



## **Sustainable land management and restoration of productive landscapes in river basins for the implementation of national targets of Land Degradation Neutrality (LDN) in Panama**

### **Part I: Project Information**

#### **GEF ID**

10588

#### **Project Type**

MSP

#### **Type of Trust Fund**

GET

#### **CBIT/NGI**

CBIT **No**

NGI **No**

#### **Project Title**

Sustainable land management and restoration of productive landscapes in river basins for the implementation of national targets of Land Degradation Neutrality (LDN) in Panama

#### **Countries**

Panama

#### **Agency(ies)**

FAO

#### **Other Executing Partner(s)**

Ministry of Environment and CATHALAC

#### **Executing Partner Type**

Government

#### **GEF Focal Area**

Land Degradation

#### **Taxonomy**

Influencing models, Stakeholders, Demonstrate innovative approaches, Transform policy and regulatory environments, Strengthen institutional capacity and decision-making, Convene multi-stakeholder alliances, Information Dissemination, Type of Engagement, Partnership, Consultation, Financial intermediaries and market facilitators, Private Sector, Education, Communications, Public Campaigns, Behavior change, Awareness Raising, Beneficiaries, Community Based Organization, Civil Society, Academia, Non-Governmental Organization, Local Communities, Carbon stocks above or below ground, Land Degradation Neutrality, Land Degradation, Focal Areas, Land Productivity, Land Cover and Land cover change, Restoration and Rehabilitation of Degraded Lands, Sustainable Land Management, Drought Mitigation, Income Generating Activities, Integrated and Cross-sectoral approach, Sustainable Livelihoods, Ecosystem Approach, Community-Based Natural Resource Management, Sustainable Pasture Management, Improved Soil and Water Management Techniques, Sustainable Agriculture, Ecosystem-based Adaptation, Climate Change Adaptation, Climate Change, National Adaptation Programme of Action, Innovation, Climate information, Climate resilience, Knowledge Generation and Exchange, Gender results areas, Gender Equality, Access and control over natural resources, Access to benefits and services, Participation and leadership, Capacity Development, Women groups, Gender Mainstreaming, Sex-disaggregated indicators, Gender-sensitive indicators, Knowledge Generation, Capacity, Knowledge and Research, Knowledge Exchange, Enabling Activities, Learning, Adaptive management, Theory of change, Indicators to measure change

#### **Rio Markers**

##### **Climate Change Mitigation**

Climate Change Mitigation 1

##### **Climate Change Adaptation**

Climate Change Adaptation 1

##### **Submission Date**

4/10/2020

##### **Expected Implementation Start**

7/1/2021

##### **Expected Completion Date**

6/30/2024

##### **Duration**

36In Months

##### **Agency Fee(\$)**

177,442.00

**A. FOCAL/NON-FOCAL AREA ELEMENTS**

<b>Objectives/Programs</b>	<b>Focal Area Outcomes</b>	<b>Trust Fund</b>	<b>GEF Amount(\$)</b>	<b>Co-Fin Amount(\$)</b>
LD-1-1	Maintain or improve the flow of agroecosystem services to sustain food production and livelihoods, through Sustainable Land Management (SLM) Maintain or improve the flow of agroecosystem services to sustain food production and livelihoods, through Sustainable Land Management (SLM)	GET	1,423,092.00	13,131,388.00
LD-2-5	Create enabling environments to support the expansion and integration of SLM and LDN	GET	444,716.00	4,377,129.00
<b>Total Project Cost(\$)</b>			<b>1,867,808.00</b>	<b>17,508,517.00</b>

## B. Project description summary

### Project Objective

Expand sustainable land management and restoration of productive landscapes in hydrographic basins for the implementation of the national goals of Land Degradation Neutrality (LDN) in Panama.

<b>Project Component</b>	<b>Financing Type</b>	<b>Expected Outcomes</b>	<b>Expected Outputs</b>	<b>Trust Fund</b>	<b>GEF Project Financing(\$)</b>	<b>Confirmed Co-Financing(\$)</b>
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Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 1: Strengthened governance to achieve the implementation of LDN goals	Technical Assistance	<p>1.1. Strengthened enabling environment to improve decision-making and facilitate the implementation and monitoring of LDN at the national level.</p> <p><i>Indicator: # policy, legal and regulatory instruments developed (target: at least 3)</i></p> <p><i>Indicator: One (1) consolidated agro-environmental information system</i></p> <p><b>1.2 Integration of LDN, SLM and CSA in the land use planning of the selected basins</b></p> <p><i>Indicator: At least one territorial plan for each basin that integrates better LDN, SLM and CSA</i></p>	<p>1.1.1 Analysis of gaps and harmonization of policies, legal and regulatory frameworks between sectors, to facilitate planning, execution and monitoring of SLM with a landscape perspective.</p> <p>1.1.2 National Environmental Information System (SINIA) consolidated between MiAmbiente, MIDA (Ministry of Agriculture) and IDIAP (Institute of Agricultural Innovation), and accessible to external users with information on the use and degradation of land, soil, biodiversity, water, early warning systems, agrochemicals in key crops and pastures and emissions (GHG).</p> <p>1.2.1 Up-to-</p>	GET	206,450.00	5,581,674.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 2: Implementation of best practices on sustainable land management, climate-smart agriculture (CSA) and climate-smart livestock in production systems and restoration of productive landscapes with large-scale agroforestry to achieve LDN in selected watersheds	Investment	<p><b>2.1 Innovative practices and technologies implemented in the sustainable management and restoration of degraded lands in productive landscapes</b></p> <p><i>CORE Indicators:</i></p> <p><i>Core indicator 3.1: 500 ha of degraded agricultural land restored with agroforestry (permanent crops and riparian forest)</i></p> <p><i>Core Indicator 4.3: 5,000 ha of landscape under SLM in production systems</i></p> <p><i>Core Indicator 6.1: - 138,068 tCO<sub>2</sub>e emissions avoided in the AFOLU sector</i></p> <p><i>Indicator: 40% of beneficiaries</i></p>	<p>2.1.1 Investment plans of SLM, CSA and climate-smart livestock practices on farms, formulated participatively with producer organizations and cooperatives, with a gender perspective</p> <p>2.1.2 SLM practices, with a CSA approach, implemented in agroecological systems (including corn, rice, plantain) with fertilizer reduction, small-scale water harvesting systems and efficient irrigation systems for the dry season, etc.), with organizations of producers and MIDA.</p> <p>2.1.3. Silvopastoral systems with sustainable grassland management and a climate-smart livestock</p>	GET	1,093,600.00	10,278,798.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 3: Innovative financial mechanisms to promote SLM, with focus on CSA, CSL, and land restoration in order to achieve LDN.	Technical Assistance	<p><b>3.1 Financing mechanisms strengthened or established to mobilize resources to implement SLM practices, with a CSA and CSL approach, and support undertakings in the selected watersheds.</b></p> <p><i>Indicator: At least USD2.5 million mobilized to strengthen the changes with SLM.</i></p> <p><b>3.2 Strengthening of organizational capacities for access to markets and certification mechanisms for agricultural products from areas with SLM and restored areas.</b></p> <p><i>Indicator: # cooperatives and associations by basin with access to financial markets for SLM practices (goal by basin:</i></p>	<p>3.1.1 Proposals for SLM projects with a CSA/CSL approach prepared and presented to financial entities</p> <p>3.1.2. Financial mechanisms for basin committees established.</p> <p>3.1.3 Measurement of carbon footprint and water footprint in key products in each basin and integration in certification schemes of the Reduce Your Corporate Footprint Program and Products (water and / or carbon footprint), to facilitate access to certified markets.</p> <p>3.2.1 Technical capacities of institutions to adopt carbon</p>	GET	340,850.00	700,000.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 4. Knowledge management, project evaluation and reporting	Technical Assistance	<p><b>4.1 Communication strategy on SLM, CSA, CSL and restoration of degraded lands developed.</b></p> <p><i>Indicator: At least 3 institutions reporting on SLM, CSA and CSL.</i></p> <p><i>Indicator: A systematization of lessons learned and best practices with a gender equality approach</i></p> <p><b>4.2 Monitoring, reporting and evaluation of the progress and results of the project.</b></p>	<p>4.1.1 Communication strategy on the project and on SLM-CSA and LDN based on new technologies and digital tools, developed and implemented for the dissemination and expansion of the process (scaling up).</p> <p>4.1.2 Systematization, publication and dissemination of the lessons learned to support the expansion of LDN at the national level</p> <p>4.2.1 Project progress and achievements monitoring system.</p>	GET	137,965.00	160,000.00



Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
				<b>Sub Total (\$)</b>	<b>1,778,865.00</b>	<b>16,720,472.00</b>
<b>Project Management Cost (PMC)</b>						
		GET	88,943.00		788,045.00	
		<b>Sub Total(\$)</b>	<b>88,943.00</b>		<b>788,045.00</b>	
		<b>Total Project Cost(\$)</b>	<b>1,867,808.00</b>		<b>17,508,517.00</b>	

**C. Sources of Co-financing for the Project by name and by type**

<b>Sources of Co-financing</b>	<b>Name of Co-financier</b>	<b>Type of Co-financing</b>	<b>Investment Mobilized</b>	<b>Amount(\$)</b>
Recipient Country Government	Ministry of Environment	Grant	Investment mobilized	16,470,017.00
Recipient Country Government	IDIAP	In-kind	Recurrent expenditures	206,500.00
GEF Agency	FAO	In-kind	Recurrent expenditures	410,000.00
Civil Society Organization	CATHALAC	In-kind	Recurrent expenditures	422,000.00
<b>Total Co-Financing(\$)</b>				<b>17,508,517.00</b>

**Describe how any "Investment Mobilized" was identified**

The investments mobilized were identified through consultation with key project stakeholders and through the identification of key national plans and priorities that have guided the development of this project. Agencies and partners with comparative advantage and experience in the priority areas of this project were identified and consulted in order to foster a collaborative vision that mutually supports the project and the initiatives of the co-funders.

