the **Nicaragua Dry Corridor Resilient Agriculture Project** (P162982), the **Integrated Water Resources Management in Nicaragua and the Dry Corridor Project** (P158256) to address the region's water crisis. The Bank is also supporting GoN's national **Strategic Development Framework for the Nicaraguan Dry Corridor**¹⁵, which will set priority actions to improve forest conservation, increase resilience, and generate sustainable paths of development for the region.
36. **Forest Action Plan.** The project is also aligned with the WBG Forest Action Plan FY16–20, in particular with Focus Area 1 on Sustainable Forestry (“Protect and Optimize the Management of Natural Forests”), Focus Area 2 on Smart Interventions in Other Economic sectors (“Inform Decision Making on Land Use”) and with the Climate Change and Resilience Cross-Cutting

¹⁴ [Nicaragua FCPF REDD Readiness \(P120657\)](#)

¹⁵ [Climate Change and Disaster Resilience for Decision Making in Nicaragua and Honduras \(P153847\)](#).



theme. The project responds to the WBG Climate Change Action Plan (2016) specifically to the Priority III (“Scale Up Climate Action”). This project will be delivering on forestry and land restoration as key components of resilience landscapes and climate-smart land use.

37. GEF Strategic Framework. Additionally, the project is well-aligned with the GEF Strategic Frameworks for Biodiversity (BD-1, Programs 1; BD-4, Program 9); see Annex 2.

38. Strategic Plan of the Convention on Biological Diversity 2011-2020. The proposed project will contribute with seven of the Aichi Targets that are of direct relevance to conservation of biodiversity, protection of *terrestrial and inland water* habitats, climate change mitigation, landscapes restoration, and food security (Targets 1, 5, 7, 11, 12, 14, and 15); see Annex 2.

39. Alignment with High-Level Government Policies. The proposed project is in line with seven National Priority Policies and Strategies:

- i. **National Human Development Plan (NHDP) from 2012–2016.** The project will support the Policy on Environmental Defense and Protection of Natural Resources, which aims to promote the conservation of biodiversity and coexistence, monitoring and sustainable use of protected areas and support livelihoods of surrounding communities. The proposed project would also help Nicaragua towards achieving the Sustainable Development Goals (SDGs). This set of global objectives are supported by Nicaragua, through the NHDP which the government new sustainable development agenda. Of the 17 SDGs, the project will contribute to SDGs 1, 2, 5, 13, 14, and 15¹⁶.
- ii. **Nicaragua National Biodiversity Strategy 2015–2020¹⁷.** This is Nicaragua’s main roadmap to address the threats affecting biodiversity and promoting its restoration and conservation. The proposed project is aligned with this strategy. The proposed project will directly contribute in the implementation of six strategic lines and objectives of the strategy in the following ways. (a) Improve biodiversity conservation, with consideration given to its integral role in the country’s development. (b) Promote the economic viability of biodiversity, taking into account its richness and economic value, as well as the cost of its degradation. (c) Improve the country’s capacity in the fields of scientific research, monitoring, and technical assistance for conservation and sustainable use of biodiversity. (d) Develop mechanisms and institutional tools to improve the country’s coordinated response capacity to address biodiversity degradation. (e) Develop and implement legal tools to improve the country’s response capacity to address biodiversity degradation and loss. (f) Improve the country's capacity to address the issues of education and citizen participation. *The project will directly contribute to reach several targets of this strategy. The parameters of the project’s contribution will be defined during PAD preparation.*

¹⁶ SDG1 No poverty, SDG 2 Zero hunger, SDG5 Gender equality, SDG13 Climate action, SDG14 Life below water, SDG15 Life on land.

¹⁷ Estrategia Nacional de Biodiversidad y su Plan de Acción. Nicaragua 2015–2020.



- iii. **National Environmental and Climate Change Strategy.**¹⁸ The proposed project is aligned with this strategy and will contribute in addressing environmental degradation and climate change in the strategic guidelines. These contributions will be in the areas of (a) environmental education for life; (b) protection of natural resources; (c) conservation, recovery, catchment, and water harvesting; (d) mitigation, adaptation, and risk management of climate change; and (e) sustainable land management.
 - iv. **National Program for Strengthening the Resilience of Protected Areas and Biological Corridors.** The Ministry of Finance and Public Credit (MHCP) approved this program in December 2014 to promote conservation of 40 protected areas in 2015–2020. The program needs US\$40 million for achieving the targets; the proposed project would contribute directly.
 - v. **Initiative 20x20.** Nicaragua has endorsed this international alliance and the implementation of a Forest Landscape Restoration Pledge as announced at the Conference of Parties 21 (COP21) to the UNFCCC in Paris in December 2015. The Initiative 20x20 is country-led and aims to restore 27 million ha of degraded and deforested land in Latin America and the Caribbean by 2020,¹⁹ of which Nicaragua’s target is of 2.8 million hectares.
 - vi. **National Plan to Combat Desertification and Drought (2002)**²⁰. The project will contribute with this national plan by implementing activities to restore ecosystems, protect biodiversity and reverse the process of land degradation in dry areas of Nicaragua such as the Dry Corridor where this project is focused.
 - vii. **National Strategy for Avoided Deforestation (ENDE)–Reduce Emissions from Deforestation and Forest Degradation (REDD+), 2016.** The World Bank’s Forest Carbon Partnership Facility (FCPF) is financing the preparation of the ENDE–REDD+, which is conceived as the Nicaraguan government’s political and strategic framework to integrate national, state, and local activities focused on reversing the main causes of deforestation and forest degradation, taking into consideration the participation of Nicaragua’s indigenous peoples and civil society. The project will contribute to implementing a pilot ENDE–REDD+ in the pine-oak Corridor.
- 40. Annex 3** presents’ further details on the project’s alignment with GoN’s legal frameworks, international agreements to protect biodiversity, and high-level policies and programs.

¹⁸ Estrategia Ambiental y de Cambio Climático.

¹⁹ <http://www.wri.org/our-work/project/initiative-20x20>

²⁰ In 1997, Nicaragua signed the United Nations Convention to Combat Desertification (UNCCD).



ENDE-REDD. A platform to address land degradation and creation of incentives. The National Strategy for Avoided Deforestation (ENDE, according to its acronym in Spanish) is a national policy platform to carry out activities to help Reduce Emissions from Deforestation and Forest Degradation (REDD+). The ENDE-REDD+ will be the programmatic framework with regard to mitigation and climate change adaptation, aiming to reduce emissions from deforestation and forest degradation, as well as preventing and reducing the negative impact of climate change through increasing resilience and coping capabilities of the forest and farming ecosystems and of the communities that depend on them in order to reduce social, ecological, and economic vulnerability, and to create the capabilities to contribute to mitigating greenhouse gas (GHG) emissions, mainly carbon dioxide (CO₂).

ENDE-REDD+ in Nicaragua aims to support sustainable management of forests, contribute in the connectivity of corridors while increasing carbon sequestration and to generate the co-benefits of conservation and its effects on local development. The project will implement a Sustainable Forest Management (SFM)/REDD+ pilot project, which will result in the avoided deforestation of 20,000 ha in the landscape of the pine-oak Corridor. The protocol will include specific indicators, such as verification mechanisms and frequency of measurements. The protocol will be consistent with the ENDE-REDD+ national standards and readiness guidelines as established in Nicaragua's R-PP. The VM0015 methodology was chosen (methodology for estimating the reduction of GHG emissions derived from unplanned deforestation) from among these, considering that the elements included in this methodology are the most applicable to the project site and it is characterized as having a mosaic configuration system due to activities such as cattle-ranching, small-scale agriculture, and selective timber extraction.



PROPOSED PDO/RESULTS

A. Proposed Development Objective(s)

41. The Project Development Objective (PDO) is to strengthen the National Protected Areas System and support sustainable land use and restoration practices in selected areas of the Dry Corridor of Nicaragua to foster biodiversity conservation, resilient landscapes, and local livelihoods.