**D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds**

<b>Agency</b>	<b>Trust Fund</b>	<b>Country</b>	<b>Focal Area</b>	<b>Programming of Funds</b>	<b>Amount(\$)</b>	<b>Fee(\$)</b>
FAO	GET	Panama	Land Degradation	LD STAR Allocation	1,867,808	177,442
<b>Total Grant Resources(\$)</b>					<b>1,867,808.00</b>	<b>177,442.00</b>

**E. Non Grant Instrument**

NON-GRANT INSTRUMENT at CEO Endorsement

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Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

**F. Project Preparation Grant (PPG)**

PPG Required **true**

**PPG Amount (\$)**

50,000

**PPG Agency Fee (\$)**

4,750

<b>Agency</b>	<b>Trust Fund</b>	<b>Country</b>	<b>Focal Area</b>	<b>Programmin g of Funds</b>	<b>Amount(\$)</b>	<b>Fee(\$)</b>
FAO	GET	Panama	Land Degradatio n	LD STAR Allocation	50,000	4,750
<b>Total Project Costs(\$)</b>					<b>50,000.00</b>	<b>4,750.00</b>

## Core Indicators

### Indicator 3 Area of land restored

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
500.00	500.00	0.00	0.00

### Indicator 3.1 Area of degraded agricultural land restored

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
500.00	500.00		

### Indicator 3.2 Area of Forest and Forest Land restored

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

### Indicator 3.3 Area of natural grass and shrublands restored

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

### Indicator 3.4 Area of wetlands (incl. estuaries, mangroves) restored

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

### Indicator 4 Area of landscapes under improved practices (hectares; excluding protected areas)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
5000.00	5000.00	0.00	0.00

### Indicator 4.1 Area of landscapes under improved management to benefit biodiversity (hectares, qualitative assessment, non-certified)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
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Indicator 4.2 Area of landscapes that meets national or international third party certification that incorporates biodiversity considerations (hectares)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
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Type/Name of Third Party Certification

Indicator 4.3 Area of landscapes under sustainable land management in production systems

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
5,000.00	5,000.00		

Indicator 4.4 Area of High Conservation Value Forest (HCVF) loss avoided

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
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### Documents (Please upload document(s) that justifies the HCVF)

Title	Submitted
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Indicator 6 Greenhouse Gas Emissions Mitigated

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO <sub>2</sub> e (direct)	158360	1380682	0	0
Expected metric tons of CO <sub>2</sub> e (indirect)	0	0	0	0

Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO <sub>2</sub> e (direct)	158,360	1,380,682		
Expected metric tons of CO <sub>2</sub> e (indirect)				

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Anticipated start year of accounting	2020			
Duration of accounting	20			

Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO <sub>2</sub> e (direct)				
Expected metric tons of CO <sub>2</sub> e (indirect)				
Anticipated start year of accounting				
Duration of accounting				

Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Total Target Benefit	Energy (MJ) (At PIF)	Energy (MJ) (At CEO Endorsement)	Energy (MJ) (Achieved at MTR)	Energy (MJ) (Achieved at TE)
Target Energy Saved (MJ)				

Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Technology	Capacity (MW) (Expected at PIF)	Capacity (MW) (Expected at CEO Endorsement)	Capacity (MW) (Achieved at MTR)	Capacity (MW) (Achieved at TE)

Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female	1,600	1,600		
Male	2,400	2,400		
Total	4000	4000	0	0



## Part II. Project Justification

### 1a. Project Description

The GEF LDN project focuses on land degradation (LD) and the actions necessary to achieve sustainable land management in areas of grasslands and agricultural crops in three selected basins of Panama and, in parallel, reduce and mitigate climate effects. The project seeks to overcome the barriers that limit the adoption of good sustainable land management (SLM) practices, such as (i) weak governance of water and soil resources at the local level without an ecosystem approach that integrates management of the land with climate change and biodiversity conservation (ii) the targeting of SLM experiences at the level of specific projects, farms or groups of producers without the capacity for scaling or replication at the landscape level; (iii) financial mechanisms for the agricultural sector that do not incorporate environmental variables in credit operations, limiting the opportunity to develop low-emission production systems; and (iv) the limited knowledge and technological access of producers to information and knowledge on good SLM practices.

Classified as an upper middle income country,<sup>[1]<sup>1</sup></sup> (per-capita income in 2018 was US \$ 15,612.3)<sup>[2]<sup>2</sup></sup> and one of the most thriving economies in Latin America, Panama faces great challenges to recover productive soils in which a considerable portion of the total population lives (2010 Census)<sup>[3]<sup>3</sup></sup>. The situation is of greater importance because this population is located in rural and indigenous areas where there are less employment and income opportunities outside the primary production sector. The COVID19 pandemic, which has created a humanitarian crisis over the last year, has had differentiated impacts in the country, significantly affecting the rural and indigenous population's livelihoods, very vulnerable to external shocks. Land degradation has been a constant concern in the country, the first effort being a diagnosis to determine the state of the soil, the diagnosis of dry and degraded lands (2009), identifying four critical areas (Cerro Punta, Comarca Ng?be Bugl?, Sabana Veraguense and Arco Seco), three of which coincide with the basins selected for the execution of the GEF LDN project. Simultaneously, the National Action Program to Fight Desertification and Drought was created, and also the National Committee to Fight Drought and Desertification in Panama (CONALSED), both supported by plans, programs and projects focused on mitigating, preventing and reversing the state of soil degradation.

In 2017, MiAmbiente<sup>[4]<sup>4</sup></sup> made new evaluations (with a new data for the period 2000-2010) on the state of soil degradation in order to establish the baseline of the Strategy and the national LDN goals<sup>[5]<sup>5</sup></sup>. For this, three indicators internationally accepted by the UNCCD were used<sup>[6]<sup>6</sup></sup>: (i) changes

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in land cover; (ii) dynamics of land productivity by category of use; and (iii) distribution of soil organic carbon by type of cover. The evaluation of these indicators showed that at least 13.4% (1,010,753 ha) of the country's territory presents some degree of degradation within the analyzed period. Although 50% of the areas most affected by degradation processes were concentrated in 4 basins in the eastern region of the country, in the other 50% there were various basins, including those selected for the execution of the project (See Figure 1). Other important results of the baseline indicate that 14.5% of the forest cover presented some degree of productivity loss and 22% of the agricultural land area had suffered a decrease in productivity.

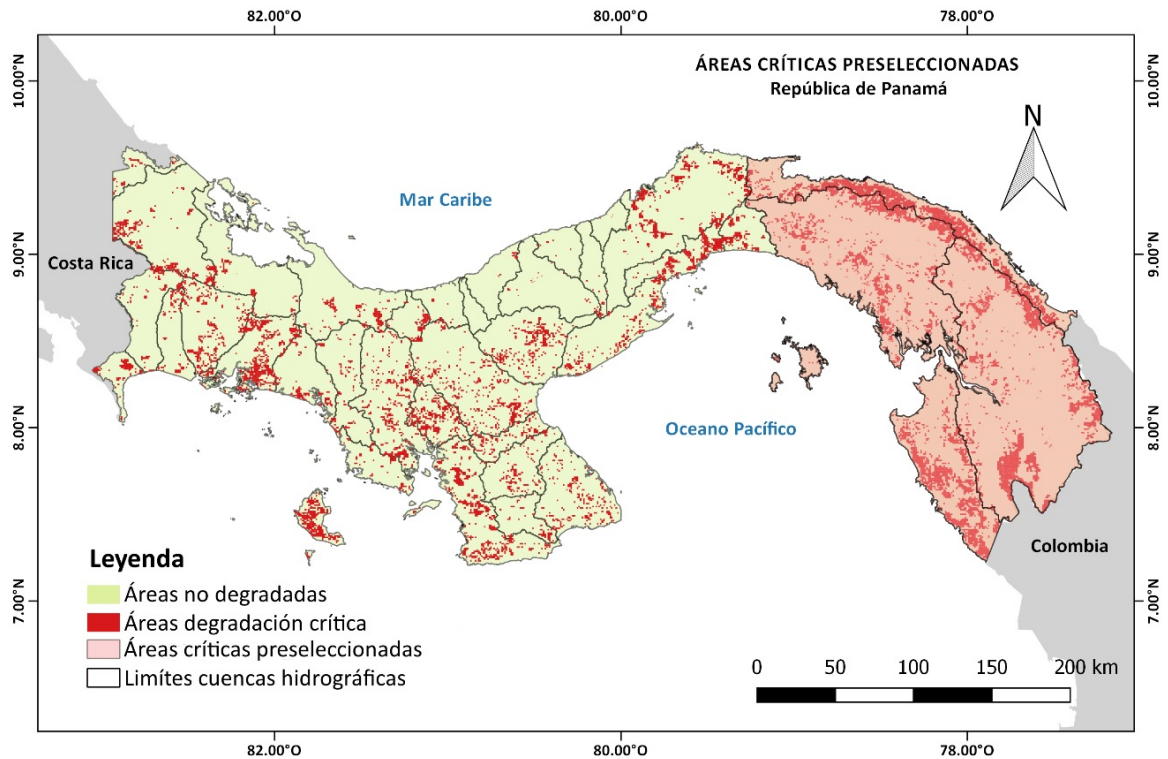


Figure 1. Critical areas of degradation. Baseline of LDN goals.