B. Key Results

42. Following are the key results expected from the project in **Global Environmental Benefits**:

- i. Improved habitats for biodiversity through 73,563 hectares conserved or restored (natural regeneration, re/afforestation and agroforestry and silvopastoral systems) to increase resilience, protection and connectivity between 7 protected areas and remnant pine and oak forests, targeting an approximate area of an additional 55,754 hectares (buffer areas), bringing the total area targeted to 129,317 hectares (Components 1, 2, 3).
- ii. Improved management effectiveness of 7 protected areas (core areas) in a total 73,563 hectares (Component 1).
- iii. Contribution to at least 5 Strategic Lines of the 2020 National Biodiversity Strategy and tracked by the biodiversity monitoring system to be developed under the project (Components 1, 2, 3).
- iv. 20,000 hectares (TBD) additional from local farmers benefiting from a results payment program for applying sustainable forest use practices that contribute to reduce deforestation, increase corridor connectivity and support local livelihoods (Component 2).
- v. 544,300 metric tons (600,000 tons) of Green House Gases (GHG) emissions reduced or avoided (or carbon sequestered) (Component 2).

43. All the presented target numbers will be analyzed in detail and confirmed during the PPG stage. A Results Framework will be prepared as part of the preparation of the operation (use of core sector indicators will be promoted to allow for aggregation of portfolio level). The feasibility of the target on reduced or avoided GHG emissions is only a preliminary estimate at this concept stage, using the ENDE-REDD+ methodology of MARENA that it is based on the 2006 Intergovernmental Panel on Climate Change (IPCC) guidelines; see Annex 4 for details.



44. The following are potential indicators for the PDO:

- (i) Area restored or re/afforested (FAP indicator);
- (ii) Land area under sustainable landscape management practices (WB core sector and FAP indicator);
- (iii) Score target to increase protected area management effectiveness according to MARENA methodology²¹;
- (iv) Progress toward reaching at least 25 percent of targets of five strategic lines of the 2015–2020 National Biodiversity Strategy²²;
- (v) Net greenhouse gas emissions (WB core sector and FAP indicator); and
- (vi) Beneficiaries of job-focused interventions.

PROJECT CONTEXT

A. Concept

1. Description

45. The project will contribute to improve management of protected areas, and reduce land degradation and biodiversity loss of Nicaragua’s critical habitats through the (a) Consolidate biological corridors that promote ecological connectivity between existing protected areas and forest/agricultural landscapes. (b) Support land uses across farms in dry and humid forest landscapes to allow farmers to improve on-farm resilience and sustainability (including the implementation of agroforestry and silvopastoral systems). (c) Implement an ENDE–REDD+ pilot project. (d) Mainstream biodiversity and sustainable use of biodiversity into production landscapes. These and other actions will address barriers related to the lack of institutional capacity, technical knowledge and tools that have limited the effective conservation of biodiversity in protected areas and the sustainable use of forests and the land within their surrounding landscapes. The project will deliver multiple global environmental benefits including biodiversity conservation of endangered, threatened, and migratory species; reduction of land degradation; increase in carbon stocks and reduction of GHG emissions; and increase in forest cover and sustainable flows of ecosystem services.

²¹ MARENA 2008. Sistema de Monitoreo y Evaluación Integral de Efectividad de Manejo en las Áreas Protegidas del Sistema Nacional de Áreas Protegidas (SINAP) de Nicaragua.

²² MARENA. 2014. *Estrategia Nacional de Biodiversidad y su Plan de Acción. Nicaragua 2015–2020*. The strategy has eight strategic lines and 55 target indicators. Among the targets that this project will contribute are developing a biodiversity information and monitoring system; supporting participation of local stakeholders in the management and protection of critical habitats, supporting knowledge development and studies that provide information for increasing protection of endangered species and ecosystems, improving management of protected areas, reducing impact on coastal and mangroves areas, and supporting agroforestry and land-use practices to increase connectivity of forest patches and support local livelihoods.



46. The proposed project targeted area is approximately 129,317 hectares, comprising seven protected areas (5.5 percent of the area under SINAP) and the pine–oak biological corridor to increased connectivity of protected areas with forest landscapes. This area extends to six departments and 14 municipalities. The applicable GEF Tracking Tools will be developed during the forthcoming project preparation.²³
47. It is proposed to organize the operation around the following four components:
48. **Component 1. Strengthening the Protected Area Management System and conservation of biodiversity (estimated GEF funding US\$ 2,145,000 million, Cofinancing US\$10,725,000).** The component will finance both TA and investments to strengthen management of the seven targeted protected areas. More specifically, it will
- (i) Strengthen the conservation and protection of protected areas from illegal logging, fires, and invasive species (pine bark beetle²⁴) by increasing presence in the protected areas, and providing field equipment and logistic support to park rangers, and regional and local offices.
 - (ii) Update and implement environmental management plans as needed and in coordination with local communities.
 - (iii) Restore important habitats for selected species within the corridors that have been affected by the current land-use practices within the protected areas.
 - (iv) Identify and proposed potential financial mechanisms to improve revenue for protected area management and conservation by forest private owners (campaigns, fees, PP partnerships, tourism, and so forth).
 - (v) Support baseline studies on critical habitats and species to develop a biodiversity monitoring system.
 - (vi) Monitor protected areas management effectiveness by putting in place the national Integral System to Monitor and Evaluate Management Effectiveness of the Protected Areas, in accordance with MARENA’s Ministerial Resolution No. 38–2008.
 - (vii) Support capacity building of MARENA staff at headwaters and regional offices, national and international training, and exchange programs with international centers or with other parks other countries, and so forth.
 - (viii) Prepare educational material and lead environmental awareness activities for national and international positioning of protected areas.

²³ GEF Tracking Tools (or GEF portfolio monitoring tools) are intended to roll up indicators from the individual project level to the portfolio level and track overall portfolio performance in the GEF focal areas. Management Effectiveness Tracking Tool (METT) is applied to track the progress in the focal areas and to provide a quick overview of progress in improving the management effectiveness in individual protected areas.

²⁴ The pine-oak ecoregion has experienced outbreaks of the Pine bark beetles of the genus *Dendroctonus* (Coleoptera: Scolytidae) which is a very destructive forest pest currently affecting the native pine forests of Central America.



- 49. Component 2: Landscape Restoration for Biodiversity, Resilience, and Local Livelihoods (estimated GEF funding US\$ 1,318,429 million, Cofinancing US \$6,591,245).** The component will finance both TA and investments in the pine and oak forest corridor to increase connectivity between the seven targeted protected areas and the landscapes and increasing resilience of local communities and of globally significant biodiversity.
- 50.** The component activities will support community demand subprojects in selected communities in return for signing conservation agreements on their land to reduce impacts and align their productive activities with the protected areas' and biological corridor's management plans. Subproject design will include lessons learned from similar approaches implemented in Nicaragua with small-scale farms and community demand investments, such as: the Environmental Rehabilitation Systems Program (ERSP),²⁵ the Adaptation of Nicaragua's Water Supplies to Climate Change (PACCAS) Project (P127088), supported by the Special Climate Fund Project and the Caribbean Coast Food Security Project (P148809) financed by the Global Agriculture and Food Security Program.²⁶ Also, the results of this pilot will be use to prepare and proposed a permanent program for payment for results that can applied the lessons learned from the different projects/initiatives (PES, community demand) that has been tested in Nicaragua and will benefit the government of future similar interventions (REDD+) of clear methodologies, prioritization of territories, criteria of selection, monitoring and verification of emissions reductions
- 51.** The proposed project will also ensure the application of local knowledge in subprojects design. The component will require counterpart contribution from each participating group of farmers/farmer in form and quantity that will be assessed during project preparation and implementation. The following aspects, among others, will be further assessed during project preparation to define this component's scope: (i) criteria to select the communities and beneficiaries; (ii) MARENA's experience with different models of livelihood improvement in protected areas, productive landscapes, and watersheds; (iii) socioeconomic analysis of existing and potential productive activities and livelihoods in the project area; and (iv) available resources for direct investments with GEF-6 and co-financiers.
- 52.** The farm-level rehabilitation agreements and plans (subprojects) to be financed by this component will implement sustainable production practices within the pine and oak forest corridor that contributes to increase resilience, forest restoration, biodiversity and support local livelihoods, such

²⁵ Developed by MARENA as part of the Socio-Environmental Forest Development Program (POSAF I and POSAF II), with support from the EuropeAid Cooperation Office (EuropeAID), the Nordic Development Fund (NDF), and other donors. The ERSP promotes agroforestry and silvopastoral systems, management of natural regeneration, and forest management, including 21 different sets of best management practices (BMPs) that contribute to ecosystem and biodiversity conservation.

²⁶ The PACCAS project has implemented a program of payments for results in the conservation of forest and water resources in communities of the Corredor Seco with the participation of FONADEFO. Also, the Caribbean Coast Food Security Project is supporting the development of Innovation Development Plans (IDPs) to diversify production and marketing capacities of farmers and rural enterprises in the Caribbean of Nicaragua. Lessons learned and results obtained by the community tested models of these two projects will be incorporated in the design of this component.



as: i) Landscape restoration (reforestation with native species, tree fences, natural regeneration, nurseries); ii) Sustainable land use (agro-ecotourism, shade crops such as coffee and cacao; reforestation for firewood; honey production);

53. This component will also finance a pilot initiative of REDD+ incentives and the funding needed to provide for the related tools and mechanisms like the baseline and monitoring system. This pilot will be implemented in close coordination with the REDD+ Readiness grant that is being implemented by MARENA under the country's National Strategy of Avoided Deforestation (ENDE REDD+). The pilot would work with beneficiary families to promote conservation of 20,000 ha of forest in the Pine-Oak Forest Corridor in north-central Nicaragua, and would include land under high risk of deforestation due to unplanned land-use change. The pilot will apply the methodology agreed for the Nicaraguan ENDE- REDD+ strategy and will contribute to verified and monitored carbon emission reductions (see Annex 5).
54. **Component 3. Mainstreaming biodiversity and restoration for resilient landscapes at the institutional and development sectors (estimated GEF funding US \$650,000 million, US\$3,250,000).** The component will promote mainstreaming of biodiversity and landscape restoration in key government and private sectors strategies, practices and planning to increase biodiversity conservation; consolidate and strengthen institutional capacity to learn, produce and disseminate biodiversity information within government sectors, in the pine-oak corridor and in general in the country.
55. Landscape planning and dissemination of biodiversity information will contribute to strengthen plans and development programs in the conservation of globally significant biodiversity, address land degradation, climate change impacts, and the loss of forest cover in the project area. To create the technical knowledge needed to support mainstreaming activities in sectors such as agriculture, family, territorial planning, tourism, and water, a special focus will be placed on creating capacity within institutions that did not previously work with biodiversity. The project plans to implement this component through several activities:
- (i) Strengthen technical capacity of MARENA and the project municipalities to include the corridor into local development plans and to monitor its implementation²⁷; provide equipment, materials, and support.
 - (ii) Coordinate and develop strategies and mechanisms for incorporating the objective of biodiversity conservation, increasing connectivity and landscape restoration into policies, programs, projects, and development plans throughout different government sectors and levels intervening in the corridor. In addition, seek opportunities to generate income from the protected area (for example, ecotourism).

²⁷ This will include establishing an early warning system of deforestation at municipal level through at least one community-based observation post per participating Municipality. It will be supplemented by MARENA using quarterly monitoring through satellite images and field verifications. Activities will be coordinated with the Nicaraguan Institute for Territorial Studies (INETER) and INAFOR, and the Ministry of Agriculture (MAG) and Nicaraguan Institute of Agricultural Technology (INTA).



- (iii) Support interinstitutional coordination and collaboration to strengthen biodiversity knowledge, sustainable forest and land management, and productive systems in the corridor across MARENA; INAFOR; INETER; Ministry of Family, Communal, Cooperative and Associative Economy (MEFCCA); Nicaraguan Institute of Tourism (INTUR); and INTA.
- (iv) Promote investments in forest regeneration, agro-forestry and silvopastoral systems with the private sector and government institutions working with the agrosector.
- (v) Establish an environmental awareness and biodiversity dissemination plan. Raising of awareness will also address the value of biodiversity, ecosystem services, and key species to communities, among other topics.

56. Component 4. This component will have two subcomponents:

-4.1 Monitoring and evaluation (estimated GEF funding US\$67,000; Cofinancing US\$ 335,000)

-4.2 Project Management (estimated GEF funding US\$209,012; Cofinancing US\$ 1,045,060.00). This component will finance the Project Implementation Unit (PIU) at the Ministry of Environment and Natural Resources (MARENA), auditing, financial, procurement and safeguards management and monitoring and evaluation of project results. The PIU will comprise of consultants and technical staff assigned by MARENA; they will be in charge of socioenvironmental and fiduciary management. This team, in coordination with MARENA’s authorities, will coordinate with other sector and local institutions related to sustainable management of protected areas and in the biological corridors included in the project to promote the forest restoration and application of the landscape approach. The project will collaborate with the National Forestry Institute (INAFOR), Nicaraguan Institute of Tourism (INTUR), and Ministry of Family, Communal, Cooperative, and Associative Economy (MEFCCA).

57. Cofinancing. A total of **US\$21,946,305** parallel financing is expected by the government of Nicaragua, European Union and Switzerland (COSUDE) (Table 2). Also this project will benefit from a GEF 5 allocation (US \$5.9) from the **project “Strengthening the Resilience of Multiple-Use Protected Areas to Deliver Multiple Global Environmental Benefits”** that was prepared and initially implemented by the United Nations Development Program (UNDP). In October 2015, the GoN asked the WB to take over the project implementation. The GEF-5 financing complements the GEF-6 project by implementing the same type of activities under similar components but addressing 8 additional protected areas and globally significant biodiversity from the dry forest and humid forests ecoregions.

Components	GEF 6 US\$ millions	percent	Cofinancing US\$ millions
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Component 1 Strengthening the Protected Area Management System and conservation of biodiversity	2,145,000	48.87	10,725,000
Component 2 Landscape restoration for biodiversity, resilience, and local livelihoods	1,318,429	30.03	6,591,245
Component 3 Mainstreaming biodiversity and restoration for resilient landscapes at the institutional and development sectors	650,000	14.81	3,250,000
Component 4 4.1 Monitoring and evaluation	67,000	1.53	335,000
Subtotal	4,180,249		
4.2 Project management (5 percent)	209,012	4.76	1,045,060
Total	4,389,261	100	21,946,305
Donor	Project	Cofinancing US\$ millions	
COSUDE	Communal Management Program for the Dipilto Watershed	5,500,000	
EU	Protection and conservation of the upper watershed of the Coco River for adaptation to Climate Change through strategic communal alliances	13,000,000	
	Total bilateral	18,500,000	
	Government	3,446,305	
	MARENA	1,250,000	
	Ministry of Family Economy, Community, Cooperative and Association (MEFCCA)	1,125,805	
	National Forestry Institute (INAFOR)	1,070,500	
	Total cofinancing	21,946,305	



2. Overall Risk and Explanation

58. The overall project risk is considered Substantial. Following are the project's main potential risks:
59. **Political and Governance.** Decision making is controlled over different instruments of the administration, which limits and slows project implementation. Selection of project areas can also be influenced by political reasons. The project will address the risk by i) including participatory process to increase opportunities of beneficiaries to participate and be informed of project opportunities and ii) perform periodic technical–finance audits to have a third party providing evidence of project performance.
60. **Institutional Capacity for Implementation:** MARENA has currently limited staff and other resources across the country to provide sufficient effectiveness of protected areas management to safeguard their sustainability and to establish and support management of biological corridors. During the forthcoming project preparation stage, the most cost-efficient ways to improve these institutional gaps will be identified to define the final project design.
61. **Technical.** This risk is considered substantial, since restoration of forestland and biological connectivity requires multisectoral institutional coordination, policy making sensitive to the country protected areas and biodiversity, and behavioral changes from farmers and forest owners that need to be sustained over time. Appropriate design is needed for all components to ensure local capacity for implementation, effective institutional arrangements and appropriate monitoring tools for project implementation and results.
62. In addition, the support for the ENDE–REDD+ incentives pilot adds additional risk, for the following reasons. This activity will require the defining of protocols to select critical areas, beneficiaries, and criteria for results-based payments; the building of institutional capacity for implementation and sustainability, fiduciary, and safeguards aspects; and the participation of stakeholders to ensure the expected results and the ownership required by landowners and farmers living in the program area.
63. **Fiduciary:** Related with MARENA's limited institutional capacity and the geographical extension of the project area, the project design will need to provide for strong arrangements for fiduciary management. The potential approach is to hire an agency that helps MARENA in the supervision of interventions across the project area, including support to strengthen MARENA's regional offices in the project area.
64. **Stakeholders:** Project success will depend heavily on stakeholder commitment and ownership, taking into account that the majority of the land declared as protected areas is private and the challenge to targeted people's selection between short-term and long-term benefits that relate with the use and conservation of natural resources. To build ownership, the project design will (a) support investments for planning and sectoral coordination in the corridor areas, (b) define and implement mechanisms that increase sustainability of the project investments, and (c) integrate participatory arrangements of local stakeholders in subprojects' design and implementation.