### Land Degradation Causes

In the project execution areas, the leading causes of land degradation are deforestation, forest degradation, overexploitation of natural resources, overgrazing, and inappropriate crop and pasture management practices (e.g. logging, burning, excessive use of agrochemicals, use of soils without productive capacity).

Land degradation is associated with the lack of sustainability and efficiency of the crop, grassland and forest production systems with effects on erosion, biological degradation of soils (e.g. loss of vegetation cover, loss of habitats), chemical deterioration of soils (e.g. loss of fertility and loss of

organic carbon) and water pollution. This situation is exacerbated by climate variability, climate change and forest fires, as well as social inequity and economic exclusion of the most vulnerable population (including women, rural youth and indigenous people with limited access to productive and financial resources, markets, knowledge and technological innovations) and deficiencies (limited planning processes and weak implementation) in land use planning.

According to the 'Reference Levels of Forest Emissions of Panama' (MiAmbiente, 2018), more than 90% of forest lands' conversion to other uses corresponds to a change from mature forest and secondary forest pasture (grass and stubble for livestock use ) and crops. Considering the period 2006-2015, the conversion of forest lands to other services reached 132,673 hectares. The transformation of forest lands to grounds for livestock use (grasslands - pasture and stubble) reached 122,339 hectares (92% of the total of the area converted from forest land to other uses); In the same period, the conversion of forest lands to agricultural lands with annual crops was 6,361 ha.

On agricultural land, there is a reduction in productivity over time. The soil pressure is even more remarkable, taking into account that only 25% of the soils are suitable for agricultural activities. However, 37% of the soils are used for these activities. As a consequence of the loss of soil productivity in the agricultural sector, the commercial supply of food has had sustained increases in agrochemicals with the consequent increase in costs for producers and contamination of soil and water sources.

Land degradation mainly impacts areas with economies highly dependent on forests and agriculture, significantly influencing the livelihoods of the population living in multidimensional poverty (townships that are part of the HIVE Strategy), with a decrease in the provision of vital eco-systemic services (including the provision of food, raw materials, availability of water and fuel (firewood)). The 2010 population census identified about 66,000 people living in degraded agricultural areas, which represented an increase of 13% in relation to the 2000 census; It is presumed that by 2020 this amount has continued to grow given the average birth rate; however, there is no factual data because the 2020 census has not been carried out due to the pandemic.

The annual cost of land degradation in Panama is estimated to be USD309 million, equivalent to 1.5% of GDP[1]. This cost is measured in terms of changes in land productivity, considering two aspects: changes in land cover (for example, forest land converted to agricultural land); and the decline in the provision of ecosystem services in one type of land cover due to degrading land use practices (e.g. reduced productivity of agricultural land over time).

A favorable factor for the changes proposed in the project is that the country has abundant water resources,[2] favored by rainfall that varies between 1,000 and 7,000 mm / year, depending on the climatic zone and altitude. However, the governance of fresh water processed by hydrographic basins, essential for human and agricultural consumption, is in a state of vulnerability due to the poor global

administration given to the ecosystems that protect them and the accelerated extraction of groundwater, particularly in arid, semi-arid or areas with economic scarcity of water (Dry Arc and Darien Region), without taking into account the impact on the local hydrological cycle or applying the planning required to allow the recovery of aquifers. The loss of forest cover has increased the vulnerability of soils to rains and droughts, as have agricultural activities without appropriate techniques, which increase runoff, the loss of fertile soil and the percentage of sediment in water courses. The National Plan for Integrated Management of Water Resources 2010-2030[3] evaluated 10 national basins[4] in critical condition, among them, the Chiriqu? Viejo, La Villa and Santa Mar?a rivers. These were selected for the implementation of the project. In all these basins, there are signs of degradation of the surface and underground sources. During the months of the dry season, mainly February, deficit periods are reported in most of these basins, giving rise to an increase in conflicts over water use.

The impact on the biodiversity of these basins, if their deterioration due to deforestation and the unsustainable water resources management continues, is high. In Panama, there are 8 of the 200 globally recognized ecoregions worldwide, with 21 times more plant species per km<sup>2</sup> than Brazil. A more significant number of vertebrate species than any other country in Central America and the Caribbean, an aspect favored by the biotic exchange between North America and South America that the isthmus has played since its inception.[5] In the basins within the execution area, there are biological resources of global importance such as La Amistad International Park and Bar? Volcano National Park, partially located in the Chiriqu? Viejo basin, of national and regional importance such as Santa Fe National Park in the basin from Santa Mar?a and of national interest such as the El Montuoso Forest Reserve in the La Villa basin. Also, other ecosystems such as wetlands, mangroves and marshes at its mouth are essential for the reproduction of species and the livelihood of thousands of families that depend on fishing activities. Protecting, maintaining, and mitigating the impacts caused by the unsustainable water and soil management are challenges of the project.

## Adaptation

The National Land Degradation Neutrality Strategy, presented to the United Nations Convention to Combat Desertification (UNCCD) is consistent with SDG 15 (terrestrial ecosystems), and specifically, with goal 15.3 ?By 2030, combat the desertification, restoring degraded land and soil? defined the following goals: (i) by 2030 increase forest cover by 26%; (ii) by 2025 reduce the conversion of 18,000 ha of forests into stubble and shrubs and / or agricultural soils; (iii) by 2030 increase the productivity of 62,000 hectares of agricultural land and 12,000 hectares of scrubland and grasslands with decreasing productivity and early stages of deterioration; (iv) by 2020, improve coordination between the different institutions, civil society, unions, and promote participatory mechanisms; and (v) by 2020, improve the existing legal framework that helps to promote the LDN program and the definition of projects that facilitate these changes, being the Sustainable Land Management project one of them.

The new climate change scenarios RCP 8.5 to 2070, integrated by MiAMBIENTE in the Third National Communication on Climate Change, indicate an increase in the average and maximum temperature; changes in precipitation patterns, including precipitation deficits of up to 10% between the dry season and rainy periods. On the other hand, the sensitivity of ecosystems and ecosystem services is increasing given the dynamics of change from forests to pastures and agricultural crops[6] and

demographic growth itself (higher demand for services). Exposure and sensitivity to climate threats (impact of climate change) are growing at an accelerated rate that exceeds the adaptive capacity of ecosystems, their services and the people who depend on them for their development. Air pollution is important.

With the vision of improving this scenario, Panama's First Nationally Determined Contribution (CDN1) to the United Nations Framework Convention on Climate Change (UNFCCC) focuses on the conservation and restoration of productive ecosystems as a measure which contributes to increasing resilience and reducing Greenhouse Gas (GHG) emissions in the AFOLU sector towards carbon neutrality by 2050, fighting multidimensional poverty and boosting local economies. In 2017, MIDA adopted the National Climate Change Plan for the Agricultural Sector (PNNCSA) to increase the resilience of the primary productive sector, which includes, among other actions, promoting low-emission agricultural and livestock production processes, strengthening MIDA management in the recovery of degraded lands by supporting the transformation of cattle to silvopastoral systems, promoting agroforestry systems in key crops and putting into operation two Nationally Appropriate Mitigation Action Plans (NAMA) for rice and livestock. Within the framework of the LDN, the Gender Action Plan is being prepared with adaptation measures with a rights and equity approach.

In addition, MiAMBIENTE created the Reduce your Corporate Footprint and Product Footprint program (water and carbon) that is framed within the National Reduce Your Footprint Program (PNRTH)[7]<sup>7</sup> that includes all the instruments for the management and monitoring of low-carbon economic and social development in the country: establish a sustainable system of national GHG inventories; registration of nationally determined contributions; design the national strategy for low-carbon economic and social development; establish the national registry of emissions and the registry of implementation measures (monitoring mechanisms) and create the national platform for climate transparency attached to the National System of Environmental Information (SINIA) of MiAmbiente. This project will support the development of some of those instruments necessary for the implementation of the Reduce to footprint (Corporate and of products) PNRTH for selected products in the agricultural sector.

#### Intervention Area

During the preparation of the PIF, 3 basins were selected (Chiriqu? Viejo, Santa Mar?a and La Villa) that cover the focal areas detailed in the National Action Program (PAN) to Fight Drought and Desertification 2015-2025 (Figure 1, shown previously).

The selection of intervention areas was refined, using an approach based on remote sensing, according to the definitions of the UNCCD proposed in the Guide of best practices for the calculation of the sub-indicators of the SDG 15.3.1 (Sims et al. 2019[8]<sup>8</sup>) and works of the JRC (Joint Research Centre) from the World Atlas of Desertification (Cherlet et al. 2018[9]<sup>9</sup>).

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Figure 2 shows a general view of the scope of the project regarding land use (MiAmbiente, 2012) in the areas selected for execution. The changes proposed in the project will contribute to SDG 15 Target 15.3 on combating desertification, rehabilitating degraded lands and soils, including lands affected by desertification, drought and floods, and strive to achieve neutral soil degradation. The high synergistic potential to meet several of the goals of SDG 15, makes these basins that have mountain areas in their territory are identified as relevant for implementation and reinforces the need to select sub-basins that cover the upper part medium and low of each of the project basins.