65. Systematic Operations Risk-Rating Tool (SORT)

Risk Category	Rating
1. Political and Governance	Substantial
2. Macroeconomic	Low
3. Sector Strategies and Policies	Low
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and	Substantial
6. Fiduciary	Substantial
7. Environment and Social	Low
8. Stakeholders	Substantial
9. Other	
OVERALL	Substantial



B. Economic Analysis

1. Briefly describe Project's development impact in terms of expected benefits and costs

66. The proposed project involves several economic benefits associated with improved and more resilient and sustainable landscapes. Improved or transformed current practices will lead to direct and indirect benefits from better protected areas and natural resources management, increasing biodiversity knowledge and dissemination, strengthened livelihoods, improved knowledge and skills of local communities and other associated indirect effects. Investment activities' scope and extent will be known later in the process as activities will be prioritized during project preparation involving MARENA, sectoral institutions in the project area, and local communities. For instance, during the project preparation, a portfolio of potential investment activities associated with the Component 2 will be agreed upon with forest owners of protected areas and local communities of the corridor(s). The benefits from these investments will be estimated in the detailed economic cost-benefit analysis by project appraisal.
67. The governments will provide substantial and significant **cofinancing (US\$ 21,946,305)** in cash and in kind for the project related and proposed interventions (including investments in the Protected Area systems, improved landscape planning) as will donors including through financial institutions (BCIE, IDB, IFAD), upcoming bilateral funding (Switzerland, European Union) and contributions and grants from development agencies (that is, GIZ and COSUDE).
68. **Incremental reasoning.** This GEF engagement will target the Dryland Corridor of Nicaragua. The baseline government interventions finance the basic operating costs of the protected areas which is insufficient to address key drivers of incremental environmental degradation in the project protected areas or outside of them in the productive landscape. The incremental GEF resources will be used to strengthen biodiversity conservation through management planning within the protected areas and in the productive landscape through planning and support to a series of corridors linking the protected areas through remaining forests. The project will engage communities in the project area in the planning process, forest-conservation programs, biodiversity-friendly production practices, and enhanced agro-ecological production, to achieve social and global environmental benefits, which would not take place in the baseline scenario.
69. One of the most important impacts of the proposed project relates to building the capacity building of government institutions at central and decentralized levels (Component 3) to undertake this work through landscape planning which mainstreams global biodiversity considerations and land degradation into the planning process. This is important for promoting economic development and governments core policies while achieving global environmental benefits. We expect this approach will help to conserve biodiversity through strengthening the connectivity of the area, reducing deforestation and land degradation. It will also help to reduce GHG emissions. The piloting of internationally proven approaches will be crucial in defining the most suitable and optimal approach for this area. The GEF resources are therefore incremental to the baseline scenario.



2. Rationale for public sector provision/financing, if applicable

70. The GoN will support the project with cofinancing of the SINAP and other funding allocated to the project area. This GoN support will ensure the availability of resources for long-term sustainability/interventions, capacity building, and behavioral change to ensure that project objectives are met and maintained.

3. Value added of Bank's support

71. The World Bank is well-placed to support this project. It has had a long-term involvement in Nicaragua since 1980. More recently, the Bank has worked with the GoN on forest management through the WB's FCPF and the preparation of the ENDE-REDD+ strategy. Furthermore, the Bank has supported the GoN on strengthening management and conservation of protected areas and biodiversity through the GEF-Corazon Transboundary Biosphere Reserve Project (P085488), and on climate change and protection of water resources through the Adaptation of Nicaragua's Water Supplies to Climate Change Project (P127088).
72. The WBG's Environment and Natural Resources Global Practice has ample experience in biodiversity conservation; protected areas conservation; landscape approaches; watershed management; climate change strategies and interventions, particularly on reforestation, climate-smart agriculture and policy; and financing mechanisms for conservation and climate change that could help Nicaragua to reduce deforestation rates in the Dry Corridor and support climate change and biodiversity-friendly development in this biologically and economically important region.
73. The Bank has demonstrated to have a convening power to bring different partners together as it happened during the preparation of the ENDE-REDD+ strategy. Additionally, the Bank's leverage to reach different government institutions for improving coordination with MARENA and local governments at the regional and political levels, which will be important for the project implementation.
74. Lastly, the Bank is the leading agency for the overarching FDPL Program and has served as a GEF implementing agency for several countries in the Latin America Region. There are significant opportunities for learning from these projects. This is especially the case where communities manage their forests – such as the Mexico Forests and Climate Change Project (P123760) – and where communities work together with government, binational entities, and the private sector to restore forest and landscapes to build a biological corridor – such as in the GEF-Conservation of Biodiversity and Sustainable Land Management in the Atlantic Forest of Eastern Paraguay Project (P094335).
75. The project will also benefit from Bank experience in the current global efforts to strengthened institutions to improve management of protected areas, address climate change and emissions reductions that can lead to poverty alleviation and sustainable management of land and forest resources.²⁸ The Bank is thus well placed to identify and promote synergies,

²⁸ The GEF SFM Strategy advocates an integrated approach at the landscape level, embracing ecosystem principles, including livelihood objectives in the management of forest ecosystems. The GEF offers support for a wide range of SFM tools such as



shared learning, and foster coordination and cooperation between countries, projects, and donors.

4. Brief description of methodology/scope and next steps

- 76. The proposed project will focus on landscapes around protected areas and adjacent biological corridors in the Nicaraguan Dry Corridor and in the western and north central regions in Nicaragua.** The approach used to design the project builds on previous experiences based on community development and improved protected areas management through sustainable livelihoods activities. It will include an assessment of existing land-use practices in community-managed lands and their contribution to economic well-being to understand the social context. The proposed project will draw lessons on the institutional challenges on governance and service delivery for protected areas and thus a more focused analysis of community-led management, governance, and institutions will be carried out. Baselines studies will be conducted to determine the current status and management effectiveness of the selected protected areas and social evaluations to ensure gender considerations and indicators in the project design. Consultations will be conducted with communities and other stakeholders during preparation to define the type of interventions and subproject that will be financed through the project.
- 77. The team will follow the Bank guidelines on Economic Analysis and will conduct an economic efficiency analysis for the proposed project results.** The analysis will consider some of the benefits in a quantitative analysis. The results of the quantitative simulations will be considered across a range of sensitivity analysis assuming significant changes in discount rates and key simulation parameters. Benefit assumptions will be done conservatively, using lower-bound values, especially as regards non-market benefits, such as watershed and carbon benefits, but also existence values.
- 78. The design of the ENDE–REDD+ pilots will be use available information on climatic variability – current and projected.** The prioritized area for the GEF-funded ENDE–REDD+ pilot project will be analyzed against the criteria of the Jurisdictional and Nested REDD+ of the Verified Carbon Standard (VCS–JNR). The ENDE–REDD+ pilot project includes lands of rural communities that are at risk of deforestation because of unplanned land-use changes. Thus, the pilot will fall under the Agricultural, Forest, and Other Land Uses category (AFOLU). In addition, the pilot ENDE–REDD+ project will comply with all guidelines and requirements of Nicaragua’s ENDE.

C. Implementing Agency Assessment

- 79. Institutional and Implementation Arrangements.** The execution of the proposed project will be led by the Ministry of Environment and Natural Resources (MARENA), in close coordination with MARENA regional offices and other government agencies that intervened in the project. MARENA is the country’s leading agency on environmental and climate change policy, including representing Nicaragua in the

protected area establishment and management, integrated watershed management, certification of timber and non-timber forest products, payment for ecosystem services schemes, financial mechanisms related to carbon, development and testing of policy frameworks to slow the drivers of undesirable land use change, and work with local communities to develop alternative livelihoods to reduce emissions and sequester carbon.



international fora on environment, biodiversity, and climate change. MARENA has a successful record of implementing environmental programs financed by different donors, including the World Bank.

- 80.** FONADEFO is proposed to collaborate as executive agency to support the implementation of the pilot for payment for results ENDE-REDD+ under Component 2. FONADEFO is a financial mechanism administered by INAFOR, created to (i) support programs and forestry projects which are for sustainable use of forests; (ii) increase economic development; (iii) conserve natural resources; d) develop markets for the payment of environmental services (PES); and (iv) protect the environment. It is planned that FONADEFO will make cash transfers/results based payments to producers depending on the amount of carbon not emitted by supporting eligible subprojects.
- 81.** FONADEFO will need support of technical and administrative capacity from the project to efficiently implement the ENDE-REDD+ incentives pilot. A Cooperation Agreement will need to be prepared and signed between MARENA and FONADEFO. The pilot subprojects will be subject to specific procurement and financial management procedures that the beneficiaries or other agreed selected organizations will need to follow. The mechanism will be defined during project preparation.



SAFEGUARDS

Project location and salient physical characteristics relevant to the safeguard analysis (if known)

82. The project area covers seven protected areas of the pine and oak forest corridor, including the Natural Reserves of (i) Cordillera Dipilto and Jalapa; (ii) National Monument Cañon de Somoto; (iii) Natural Reserve Tepesomoto–Patasta; (iv) Natural Reserve Cerro Quiabuc–Las Brisas; (v) Cerro Tisey Estanzuela; and (vi) Yucul Genetic Resources Reserve and (vii) Cerro Tomabú. MARENA is responsible for safeguarding these protected areas, even though most of the 80 percent of the land belongs to private owners, cooperatives or indigenous communities.

Recipient’s Institutional Capacity for Safeguard Policies

83. MARENA is the country’s leading agency for applying the country’s main environmental legislation. This includes environmental impact assessment, biodiversity, climate change, forest, wetlands, RAMSAR sites protection, and other sectors relevant to this project (annex 3). The main MARENA departments that will be working in the project are protected areas, biodiversity, and climate change. The Department of Environmental Control that issues environmental licenses will also be consulted in project preparation to ensure proper participation in the project area. During preparation, the capacity to apply and manage environmental and social safeguards will be assessed in departments of MARENA and other participating agencies that will participate in the project implementation.
84. The project plans to install a project Implementation Unit (PIU) in MARENA to lead project implementation. Social and environmental risk management under the project will be undertaken by the PIU in close coordination with MARENA staff in Managua as well as in the participating departmental offices. The project will hire a Social Specialist with experience on working with Indigenous Peoples to work as a core member of the PIU, taken MARENA currently hosts scarce related experience. The need to hire an Environmental Specialist will be assessed during forthcoming project preparation.
85. The capacity of MARENA and other project participating agencies on managing Bank and other project-related institutional capacities will be assessed during project preparation. Training and capacity building activities will be provided during project preparation and implementation

SAFEGUARDS POLICIES TRIGGERED AT CONCEPT STAGE

86. **Environmental Assessment OP/BP 4.01.** The project is proposed as category B for its potential environmental and social risks, although the project is expected to generate mostly positive environmental impacts related to effective management of protected areas and consolidation of five biological corridors through a landscape approach. Positive impacts are also expected in social aspects, since the project will have a strong focus on safeguarding the natural resources upon which local communities in the project area depend for their livelihoods. The project will reduce deforestation and biodiversity loss and strengthen the provision of ecosystem services by



- promoting access to more resilient livelihood options, reducing anthropogenic pressures and promoting sustainable use of natural resources for a more resilient landscape management path of the project area.
- 87.** As the specific investments and their physical location will only be defined during project implementation, MARENA will prepare an Environmental and Social Management Framework (ESMF), supported and to be approved by the World Bank before project appraisal. Proper disclosure and consultations will be organized in accordance with the policy requirements before appraisal.
- 88. Natural Habitats OP/BP 4.04.** This policy is triggered because the project area includes protected areas and critical habitats that are the habitat of endangered, migratory, and threatened species. The landscape approach that will be use in the project will promote positive impacts on habitat restoration within protected areas and corridors, thus increasing connectivity and habitat restoration for biodiversity. The project will also finance a biodiversity monitory system to improve biodiversity information mainstreaming into other sectoral institutions and local regions. The ESMF will include procedures and checklists to ensure that financed activities will support the conservation of natural and critical habitats and applied national legislation and international agreements (RAMSAR, CITES).
- 89. Forests OP/BP 4.36.** This policy is triggered since decisions regarding land management planning, including forest management plans, will affect forests. The ESMF will include the procedures to develop and implement sustainable forest management plans according to the Policy and the national forestry-related legislation to ensure sustainable forest management in the project area. During project preparation will be analyzed whether the project could support better forest management (timber) in public or private lands where timber harvesting is legal. The project will finance capacity building in sustainable forest management, monitoring tools, and reforestation campaigns, among other activities, which will have positive effects on the forest by reducing carbon emissions, and increasing forest stocks, biodiversity, and connectivity of protected areas.
- 90. Pest Management OP/BP 4.09.** The project will support agro-forestry and silvopastoral activities though subprojects to benefit local producers while promoting resilience and sustainable land-use practices. An Integrated Pest Management Framework (IPMF) will be prepared to serve as a framework to ensure preventive and mitigation measures will be use in project components. Procedures included in the IPMF will follow OP 4.09 and will establish procedures to applied best international practices on pest management.
- 91.** Because of the current bark beetle infestation in pines occurring in Nicaragua, the project might need to support current efforts of the GoN in controlling the expansion of the infestation. If necessary, the IPMF will include procedures for managing specific pesticides to deal with the beetle, always excluding yellow and red label products.
- 92. Physical Cultural Resources OP/BP 4.11.** This policy is triggered, since the project might support acceptable use of, and access to, areas with potential cultural significance (that is, sacred sites, petroglyphs, caves, and so forth) for communities living within and around the protected areas and corridors management zones. The ESMF will include procedures to ensure proper



application of the country environmental impact/ cultural/ archeological/ paleontological legislation and ensure proper consultation and conservation of the region cultural heritage.

- 93. Indigenous Peoples OP/BP 4.10.** Preliminary information indicates the presence of Mozonte Indigenous People in the *Natural Reserve of Cordillera Dipilto y Jalapa*. During the forthcoming project preparation, the Bank will collaborate with MARENA, Indigenous Peoples' representatives and relevant specialists to conduct related screening to confirm the specific presence of Indigenous Peoples in the project area, or if Indigenous Peoples have collective attachment to any of the targeted land. Based on the screening results, MARENA shall prepare an Indigenous Peoples Planning Framework (IPPF), supported and to be approved by the World Bank before project appraisal.
- 94. Involuntary Resettlement OP/BP 4.12.** MARENA will prepare a Process Framework (PF) for potential involuntary restrictions on access to the use of natural resources according to OP 4.12. The PF's preparation will be supported by, and undergo an approval process by, the World Bank before project appraisal. The PF will establish the procedures and applicable mitigation measures that MARENA and the other participating GoN agencies will follow during project implementation in order to identify, evaluate, and manage the associated potential negative social impacts that the project might cause to local communities.
- 95. Projects on International Waterways OP/BP 7.50.** There are international waterways in the project area (protected areas are along the shore of the Fonseca Gulf) so triggering and addressing OP/BP 7.50 will need further assessment during the forthcoming project preparation to define if the use of water proceeding from international waterways is required to carry out by the project. In every case, the overall project impact on water bodies is expected to be positive.

SAFEGUARDS POLICIES NOT TRIGGERED

- 96. Safety of Dams OP/BP 4.37:** The project will not finance any major dam and is not expected to finance subprojects that would depend on an existing dam.
- 97. Projects in Disputed Areas OP/BP 7.60:** Project activities will not be conducted in disputed areas.

SAFEGUARDS PREPARATION PLAN

- 98.** The World Bank team will coordinate with MARENA and other participating agencies the preparation of the safeguards documents. The WB will provide guidance to MARENA for the preparation, consultation, and disclosure of the safeguards documents before project appraisal.

At this stage is identified that the project will need to prepare four safeguards instruments:

- i) Environmental and Social Management Framework (ESMF)
- ii) Integrated Pest Management Framework (IPMF)
- iii) Indigenous Peoples Planning Framework (IPPF)
- iv) Process Framework (PF) for potential involuntary restrictions on land

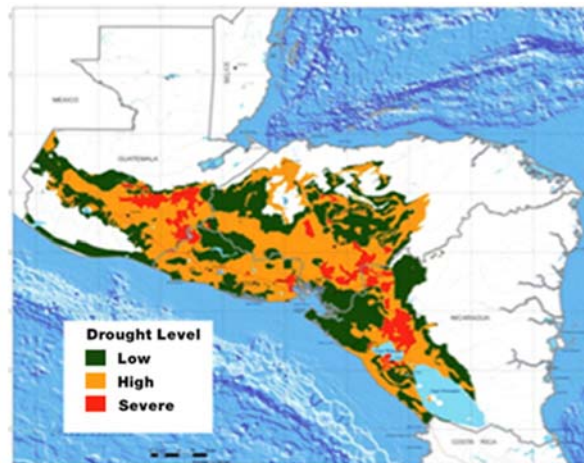


Annex 1. Biophysical Characteristics of the Project Area

A1.1 Dryland Corridor in the Central America Region

1. The Dry Corridor (CADC) is a geographical region that extends in the Pacific versant of Southern Mexico and the five Central American countries (Guatemala, El Salvador, Honduras, Nicaragua and Costa Rica), (see map A1.1). The region expands from the coastline up to 1,000 meters above sea level; it is characterized by low precipitation and recurrent extreme weather events such as droughts (influenced by El Niño), hurricanes, and tropical storms (for example, Hurricane Mitch). These natural hazards have caused severe social, economic, and environmental impacts affecting ecosystems, agricultural production, food security, local livelihoods, and extensive damage to national economies.²⁹ Climate change has increased the occurrence of these extreme events. It is estimated that in Central America's Dry Corridor, more than 1 million families rely on subsistence farming.