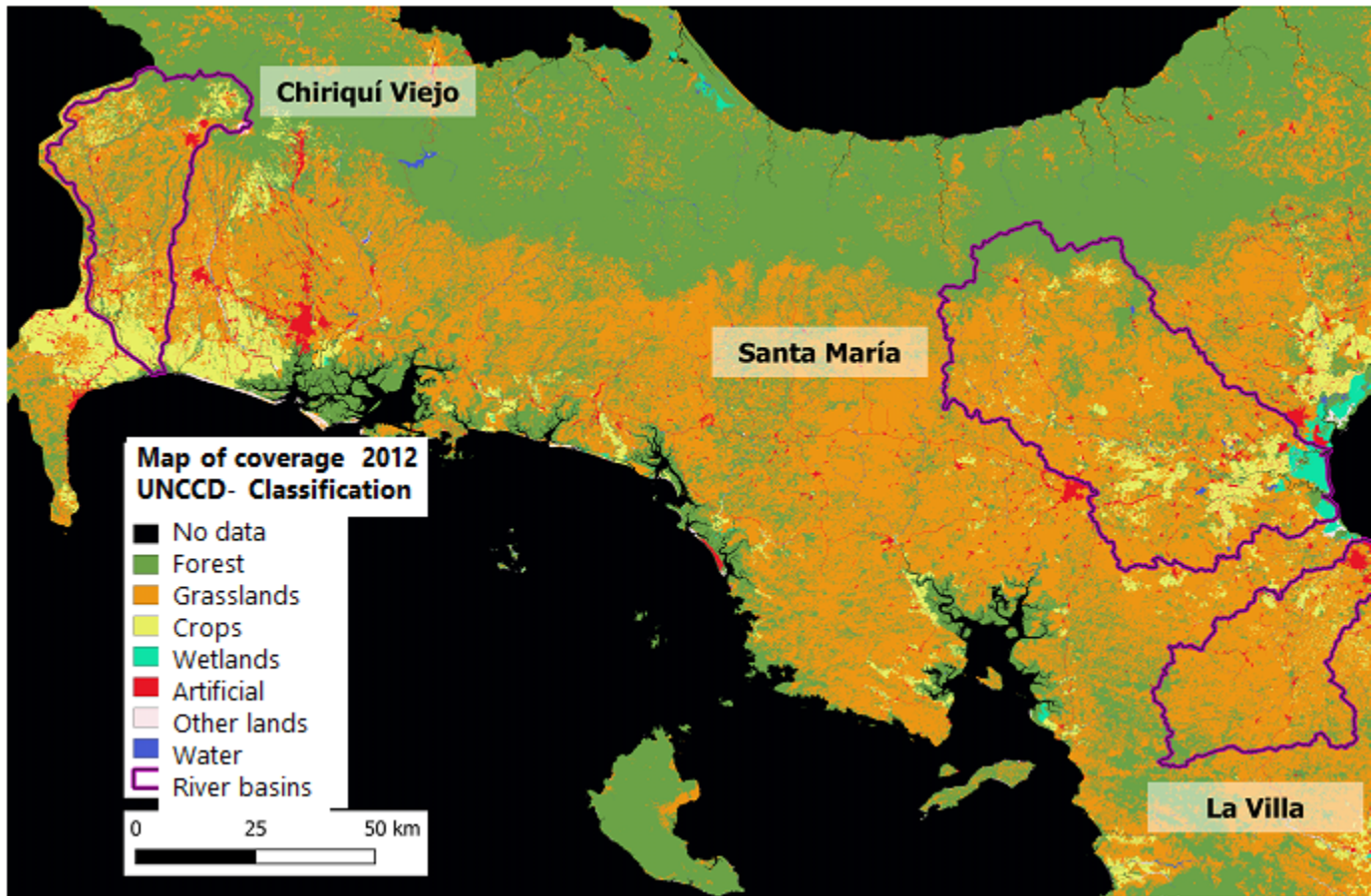


Figure 2- Project basins and land use of Panama

The main layer of bio-physical information used was the 2012 Panama Land Cover Map (MiAmbiente). As a characterization of productivity trends, maps of the Land Productivity Dynamics - LPD (Ivits and Cherlet 2013-)[1] were developed, which uses non-linear phenology (Ivits et al. 2013)[2], as well as the indicators of Land Trends proposed by Teich et al. (2019)[3]. In addition to the bio-physical variables, the process also considered national information on the socio-economic condition of the population (National Agricultural Census 2011 and Census of Population and Housing 2010), the multidimensional poverty level (Plan Colmena) and the level of use of water resources (Relative Availability Index and Water Scarcity Index). All this information was compiled at the level

of the sub-basins on which Principal Component Analysis and Cluster Analysis were used to summarize the information and generate groups of sub-basins based on their multivariate behavior.

The data analysis concluded with a pre-selection of strategic sub-basins for the implementation of the project (Figure 3):

- ? Chiriquí Viejo: Chiriquí Viejo River source, Caisón river, Divalí river
- ? La Villa: Piedras river Brook ? Salitre river, Pesé river brook
- ? Santa María: Santa María (lower part), Cocobí river, Las Guás river, Gatí river.

The preselected sub-basins were validated in a participatory manner during a virtual consultation process, adapted to the global context imposed by COVID-19. Two web tools were used to prepare: 1.- A map server with cartographic information for interactive consultation on the sub-basins (<https://projectgeffao.users.earthengine.app/view/subcuencas-panama>); and 2.- An online survey associated with the maps. The set of these tools allowed the main stakeholders to be consulted to define the project's sub-basins and collect reference information from them

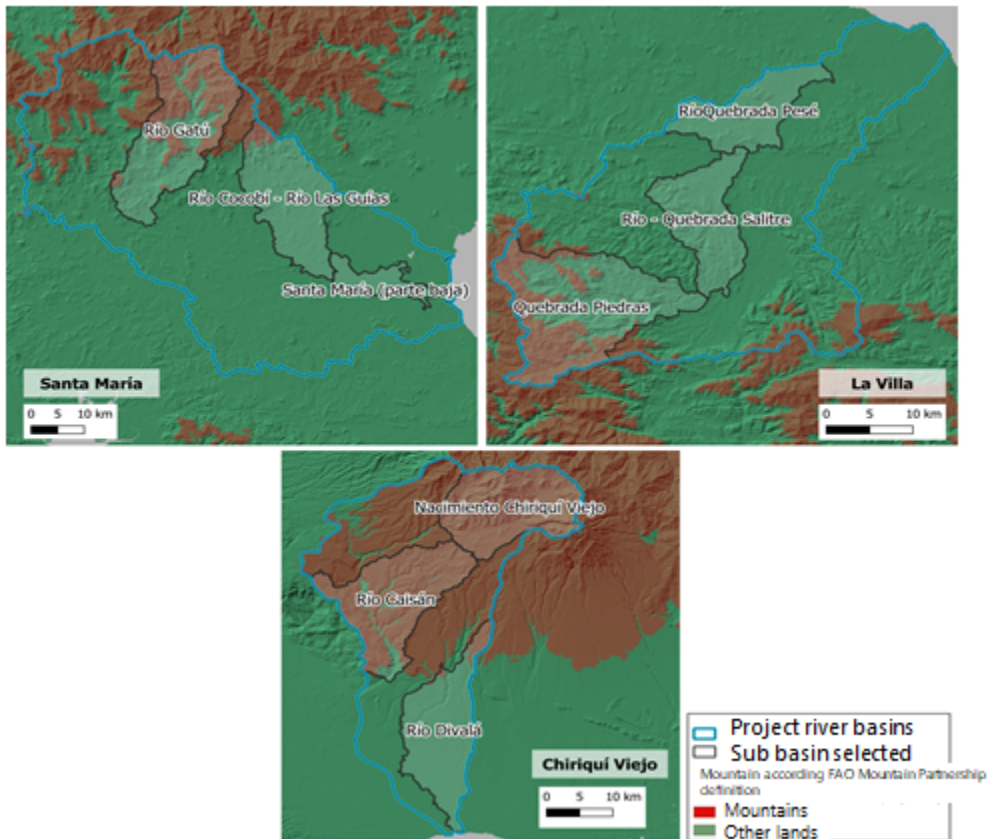


Figure 3. Selected Sub-basins

In total, these sub-basins cover an area of 219,311 ha, representative of the different productive landscapes in the various levels (high, medium and low) of each of the basins. Figure 4 shows that the pastures used for livestock are the dominant soil cover, occupying 95,755 ha (44%). Figure 4b indicates that 63% of the land productivity (137,462 ha) is stable. However, 25% of the project area shows a decrease in productivity, strongly suggesting processes of land degradation.