Map A1.1 Central America Dryland Corridor



A1.2 The Dryland Corridor in Nicaragua

The Dryland Corridor in Nicaragua extends from the Pacific Coastline to the central territory of Nicaragua, including 35 municipalities and it is characterized by low precipitation, intense use of land for agriculture and recurrent droughts. The Dry Corridor is densely populated, hosting 80 percent of the country's population. Fifty-three percent (53 percent) of Nicaragua's municipalities are considered extremely poor, most of which are located in this region.

²⁹ Van der Zee, A., J. Meyrat, C. Poveda, and L. Picado. 2012. *Estudio de caracterización del Corredor Seco Centroamericano*. FAO.



The region's local communities depend on the services and functions of the forest ecosystem as fuelwood, soil and water resources for economic development and daily subsistence. The dry region's agricultural production supports the entire country, since it comprises more than 60 percent of the country's jobs and 55.8 percent of the total exports. This region produces 49 percent of the bean crop, 33 percent of corn, 100 percent of the nation's sorghum, and 80 percent of the beef production. Despite the fertility of the volcanic soils in the region, this area's severe degradation during the last decades has led to a 30 to 50 percent reduction in national agricultural production. In addition, Nicaragua's Dry Corridor is the area of the country most affected by droughts and climate change. Droughts have affected 11.5 percent of the Dry Corridor (28 municipalities); in addition, El Niño has seriously affected climate change in the region, and the drought has affected the economy and food security of the country.

In addition, the central part of the Dryland Corridor is inhabited by populations with a high degree of poverty and who use the land and the remaining forests principally for establishing subsistence farming (coffee, corn, cattle ranching). These populations are vulnerable to drought and their livelihoods depend on the productivity of ecosystems and agro ecosystems, which in turn are highly vulnerable to fluctuations in precipitation. Almost half of these dry lands are overused and unsustainably managed, leading to severe land degradation. Poverty results in unsustainable agricultural practices, the colonization of new lands for cultivation leading to their deforestation, degradation of natural watersheds, and reduced ecosystem integrity; also, the excessive use of fuel wood for energy consumption by households depends primarily on native forests.

In Nicaragua, the Dryland Corridor covers the Pacific Coast lowlands and most of the central pre-mountain region. *The dominant ecoregions in the Dryland Corridor, according to WWF classification are tropical dry forest, pine–oak forests, and humid forest.* Some of these forests are very fragmented and the adverse climatic effects have degraded the land and decreased rivers flows affecting the wildlife and ecosystems of the ecoregion as well the living conditions of the local communities. Despite of all these drivers of biological degradation, Nicaragua hosts a rich biodiversity from the many different types of ecosystems found in the Pacific and Atlantic regions. Biodiverse dry, pine–oak and humid forest from Nicaragua are recognized globally as centers of high endemism and ecosystem value as well as flora and fauna biodiversity.
onca).

The Pine–Oak Forest Corridor. The Nicaraguan Pine–Oak Corridor forms a part of the Central American pine–oak forests ecoregion (according to the global ecoregions defined by the WWF)³⁰ which extends from the southern Mexico, through the southern highlands of Guatemala, reaching most of Honduras and El Salvador, and ending in the west central Nicaragua (see map A1.2). The most outstanding characteristic of the pine–oak forests ecoregion is the richness of trees of the genus *Pinus* and *Quercus*. Despite of the biological diversity that these forest are habitat, there are very few protected designed to protect these type of forests in this territory which species are threatened by logging, deforestation, forest fires, land conversion for agriculture and livestock. Despite the

³⁰ Olson, D. M., and E. Dinerstein. 1998. "The Global 200: A Representation Approach to Conserving the Earth's Most Biologically Valuable Ecoregions." *Conservation Biol.* 12: 502–15.



ecological importance of this ecoregion, accelerated deforestation, high poverty rates, and unsustainable current use of this region's resources have made this a critically endangered area, according to the World Wildlife Fund (WWF).

Map A1.2 Location of the Central American Pine–Oak Forests



Pine and Oak forest corridor in Nicaragua. In Nicaragua, the pine–oak forests are only found in the mountainous terrain of the North–Central region in approximately 971,315 ha (9,713 km²). Pine–oak forests lie between 600–1,800 meters (2,000–5,900 feet) elevation and are surrounded at lower elevations by tropical dry forests (Pacific) and tropical moist forests (Atlantic). The oak–pine forests are in the provinces of Nueva Segovia, Estelí, Madriz, and Matagalpa.

Importance. These forests are important since represent the last territory of the *Pinus* species in the Central American region. It is the habitat of a rich flora and fauna biodiversity. Pines trees represent an important source as firewood and in commercial logging operations. The ecoregion is also very important for water production, since three major rivers have their headwaters in these mountains (Grande River of Matagalpa, Coco River, and Prinzapolka River) and their flow is critical for agriculture and is the source of drinking water for several cities. **Biodiversity.** This ecoregion is characterized by coniferous forests of *Pinus oocarpa*, *P. maximinoi* and *P. patula tecunumanii* and mixed forests of pine and oak species (*Quercus oleoides*).

Globally important species. This corridor is habitat of important endangered, threatened, endemic and migratory species, large portions of these forests are the wintering grounds for many migratory birds such as golden-cheeked warbler (*Dendroica chrysoparia*) and azure-rumped tanager (*Tangara cabanisi*). In addition, this corridor is the main habitat to the resplendent quetzal (*Pharomachrus mocinno*) a bird with cultural values and ecotourism interest. In Nicaragua, 71 percent of the 1,805 Nicaraguan species of wild vertebrates are found in the pine–oak forest, including 50 percent of reptiles, 37 percent of amphibians, and 19 percent of birds.

Endemism. The pine–oak corridor hosts a high number of endemic species and 23 globally threatened species. Almost half of the endemic 47 species (more than 45 percent) are located in the northcentral region (Jinotega, Matagalpa, Estelí, Madriz, Boaco, and Chontales).² Emblematic fauna endemic species include the moss salamander (*Nototriton saslaya*), Saslaya snake (*Rhadinaea*



rogerromani), Dunn's earth snake (*Geophis dunnii*), Wermuth's anole (*Norops wermuthi*), shara (*Cyanocorax melanocyaneus*), Nicaraguan pocket gopher (*Orthogeomys matagalpae*), snail dysoni (*Neocyclotus dysoni nicaraguen*), and aplexa snail (*Aplexa nicaraguana*).³¹

There forests are also rich on endemic plants such as *Bonamia douglasii*, *Vanilla helleri*, *Coursetia apantensis*, *Aldama mesoamericana*, *Archibaccharis nicaraguensis*, *Phoradendron boacoi*, *Coursetia apantensis*, *Eugenia esteliensis*, *Styphnolobium caudatum*, *Caesalpinia nicaraguensis*, *Diospyros morenoi*, *Marsdenia nicaraguensis*, and *Meliosma nanarum*.

Endangered, threatened, and vulnerable species found in this corridor include the jaguar (*Panthera onca*), puma (*Felis concolor*), ocelot (*Leopardus pardalis*), tapir (*Tapirus bairdii*), greater grison (*Galictis vittata*), tayra (*Eira barbara*), spider monkey (*Ateles geoffroyi*), howler monkey (*Alouatta palliata*), *Orthogeomys matagalpae*, and *Crax rubra*.