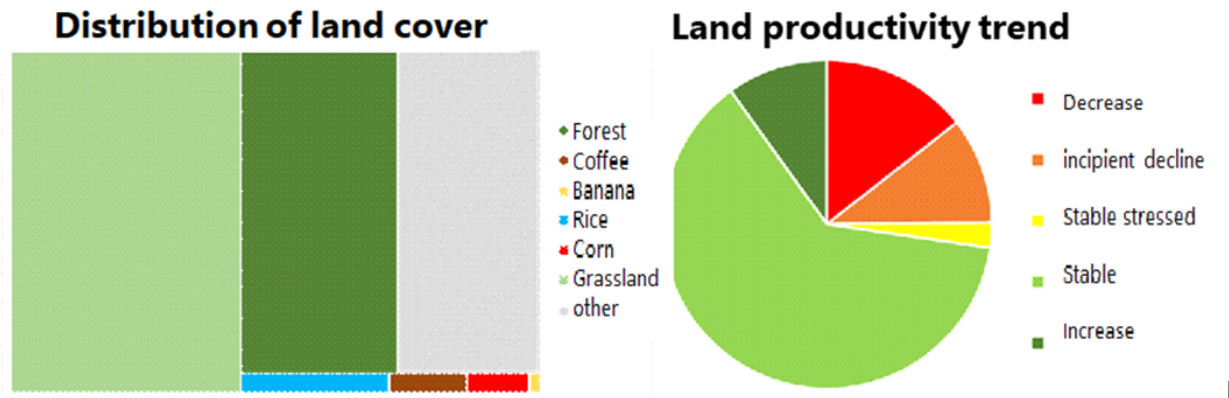


Figure 4. Left: Proportion of land discriminated in each of the target categories of the project according to the Vegetal Cover Map 2012. Right: Categories of the Land Productivity Dynamics (LPD) map 2001-2019 for the selected Sub-basins.

Land cover and productivity are two main variables to monitor LDN (Cowie. et al 2018[1]). In addition, the combination of these two variables can be of great help to make strategic decisions in the implementation of SLM practices taking into account LDN accounting. Analyzing the combination presented in Figure 5, it can be seen that around 30% of the pastures, and the areas with rice or corn cultivation show signs of decreased land productivity (Fig 5, above). In terms of number of hectares (Fig 5 below) it is evident that the greatest problem at the scale of productive landscapes is related to pastures and livestock activity. Within the LDN framework, for each type of land use, degradation (and the loss of functions such as productivity, decreased water retention or GHG) must be balanced with practices and measures that counteract the loss of ecosystem services. Therefore, those areas with Decrease and Incipient Decrease should be reduced, while conserving and increasing the Stable and Increasing areas, taking into account the hierarchy of responses of the LDN: Avoid> Reduce> Restore (Cowie et al. 2018) . This is why this analysis serves as the basis for the strategic planning of this project.





Figure 5. Top: Relative proportion of LPD categories in each type of project target coverage. Bottom: absolute values in hectares for the same combination.

### Barriers

The main barriers to expanding the adaptation of SLM best practices are associated with the following factors:

Barrier 1. Weak governance that limits the integration of SLM with an ecosystem approach (LD, CC and BD) in planning and monitoring processes

The country has long-term strategies, programs, and plans in each of these areas; however, the implementation is disarticulated in most cases. Faced with the challenges of globalization and the demands of the international market, the national environmental management shows the following weaknesses: i) reactive management lacking vision and long-term objectives; ii) broad but scattered regulations; iii) disintegrated and sectoral approach to management (there are no adequate coordination mechanisms); iv) limited focus on SLM; v) bureaucratic, complicated, time-consuming and high cost operating procedures; vi) weak financial and human resource main base; g) non-compliance with regulations on the productive sectors and institutional weakness in applying rules.

The planning processes at the national and territorial levels do not include SLM with a landscape approach. The coordination of actions at the diverse public, private and civil society institutions is weak and/or non-existent in many cases. National information management systems do not always have critical data on land degradation (e.g. water quality in secondary sources), and they are not harmonized. Besides, they are not still accessible by members of governments, technicians, entrepreneurs and producers at the local level, which prevents them from actively participating in the decision-making process related to integrated planning of water and land use. Their territories and monitoring the results. The information exchange mechanism is weak between government entities and research organizations, and policymakers frequently do not use available scientific information for decision-making. Furthermore, the technical standards and the monitoring, control and inspection instruments are inadequate to evaluate/monitor the changes produced scientifically. Given that the UNCCD has repeatedly mentioned the lack of a landscape approach and local indicators to complement the global LDN indicators, Panama wishes to solve this weakness by supporting the development and monitoring of these indicators. It is also necessary to strengthen the scientific information to validate the LDN baseline and develop the tools to monitor the results and prepare the country reports.

Barrier 2. Localized adoption of SLM by producer groups (limited access to improved SLM practices and information/extension services).

Institutional efforts are isolated, almost always at the project level, or with farm selection, without a strategic landscape approach. Weak inter-institutional actions on the protection/conservation of natural resources limit the opportunities for replicating best practices outside the project intervention areas (government, academics, and research centres). Information, communication and training mechanisms are limited. Information/extension services do not always include economic SLM practices with a CSA/CSL approach (droughts, floods, hazardous pesticides, access to markets, etc.) or environment and health protection. There is not enough knowledge by rural producers and local authorities about the effects of unsustainable soil and water management at the farms and even less at the landscape level. Furthermore, current extension mechanisms do not empower producers and their communities to be an integral part of decision-making on land use planning, limiting opportunities for adopting good SLM practices.

Barrier 3. Lack of innovative financial mechanisms to promote production systems and integrate value chain (low entrepreneurial capacity by the agricultural producer).

At the territorial level, the financing mechanisms are inadequate to support the mobilization of resources required for implementing the Watershed Management plans with the incorporation of SLM/ CSA/CSL and restoration practices. It is necessary to evaluate possible public and private financial sources to take advantage of sustainable land management investment. Most producers lack financing for SLM at the farm level, with a CSA/CSL approach, in the traditional credit system (public and private) due to their weak borrowing capacity. Traditionally, international organizations have provided financial assistance for SLM with limited funds that benefit a small number of producers. Incentive laws[1] are not accessible to all climate-adapted producers or seeds in areas of high vulnerability to CC. The traditional credit system often favors unsustainable production systems, or is based on non-harmonized public policies that favor unsustainable techniques (monocultures, use of agrochemicals, farm expansion, etc.). Another aspect is that financing does not promote value-added products that strengthen business management (supply, demand, transportation, transformation) with broader access to national and international markets.

Barrier 4. Inadequate knowledge management and LDN monitoring at the landscape level

The lessons learned are not systematized, published and disseminated to support the expansion of LDN at the national level, generally remaining at the level of projects and institutions. There is a lack of a structured knowledge management process on the subject of SLM that facilitates the sharing of experiences and inefficient mechanisms for harmonization and dissemination of information to improve the knowledge of producers and local governments for the replication of best practices.

#### A. Baseline Scenario and any Associated Baseline Projects

##### Baseline Scenario

In compliance with the guidelines of the United Nations Convention to Fight Drought and Desertification, Panama launched the National Action Program (NAP) to Fight Drought and Desertification in Panama (2014-2022), which defined 5 priority approaches:

- ? Maintain or improve the balance of ecosystem services, which means protecting the earth's natural capital represented by natural resource reserves and guaranteeing the flows of goods and services of high social, economic and environmental value;
- ? Maintain or increase productivity to improve food security and ensure that future degradation (losses) was counteracted with positive actions planned elsewhere (gain)
- ? Increase the resilience of the land and the people who depend on it;
- ? Seek synergies with other social, economic and environmental objectives; and

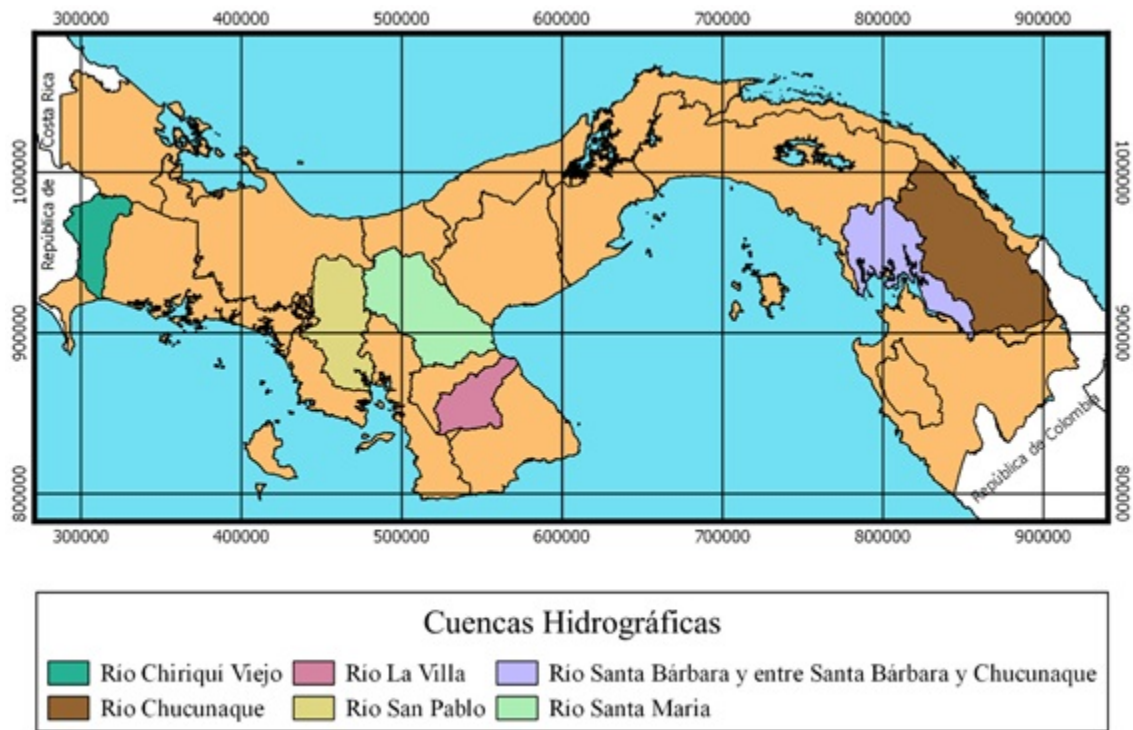
? Strengthen responsible and inclusive governance of land.

The NAP made a diagnosis of the state of the land in the country, identifying 4 critical areas that presented the most serious conditions of droughts and soil degradation: Cerro Punta (Chiriquí Viejo river basin), Arco Seco (La Villa river basin), the Sabana Central Veraguense (basin of the Santa María river) and the Comarca Ngäbe Buglé. These areas comprise an area of 220,787.57 km<sup>2</sup> and a population of over half a million people.

The LDN Strategy (2019-2030) focuses on the three pillars of land neutrality, which are avoiding, reducing and reversing land degradation and integrates NAP in all its parts. This strategy defines an approach based on five cohesive objectives with the focal areas of the NAP:

- (i) By 2030, increase the forest cover by 26%;
- (ii) By 2025 reduce the conversion of 18,000 ha of forests into stubble and shrubs and / or agricultural soils;
- (iii) By 2030 increase the productivity of 62,000 hectares of agricultural land and 12,000 hectares of scrubland and grasslands with decreasing productivity and with early stages of deterioration; (iv)
- (iv) By 2020, improve coordination between the different institutions, civil society, unions, and promote participatory mechanisms, and
- (v) By 2020, improve the existing legal framework that helps strengthen the NDT program. The COVID-19 pandemic affected the performance of the last 2 goals, keeping them in force in the following years.

The NDT manages the synergies and collaboration on sustainable land management in the critical areas identified by the NAP, and extends the actions to the eastern part of the country (Darién region). The approach priorities are focused on 4 priority areas (comprising several basins) as shown in the following image, among them, the 3 areas of implementation of the Project: Chiriquí Viejo river basin (area No.1), river basin La Villa (area No.2) and the Santa María river basin (area No.3), as shown in the image below.



The project will develop activities that support the goals of the LDN to strengthen its implementation in the territories of the selected basins:

- a. Forest coverage of 500 ha will be increased through the recovery of gallery forests and agroforestry systems with coffee (Chiriquí Viejo river basin and Santa María river basin).
- b. The productivity of the land will be increased by converting 4,600 ha from traditional livestock systems to silvopastoral systems with climate-smart livestock techniques in the basins of the 3 basins (Chiriquí Viejo, Santa María and La Villa).
- c. It will contribute to improve the productivity of 400 ha with traditional agriculture to systems with climate-smart agriculture.
- d. Improve inter-institutional coordination between MiAMBIENTE / Ministry of Agricultural Development / MIDA / Institute of Agricultural Innovation of Panama / IDIAP / Banco de Desarrollo Agropecuario-BDA) to promote environmentally sustainable land uses.
- e. It will strengthen the legal framework at the national level of the NDT with the elaboration of the land law that incorporates the principles of the NDT, and at the local level, it will integrate the guidelines of the NDT into plans and projects of land use.

The project's baseline also considers long-term strategies, programs, and plans, the following being the most closely linked:

- *National Strategy for Land Degradation Neutrality (2017-2030)*

- *National Action Plan to Fight Desertification and Drought in Panama (UNCCD)*
- *Government Strategic Plan (PEG 2020-2024)*
- *National Plan on Water Security: 2015-2050 Water for All*
- *National Forestry Strategy to 2050*
- *National Policy towards Climate Change (Executive Decree 35 of 2007)*
- *National Policy on Agricultural Transformation 2001 (Law 25 of June 2001)*
- *National Determined Contributions (2020)*
- *National Climate Change Strategy to 2050*
- *National Biodiversity Strategy and Action Plan 2018-2050*
- *National Plan to Combat Drought in Panama - 2020*
- *National Reduce your Footprint Program (carbon and water)*
- *Government Strategic Plan (PEG 2020-2024)*
- *Economic Recovery Plan for the Impacts of COVID-19*
- *National Climate Change and Agricultural Sector Plan (2017)*
- *Plan Colmena (2019-2030)*
- *REDD+ National Strategy, Panama*
- *Alliance for the Million (2014 - 2030).*

In support of addressing the LDN goals, synergies and complementarities may be created with other projects that pursue similar objectives and that will have an impact on expanding the SLM and contributing to the LDN goals:

? *LDN strategy.* Ministry of the Environment (MiAmbiente) is responsible for leading the activities to achieve the goals of LDN at the national and local levels. To this end, it will reinforce synergies with programs already established such as the Alianza Por el Mill?n, the ProCuenca Program, the Wildlife Water and Protected Areas Fund, etc.

? *Alliance for the Million.* It is a public-private pact that aims to reforest one million hectares in 20 years. It is structured in 2 components: restoring gallery forests on degraded lands and commercial reforestation. This initiative is led by the Ministry of the Environment (MiAmbiente), the Association for the Conservation of Nature (ANCON), the National Association of Reforesters of Panama (ANARAP) and the Ministry of Agricultural Development (MIDA). It is supported by 26 corporate partners (including banks and large corporations), 22 institutional partners (public entities and private organizations, including NGOs) and 3 media, making it the most widely supported public-private initiative in the country. Preparatory Support Programme for Climate Management in Panama (Readiness) Ministry of Environment (MiAmbiente), aimed at developing the National Climate Change Strategy 2018-2025, the Country Program for the Green Climate Fund (GCF) and the evaluation of barriers and opportunities for private sector participation, among others[1]. Financed by the GCF and administered by CAF.

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[1] <https://anpanama.com/9614-CAF-inicia-seleccion-de-empresa-que-implementara-el-Readiness-de-gestion-climatica-de-Panama.note.aspx>

?

? Adaptation to Climate Change through Integrated Water Management in Panama Programme. MiAmbiente/MIDA/NATURA. Focused on adaptation to CC aimed at designing, developing and installing an information system on climate change and early warning systems for droughts and floods at the service of producers and productive development projects with producer organizations. Its objective is to reduce vulnerability through integrated water management. It has a budget of US \$ 9.9 million contributed by the UNCCD Adaptation Fund executed by MiAmbiente, MIDA and ETESA and implemented by the NATURA Foundation in the Chiriquí Viejo (sub-basin of the Caizán River) and Santa Mará (sub-basin of the El Gallito river) basins. This project ends in December 2021, but it will leave infrastructure, technical and operational capacities, human and institutional capital that will be capitalized by the project.

? Productive Investment Initiative for Adaptation to Climate Change (CAMBio II). Regional project for Central America and Panama that provides financing, technical assistance and financial incentives to SMEs to increase their resilience to climate change. It was approved in 2019 by the GCF and is implemented through CABEI (Central American Bank for Economic Integration).

? Priority Watershed Restoration Programme for Panama (PROCUENCA). A loan operation from MiAmbiente / Development Bank of Latin America (CAF) for US \$ 17.3 million, in support of the Alliance for the Million Initiative, which began in 2014 with a duration of 7 years. Its objectives are to recover 1,500 ha of forest cover in the basins of the Chiriquí Viejo, Chiriquí, La Villa, Santa Mará and Río Grande rivers. It plans to train 80 extension workers and benefit 4,600 producers. As of December 2019, 10,300 ha had been reforested.

? Water, Protected Areas and Wildlife Trust. Fund created with support from the GEF / WB Sustainable Production Systems and Biodiversity Conservation Project (GEF -TF-018972) / GEF Project ID 5546) and MiAmbiente's own resources to create equity capital of US \$ 3.5 million; and fed by current income from MiAmbiente and payments for environmental compensation from private companies. Until 2019, it had financed 110 projects for US \$ 20.74 million, of which US \$ 2.3 million were financed in reforestation, US \$ 0.5 million in adaptation to CC and US \$ 0.3 million in water security.

#### Project Challenges Without and With the Project

The country's challenges related to the adoption of measures to achieve LDN and fill the gaps in the baseline, focus on strengthening the political and institutional environment, ensuring intersectoral collaboration to promote LDN. The country has the regulatory and institutional framework, but it is necessary to influence public policy to integrate production and conservation efforts at the level of municipal territories and hydrographic basins. Developing territorial planning instruments (POT, PAM, POTA, basin management plans, etc.) and improving water and soil governance requires strengthening the institutional, financial and operational capacity of municipal governments and governing entities (such are the cases of MiAmbiente, MIDA, MIVIOT). Likewise, develop and put into operation efficient systems for monitoring land, forest and water resources. On the other hand, given the dynamics of change from forests to pastures and agricultural crops, the decrease in the productivity of

agricultural land and the increase in multidimensional poverty of family farmers also increased due to the COVID19 pandemic, the challenges are focused on reducing the advancement of the agricultural frontier, increasing the productivity of agricultural land and the income of family farmers, as well as increasing the adaptive capacity of ecosystems, their services and the most vulnerable rural population who depend on them for their means of life.

LDN Priority n?1 is to prevent, reduce and reverse degradation; In addition, the priority of climate change actions is to strengthen the resilience of ecosystems, their services, and of the farmers and ranchers who depend on them. This implies reinforcing technical conditions, mobilizing appropriate investments and strengthening the capacities of producers and extension personnel in SLM, with a CSA/CSL approach, to guarantee critical ecosystem services in the selected watersheds.