Current status of conservation. The ecoregion includes several protected areas, yet is still poorly represented in protected areas and no large tracts of pine–oak forest are fully protected in the area since most protected areas belong to private owners. In Nicaragua, there are 11 protected areas within the pine–oak ecoregion, with a total extension of 1,349 km² (134,940 ha) combining the respective core and buffer zones (see Table 1). These protected areas are located in seven departments of the country (Chinandega, Madriz, Nueva Segovia, Estelí, Matagalpa, Jinotega, and Leon).² Many flora and fauna species of this ecoregion are also protected by private declared wild reserves and municipal parks. According with the administrative effectiveness index for management criteria developed by MARENA and TCN³², the protected areas located within the pine–oak ecoregion range from acceptable to regular state. All protected areas have management plans, but not enough park guards (MARENA reported only five park rangers for all seven protected areas under this project) and limited implementation of such plans; the integrity of ecosystems according to this 2010 report has a range of regular to medium category (30–60 percent of integrity).

Threats. Pine–oak forests have been extensively cleared for agricultural purposes, including cattle, or degraded through logging and local demand of firewood. Unsustainable forestry practices incompatible with conservation purposes area affecting these ecosystems, among these practices are forest fires, agricultural expansion, and extraction of firewood, Illegal logging, and forest pests (Southern Pine Beetle). This pine beetle (*Dendroctonus frontalis*) has also destroyed about 30,000 ha in the last two years.

³¹ MARENA. 2010. *Estudio de Ecosistemas y Biodiversidad de Nicaragua y su representatividad en el SINAP*.

³² MARENA, TNC. 2010. *Biodiversidad De Nicaragua y su Representatividad En El Sistema Nacional De Áreas Protegidas Managua*. [http://www.sinia.net.ni/multisites/NodoBiodiversidad/images/NodosTematicos/NodoBiodiversidad/Ecosistemas/Estudio percent20de percent20Ecosistemas percent20y percent20Biodiversidad percent20de percent20Nicaragua percent20y percent20su percent20Representatividad percent20en percent20el percent20Sistema percent20Nacional percent20de percent20Áreas percent20Protegidas.pdf](http://www.sinia.net.ni/multisites/NodoBiodiversidad/images/NodosTematicos/NodoBiodiversidad/Ecosistemas/Estudio%20de%20Ecosistemas%20y%20Biodiversidad%20de%20Nicaragua%20y%20su%20Representatividad%20en%20el%20Sistema%20Nacional%20de%20Áreas%20Protegidas.pdf)



Annex 2. Project Alignment with the GEF 6 Focal Area Objectives and Programs

Table A2.1 GEF 6 – Focal Areas Objectives and Programs

<i>BD 1: Improve sustainability of protected area systems</i>	Program 1: Improving Financial Sustainability and Effective Management of the National Ecological Infrastructure	– Outcome 1.2: Improved management effectiveness of protected areas.
<i>BD 4: Mainstream Biodiversity Conservation and Sustainable Use into Production Landscapes/Seascapes and Sectors</i>	Program 9: Managing the Human-Biodiversity Interface.	<p>– Outcome 9.1 Increased area of production landscapes and seascapes that integrate conservation and sustainable use of biodiversity into management</p> <p>– Outcome 9.2 Sector policies and regulatory frameworks incorporate biodiversity considerations</p>



Table A2.2 Alignment of Project with the CBD Strategic Plan for Biodiversity 2011–2020 and Associated Aichi Targets

Target 1	By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably;
Target 5	By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced;
Target 7	By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity;
Target 11	By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes;
Target 12	By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained;
Target 14	By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and wellbeing, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable;
Target 15	By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.



Annex 3. Project’s Alignment with National Regulation, Policies, and Programs

**Table A3.1 Nicaraguan National Biodiversity Strategy and Action Plan 2015–2020.
Nicaragua Action Plan 2015–2020 by Strategic Guidelines**

Strategic lines	Strategic goals
<p>1. Continue strengthening education in training of values of love, care, and protection and sustainable use of biodiversity, in these new times, new realities, with more awareness, strength, and conviction.</p>	<p>– Implementing formal and non-formal environmental education programs, so that Nicaraguan society assimilates knowledge of conservation and sustainable use of Nicaraguan biodiversity.</p>
<p>2. Promote restoration, conservation and rational use of wetlands and mangroves, since these ecosystems are rich in biodiversity, natural resources and genetic diversity with important ecological functions for the prevention and mitigation of climate change.</p>	<p>– Preserving, restoring, and rational use of wetlands and mangroves ecosystems.</p>
<p>3. Implement actions for the conservation and restoration of flora, fauna, water and forest – inside and outside of protected areas – from each village, each community, and guaranteeing the leading role of citizen.</p>	<p>– Strengthening the National System of Protected Areas to ensure the environmental benefits because of their conservation and contribution to the well-being of the Nicaraguans citizens. – Conserving and restoring vulnerable biological diversity ecosystems such as dry forest, pine forest and threatened and/or endangered species of wildlife.</p>
<p>4. Identify, promote and implement community economic alternatives for the well-being of Nicaraguan families based on the sustainable use of biological diversity and sustainable production systems such as agroecology, tourism and sustainable fisheries for food security and food sovereignty.</p>	<p>– Improving family incomes and food security through the implementation of sustainable economic initiatives for national and international trade, captive breeding and vegetative reproduction of wildlife. – Designing and promoting programs oriented to food security and sovereignty, based on the principles of Agroecology. – Promoting sustainable methods of fishing ensuring compliance with the technical standard of fishing arts and methods. – Encouraging a sustainable, attractive and competitive tourism that allows enjoying of biodiversity resources in a responsible way.</p>
<p>5. Promote the protection and sustainable management of watersheds to ensure the rational use of water resources in quantity and quality (surface and groundwater) contributing to the well-being of communities, protection, adaptation, and mitigation in the face of Climate Change.</p>	<p>– Promoting execution of plans to protect water resources in watersheds and aquifers considering the existing relationships with land uses and the quantity and water quality.</p>



<p>6. Strengthen research national capacities to increase and strengthen knowledge, scientific basis, ancestral practices and technologies related to biological diversity, their sustainable use and resilience to the impacts of climate change.</p>	<p>Promoting and supporting processes accompanied by the development of infrastructures to increase scientific knowledge and capacities for the management and sustainable use of components of biological diversity, taking into account adaptation measures in the face of climate change.</p>
<p>7. Develop and implement an action framework for the adaptation and protection of resources to the impacts of climate change and variability climate.</p>	<ul style="list-style-type: none">– Promoting actions for the conservation, protection and recovery of ecosystems affected by deforestation and desertification.– Incorporating into sectoral policies elements that contribute to responsible and consensual management for the conservation and restoration of biodiversity from different national and local instances.
<p>8. Preserve and manage genetic diversity and threatened and/or in danger of extinction endemic species.</p>	<ul style="list-style-type: none">– Preserving and managing genetic diversity and threatened and/or in danger of extinction endemic species.– Manage, regulate and control the introduction and spread of alien and invasive species to reduce the threat of native biodiversity and ecosystems.



Table A3.2. Main Environmental Framework of Nicaragua to Manage Natural Resources, Biodiversity, Climate Change and Forest Conservation in the Country.

Law/Policy/Program	Details	Specific Aspects of Alignment
Political Constitution of Nicaragua	Articles 60 and 102	Art. 60: “Nicaraguan’s have the right to live in a healthy environment. It is the duty of the State to preserve, conserve, and save the environment and natural resources.” Art. 102: “Natural resources are national assets. Preservation of the environment and conservation, development, and rational exploitation of natural resources are the responsibility of the government.”
	Article 177	The obligation of the State is to “request and take into account the views of the municipal governments before authorizing contracts for the exploitation of natural resources located in the respective municipality.”
The General Law of the Environment and Natural Resources	Law No. 217 approved in 1996; reforms approved by Law No. 647 in 2008	Establishes rules for the conservation, protection, enhancement, and restoration of the environment and natural resources, ensuring their rational and sustainable use, according to what is stated in the Constitution.
Universal Declaration of the Common Good of Mother Earth and of Humanity	2010	Nicaragua was the first country to sign this declaration based on the principals of protection and restoration of ecosystems, with a special focus on biodiversity. Nicaragua’s Socialist, Solidarity, and Christian model implements these principles as human well-being is dependent upon the wealth and good management of biodiversity that provides the basis for the functioning of ecosystems and environmental services that again provide food security to all communities in the country.
National Human Development Plan	2012–2016	Defines the priorities in the fight against hunger and poverty. Defines as one of its principles the “sustainable development of defense, protection, and restoration of the environment” for improving the well-being of the people, to overcome poverty, and preserve the natural patrimony.
Regulation of Protected Areas of Nicaragua	Decree No. 01-2007	Regulates the legal guidelines related to protected areas that are contained in the General Law of the Environment and Natural Resources and its amendments. It establishes the general and specific rules for the protected area management, including natural reserves; specifies the mechanism for the declaration of new protected areas; and includes guidelines for the public and private administration depending on the management categories, management objectives, land tenure, monitoring control, incentives, and sanctions for violations.