To support integrated land use planning, it is necessary to strengthen land use planning schemes and integrate them into plans, in order to be consistent with LDN objectives and establish / adopt the monitoring system for land use, land, forest and water resources, as a requirement demanded in all projects that relate to these resources. It is also necessary to enhance the adoption of climate-smart agriculture and livestock and strengthen the management of MiAMBIENTE and MIDA around the mechanisms of mitigation, adaptation and resilience of both the producer and the products, promoted by the National program Reduce Your Footprint and in particular the Reduce Your Corporate and Product Footprint program, in order to have the necessary tools to promote low-emission production systems and efficient use of water, so that critical ecosystem services are conserved. With these objectives, the project has been structured in four components: (i) Component 1: Strengthened governance to achieve the implementation of LDN goals; (ii) Component 2. Implementation of best practices on sustainable land management, climate-smart agriculture (CSA) and climate-smart livestock in production systems and restoration of productive landscapes with large-scale agroforestry to achieve LDN in selected watersheds; (iii) Component 3. Innovative financial mechanisms to promote SLM / CSA / GCI and land restoration and achieve LDN; and (iv) Component 4. Knowledge management, management and monitoring of the project The interactions between the components, their complementary elements and approaches to achieve graded results that contribute to the LDN goals are shown in the following figure:



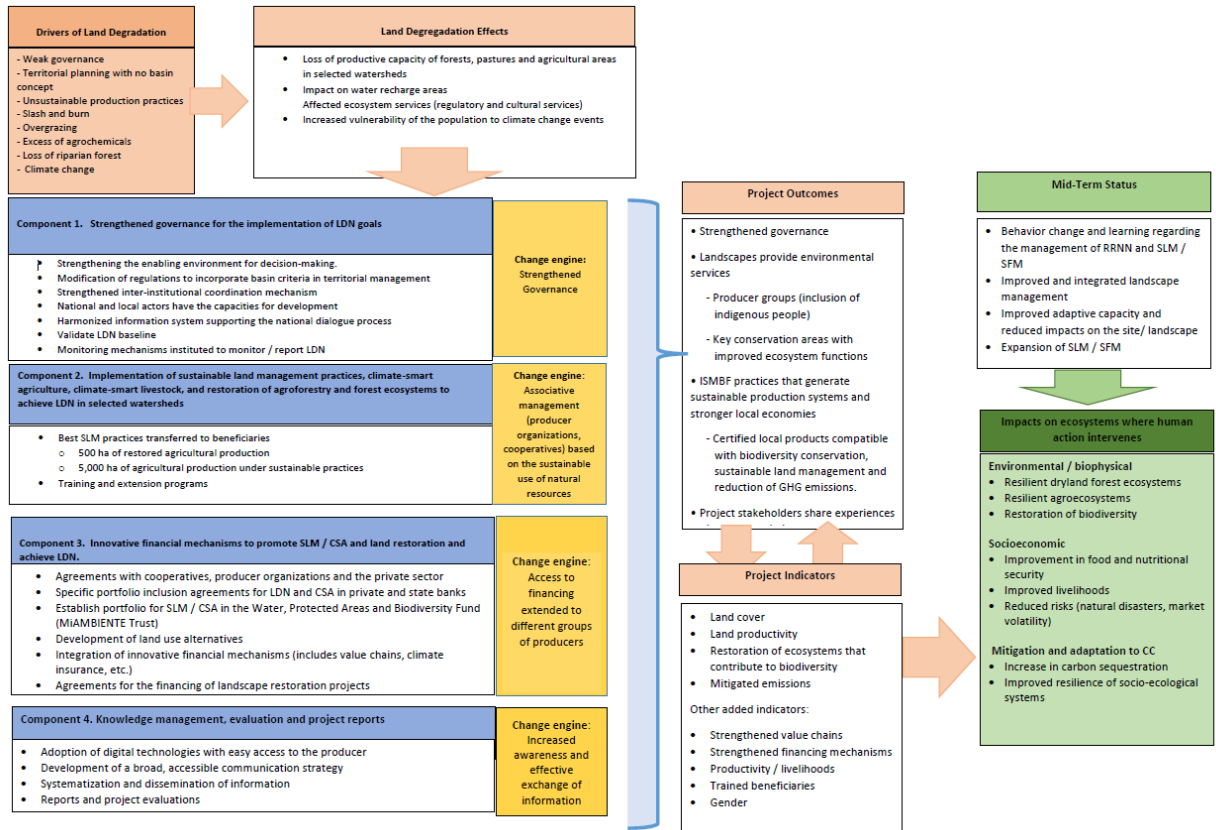


Figure 6. Theory of Change of the GEF LDN Panama Project.

1) The proposed alternative scenario with a brief description of expected outcomes and components of the project and the project's Theory of Change.

#### Project objective, results and products

The Project contributes to Panama's commitment to promote environmental and climate action for sustainable and resilient agriculture, achieving global environmental benefits and socio-economic benefits within the framework of the Sustainable Development Goals (SDGs).

The objective of the project is to expand sustainable land management and the restoration of productive landscapes in watersheds for the implementation of the national goals of Land Degradation Neutrality (LDN) in Panama.

The wide adoption of best practices of sustainable land management (SLM) with a CSA/CSL approach in 5,000 ha and the restoration of 500 ha degraded lands in productive landscapes will contribute to increase productivity, improve the income of the 4,000 direct beneficiaries (women, men and youth), increase resilience and reduce Greenhouse Gas (GHG) emissions, helping to reduce multidimensional

poverty and boosting local economies within the framework of Economic Recovery from the impacts of COVID19.

The project, through all its components, will develop actions that will contribute in different ways to reduce the pressure on forest areas, avoiding deforestation in areas that still conserve their coverage, to improve soil productivity through the dissemination, transfer of knowledge, information, access to financing and the development of pilot projects in key crops with productive techniques of sustainable land management and climate-smart agriculture and livestock; and to prevent the degradation of new areas and/or reduce and mitigate current impacts with natural and assisted coverage restoration techniques. The project objective will be achieved through four components with related results and outputs:

### **Component 1: Strengthened governance to achieve the implementation of LDN goals**

This component will strengthen the LDN vision *“Preserve land as a form of natural capital and the environmental services derived from it?”*, and highlight the importance of land use planning to achieve LDN at the basin level. This component will be achieved through the following results and products.

#### ***1.1. Strengthened enabling environment to improve decision-making and facilitate the implementation and monitoring of LDN at the national level***

Strengthening the enabling environment will enable land use planning to anticipate "losses" and plan for "gains" in terms of ecosystem services and functions that provide land resources (eg water, food, carbon and biodiversity) with better inter-institutional coordination (MiAmbiente and MIDA) in order to promote an agri-environmental agenda in the country. Within the framework of the enabling environment, water and soil governance will be improved at the regional and local levels and from a territorial perspective, to facilitate and strengthen decision-making on the management of natural resources in the 9 selected sub-basins. On the other hand, the national information systems will be harmonized between MiAmbiente, MIDA and IDIAP. The consolidated system will contribute to strengthening better evidence-based decision making on the trend of degradation of land productivity and the impacts (environmental and socio-economic) of SLM practices in the AFOLU sector.

##### ***1.1.1 Analysis of gaps and harmonization of policies, legal and regulatory frameworks between sectors, to facilitate planning, execution and monitoring of SLM with a landscape perspective. (goal: at least 3 policy, legal and regulatory instruments implemented)***

Of the gaps identified in the analysis of water governance, agricultural and agro-environmental policies[1] in Panama, the most important are: i) an outdated water use law[2] as well as the lack of a land-use law; ii) low dissemination of the National Water Security Plan 2015-2050; iii) weak

implementation of the Environmental Territorial Order for better implementation; iv) limited capacities of local governments and basin committees to make decisions about land use planning and sustainable management of water resources; and v) low promotion of projects with a water efficiency approach; and lack of incentives for young people to enable their roots and not abandon their land (promoting agriculture, community agro-industrial development, agricultural technical training in place, participatory training, information and employment opportunities). Despite the fact that the country has a normative and legal framework regarding soil, water and forest resources that normalize the use of these resources, such as:

- Environmental planning of the national territory (Executive Decree No. 283 of 2006 and Executive Decree No. 479 of 2013)
- Regulation of reforestation (law 24 of 1992, modified in 2005)
- Wildlife legislation (Law 24 of 1995, modified in 2005)
- National Policy on Climate Change (executive decree No. 35 of 2007)
- Creation of the National Committee to Combat Desertification (Resolution AG-0098 of 2004, modified in 2008)
- Forest legislation (Law 1 of 1994)
- Integrated management of hydrographic basins (law 44 of 2001)

Inappropriate instruments have been implemented that have contributed in various ways to land degradation by promoting schemes that limit the recovery of degraded areas, such as:

? Forestry Law of Panama (Law 1 of 1994) and its regulations: Establishes a forest protection zone in water courses, but does not encourage afforestation or plant regeneration in areas that have already been intervened and / or degraded.

? Laws of incentives for production that are not compatible with the conservation and protection needs of the ecosystems where the production process is carried out.

The project will specifically support goal 5: *?Improve the existing legal framework that helps to enhance the NDT program?*, with the preparation of the Draft Law on Soils with the technical legal assistance of FAO (SoiLEX). The development of this law was one of the unfulfilled goals of the project "Support in decision-making for the integration and expansion of Sustainable Land Management (LADA)", which was Panama's first experience on LDN, Therefore, the project will resume the preparation of the soil law as an action to prevent the main threats that affect the soil (fire, logging, overgrazing, production on soils unsuitable for agriculture, urbanization, etc.).