Conservation and Sustainable Use of Biodiversity Law	Law No. 807, 2012	Regulates the conservation and sustainable use of existing biodiversity in the country, ensuring fair and equitable participation and sharing of benefits arising from its use, with particular attention to indigenous and Afro-descendant communities, and respect for and recognition of intellectual property rights, traditional and customary ways of local communities.
National Biodiversity Strategy and Action Plan	2001 and 2015–2020	Promotes the implementation of actions directed mainly to the creation of values for biodiversity conservation, flora, fauna, forest, soil, water, wetland systems, protected areas, biosphere reserves and the restoration of the degraded areas to recover the corridors of life and the interrelation of the biological connectivity of the species, including health benefits of agrobiodiversity.
National Sustainable Development Policy of the Forest Sector	Decree 69-2008, Article 3	States as its objective to “contribute with a high level of citizen participation to improving the quality of life of the current and future generations of Nicaraguan people, giving priority to the families of small and medium agricultural and forest producers, peasants, farm workers, indigenous peoples and Afro-descendants and ethnic communities; promoting sustainable development of the forest sector with a focus on the replenishment of the forest resources, avoided deforestation, rationed forest management and community foresting with an entrepreneurial vision.”
National Strategy for Avoided Deforestation	2016	A national policy platform to carry out activities that will help Reduce Emissions from Deforestation and Forest Degradation (REDD+).
National Climate Change Action Plan	2007	Aims at developing adaptation measures for the economy’s most vulnerable sectors, such as agriculture and water resources, and contributing to the mitigation of GHG gases, particularly in the forest sector.
National Plan to Combat Desertification and Drought	2003	Aims at stopping and reversing the ongoing desertification processes and fomenting coexistence with cyclical drought conditions in ways compatible with the sustainable use of natural resources.
Law on Promotion of Agro-ecological and Organic Production	Law 765, 2011	Focuses on developing agro-ecological systems and organic production through regulation, promotion and enhancement of activities, practices and production processes that are environmentally, economically, socially and culturally sustainable, and that contribute to the restoration and preservation of ecosystems, agroecosystems, and sustainable land management.
Gender Policy	Law No. 648 on Equality of Rights and Opportunities, 2008	Establishes equal rights and opportunities by men and women to environment related matters, including related awareness rising and financing of conservation related productive activities in order to guarantee adoption of equal opportunities in environment-related public policy.



Annex 4. Preliminary Estimates of Related Anthropogenic Changes in Carbon Stocks, non-GHG CO₂ Emissions, and Removals from a project pilot

The proposed project could contribute to the avoided GHG emissions and maintained/increased CO₂ removals, emissions and removals in the recent past from for the land-use changes that took place in the Pine and Oak Forest Corridor during 2010–2015. The following are estimates calculated applying the draft methodology developed for the calculations of the reference emission for the ENDE–REDD+ by MARENA³³, based on the IPCC guidance³⁴.

Estimates of Anthropogenic Changes in Carbon Stocks, non-GHG CO₂ Emissions, and Removals

Estimate Level. Within the methodological framework referred to here – Tier 1 – the basic method in terms of complexity and data requirements was applied to determine the initial estimate of the quantity of the GHG emissions and CO₂ removals of the pine and oak forest corridor. Tier 1 combines (i) the information registered on the corresponding human activities, denominated data of the activity (DA) that can be statistics and/or parametric; and (ii) the coefficients that quantify the emissions or removals by activity unit, denominated emission factors (EF). In such a way:

$$\text{Emissions (CO}_2\text{e)} = \text{DA} * \text{EF}$$

EF = Emission factors were compiled and the land uses stratified based on the different climate and soil types as presented in table A4.1.

DA = Changes in land use.

In accordance with the IPCC guidance, the AFOLU sector was classified under six principal categories that take into consideration the totality of the national territory in terms of forest land, cropland, grassland, wetland, settlements, and other lands. The analysis and monitoring conducted on the land conversions from one category to another, through sampling with remote sensing, provided a matrix of land-use change for the analyzed period 2010–2015. The variables of climate and soil types were crossed on official maps to achieve emission factors by defined strata of forests.

In addition, a calculation of the carbon stocks in biomass was conducted by applying a generic factor for the relation of growth of above-ground and below-ground biomass. As i) **above-ground biomass:** includes all of the biomass found on top of the soil, including the stem, stump, branches, bark, seeds, and foliage; ii) **below-ground biomass:** includes all of the biomass related with plant roots. Fine roots less than two millimeters in diameter (a suggested number) are usually excluded, or they are measured as part of the soil carbon stock.

³³ MARENA. 2015. *Corredor Biológico del Pino*. Estimation of carbon emission and sequestration for the proposed GEF project.

³⁴ IPCC. 2006. *Guidelines for National Greenhouse Gas Inventories*. Institute for Global Environmental Strategies, Japan.



Table A4.1 Applied Emission Factors.

Emission Factor	Value	Source
Carbon fraction of the biomass	0.48 Ton C/ha	INAFOR – INF
Relationship below-ground and above-ground biomass	0.24 Ton dm	Mokany et al. 2006
Conversion factor and expansion of biomass	1.89 Ton/m ³	IPCC – Brown 2000
Above-ground biomass in forests		
Very Wet	295 Ton dm/ha	IPCC 2003
Wet	295 Ton dm/ha	IPCC 2003
Dry	90 Ton dm/ha	IPCC 2003
Net growth of above-ground biomass		
Very Wet	10 Ton dm/ha	IPCC 2003
Wet	4 Ton dm/ha	IPCC 2003
Dry	4 Ton dm/ha	IPCC 2003

Source: MARENA.

Results on Estimates of Anthropogenic Changes in Carbon Stocks, non-GHG CO₂ Emissions, and Removals

The estimate of metric tons of CO₂ captured by the pine and oak forest corridor was carried out through a multi-temporal analysis of the land-use changes during 2010–2015, using the maps of forest cover elaborated by the Nicaraguan Institute for Territorial Studies (INETER, official map 2015) and the German Corporation for International Cooperation (GIZ regional study 2010). The GHG emissions and removals were estimated for the different land uses on the approximately 248,700 ha of the total area of the pine and oak forest corridor; distributed as presented in table A4.2 below.

Table A4.2. Distribution of Land Uses in the Pine–Oak Forest Corridor for 2010 and 2015

Land Use	Ha	
	2010	2015
Forestland	141,079	105,918
Cropland	21,100	99,713
Grassland	85,321	40,595
Wetland	–	–
Settlements	664	1,372
Other lands	496	1,061
Total	248,660	248,659



Between 2010 and 2015, approximately 3,008,842 tons of CO₂ were emitted in the targeted area, associated with the exploitation of forests, advance of the agricultural frontier, forest fires and disturbances. During the analyzed period, on the other hand, 993,898 tons of CO₂ were absorbed. The forestry cover analyzed was 106,000 ha, including open forests and forest fallows.

The balance between the estimated anthropogenic GHG emissions and CO₂ removals of the AFOLU sector within the pine and oak forest corridor during 2010–2015 indicates an estimated total of 2,014,144 tons of emitted CO₂, as reflected in table A4.3 below.

Table A4.3 Emissions of CO₂ by Category of Land Use 2010-2015

Category	Emissions (+) /Removals (-) Tons of CO ₂
Forestland	- 994,000
Cropland	+ 1,330,000
Grassland	+ 1,632,000
Wetland	–
Settlements	+ 13,000
Other lands	+ 33,000
Balance	+ 2,014,000

To estimate the GHG emission reductions that can be potentially achieved by the proposed project, it is estimated that a target emission reduction of 120,000 tons (108,860 metric tons) of CO₂e per year is possible. **This would result in potential emission reductions over the project lifetime of 20 years of 2.4 million tons (2.17 million metric tons) of CO₂e.** It is to be noted that the feasibility of the target on reduced or avoided GHG emissions will need to be verified during project preparation; at this concept stage, it is only a preliminary estimate. Equally, the estimates on past GHG emissions and carbon removals in the project area will need to be verified by field visits, since they are currently based only on satellite images.