This activity is complementary to the dissemination of the Voluntary Guidelines for Sustainable Soil Management (DVGSS) [3]. The land law will be a key element to support the LDN Strategy. It will also contribute to protect water sources (National Water Security Plan 2015-2050), to conserve the country's biodiversity in accordance with the provisions of the Biodiversity Strategy and its Action Plan for 2050 and will contribute to reducing the vulnerabilities of soils and crops proposed by the National Climate Change Strategy for 2050.

The project will improve the governance of water and soil in the selected basins using the tools that the Ministry of the Environment and the Government of Panama are implementing at the national level,

such as the National Water Security Plan 2015-2050 and the NDT Strategy. Specific actions include the dissemination of the National Water Security Plan on the issues that are key to achieving the project's objectives in the selected basins: (i) guaranteeing water availability for the socioeconomic growth of each region (Goal 2); (ii) preventive risk management (avoid or reduce the risk of droughts, floods, alteration of the hydrological cycle of rivers, etc.) and increase the resilience of people and crops (Goal 3); and (iii) improve water and soil governance through inter-institutional coordination of entities that have the technical, operational, logistical, and financial capacities, an adequate regulatory framework, and the institutional capacity to do so (Goal 5). The dissemination and information activities also the actions that the NDT promotes at the national level, which are the central objective of the project management at the basin level, such as the restoration of the productive landscape with climate-smart agriculture and livestock techniques and technical of SLM.

These tasks will be carried out in coordination with the basin committees that integrate all institutional actors (public entities with a physical presence in the basin), private sector and civil society, which becomes the public forum for decision-making in the respective basin. These actions support the implementation of Objective 4 of the LDN "By 2020, improve coordination between the different institutions, civil society, unions and promote participatory mechanisms."

In addition, the regulation and dissemination of the National Family Farming Plan will be promoted, fostering the FAO VGGT for a safe and inclusive access to land for the poorest and most marginalized farmers (since they represent the group most vulnerable to land degradation. ); the regulatory framework will be reviewed to facilitate access to the priority right to land; and the regulations that regulate Law 44 of 2002 will be updated to allow greater participation of civil society in the management of basin committees with a gender perspective. The project will have a close collaboration with the JAARs for the conservation of springs and streams, guaranteeing access to drinking water as an essential instrument for the control of the COVID19 pandemic and the post-COVID19 economic recovery (collaboration agreement). In addition, the project seeks to strengthen alliances with the private sector for the sustainable management of soil and water resources in the sub-basins identified to:

i) The mobilization of co-financing resources destined to:

- Restoration activities in water recharge zones and/or riparian forests, especially those companies that have adopted the United Nations global pact (eg Copa, AES PANAM?, ENEL GREEN, ACP, Banapi?a de Panam?, SA, Petroterminales de Panam?, SA,) and/or aimed at the efficient use of water in the case of hydroelectric plants (middle and lower level of the basin), through corporate social responsibility (CSR) programs that contribute to the goals of the LDN (15.3), with potential collaboration with SUMARSE[4], and companies with national coverage and linked to the sector, such as Empresas Melo S.A. and others with which the signing of public-private cooperation agreements can be promoted;

- Conservation/restoration of natural resources activities with cooperatives and national associations (COOLECHE & ANAGAN) through the signing of agreements, administration agreements and co-administration of funds / resources (see Management Arrangements)

ii) The promotion of incentives for the conservation and sustainable management of natural resources (e.g.: facilitating access to bank financing for those who care for and preserve the upper basin, facilitate access to technical assistance, analyze the viability of creating the figure of environmental bonds as a figure promoted by the municipalities to support the conservation carried out by social actors).

iii) The inclusion of prioritized sub-basins in the environmental compensation standard as priority areas by 2025 through the formalization of agreements between MiAmbiente and environmental compensation companies (Resolution No. DM-0215 of 2019) to allocate resources to recovery of degraded areas in the execution sub-basins.

iv) Develop a study on the unequal impacts of the degradation of soil and water resources on men and women and a profile of their potential to contribute to SLM, LDN and CSA

*1.1.2 National Environmental Information System (SINIA) consolidated between MiAmbiente, MIDA and IDIAP, and accessible to external users with information on the use and degradation of land, soil, biodiversity, quantity and quality of water, early warning systems, agrochemicals in key crops and pastures and emissions (GHG).*

Harmonization of information management systems for joint decision-making on integrated land and water use planning will help policy makers to use available scientific evidence for decision-making. The information system will contribute to strengthening better evidence-based decision-making on the importance and impacts of SLM/CSA /CSL practices in tropical ecosystems, thus generating information and data on LDN goals, facilitating the necessary synergies for institutions to comprehensively address the issues of land degradation, biodiversity, carbon, water and climate change. Several information systems operating in the country with global and national coverage and the agri-environmental platforms with greater access to information were investigated. Their analysis showed[5] a wide availability to obtain and process useful information on SLM, soils, sustainable agriculture, climate, disaster, environmental, agricultural information, etc. A summary of each is presented in the following table:

**Tabla 1. Global and national environmental, climate and agricultural information systems**

<b>Global Platforms</b>
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<p>ASIS (Agricultural Stress Index)</p>	<p>Platform generated by FAO to support countries in strengthening their surveillance, early warning and drought risk management systems in agriculture. It provides information such as maps of current land use, sowing dates, length of the crop cycle, and crop coefficients. The FAO Panama Office implemented the <i>Agricultural Drought Monitoring project for Basic Grains and Pastures in the Republic of Panama</i> and supported the integration of the ASIS layer of drought occurrence in agriculture to complete the <i>Sustainable Land Management ATLAS</i> (MiAmbiente-FAO). <a href="http://www.fao.org/giews/earthobservation/asis/index_1.jsp?lang=en">http://www.fao.org/giews/earthobservation/asis/index_1.jsp?lang=en</a></p>
<p>EOS (Land Viewer)</p>	<p>Platform generated by the Earth Observation System (EOS). It has a web interface that allows users to select a geographic area and download images from different sensors for analysis. It presents a crop monitoring module, through the farm with a report form, option to select the vegetation index by date, generation of farm zoning, and also provides a field activity form. The monitoring includes forecasts of a climatic nature. <a href="https://eos.com/es/lv/">https://eos.com/es/lv/</a></p>
<p>SERVIR (Regional Visualization and Monitoring System)</p>	<p>It originated in 2005 from the Regional Visualization and Monitoring System Project (SERVIR) in CATHALAC. He is a member of NASA, USAID, MiAmbiente, and ministries of the environment from the Central American countries. He operates from CATHALAC, offering monitoring of rains, tides, hot spots, earthquakes, environmental analysis and natural disasters (including on social networks).  <a href="https://www.servir.net/">https://www.servir.net/</a></p>
<p>International Chapter `Space and Major Disasters? CATHALAC (PM Panam?)</p>	<p>The International Charter for Space and Major Disasters has been operating for 20 years supporting the countries of the world during the period after natural events cause major disasters. The European Space Agency, the Canadian Space Agency, the United States Geological Survey and important representative space agencies from countries such as: Venezuela, Argentina, France, Germany, South Korea and India, among others, are part of it. CATHALAC, in its role as Project Manager (PM) of this platform for Panama, carried out the assessments of major disasters in the country: for the Chiriqu? Viejo river basin, the flooding and landslide events that occurred in August 2014 and November of 2020; and in the La Villa river basin, the analysis of floods that occurred in October 2016. <a href="http://www.cathalac.int/">http://www.cathalac.int/</a></p>
<p>DESINVENTAR (Disaster Information Management System)</p>	<p>This System is characterized by a historical database of records of different natural events related to landslides, floods, droughts, forest fires and volcanic eruptions, among others. The data can be visualized cartographically online and are represented in the areas of populated places, townships, districts and provinces. It records all the climatic events of the country.  <a href="https://www.desinventar.org/">https://www.desinventar.org/</a></p>
<p><b>National Platforms</b></p>	

<b>SINIA (National Environmental Information System)</b>	<p>It is the official environmental information platform managed by MiAmbiente. It is visible and open access through the MiAmbiente website and with its own address. It covers the following topics: forest and biodiversity, soil, coastal marine resources, energy and transportation, waste, disasters and risks, environmental health, environmental management, atmosphere, climate change, water and sanitation. In the analysis it was observed that the SINA does not present information in the waste, energy and transport windows. For soils, it would be functional to incorporate base information related to degradation and aspects related to LDN, which is missing in this window, as well as to integrate information on climate change that is being generated by the Climate Change Directorate.</p> <p><a href="https://www.sinia.gob.pa/">https://www.sinia.gob.pa/</a></p> <p><a href="http://www.miambiente.gob.pa">www.miambiente.gob.pa</a></p>
<b>IDIAP Soil Laboratory Information System</b>	<p>The IDIAP administers a national project on soil degradation indicators: It has pits in the Azuero region (which covers the La Villa river basin) and they are working on the National Soil System. Additionally, it has an Agroclimatic Network project with twenty (20) agrometeorological stations that performs future modeling for agriculture. It is also systematizing the network through its website and has been generating, since 2017, a newsletter that it shares with producers. With the support of the World Soil Alliance, the Regional Soil Alliance and the collaboration of FAO Panama and SLM, in 2019 two important launches were made for the country, the National Soil Alliance (under the leadership of the Panamanian Society of Soil Sciences and IDIAP) and the National Network of Soil Laboratories, entities of great importance to support the scope of the LDN net. On the other hand, the Global Soil Carbon Map (<a href="http://54.229.242.119/GSOCmap/">http://54.229.242.119/GSOCmap/</a>) whose contribution to the geographical area corresponding to Panama was made by IDIAP with training from FAO.</p> <p><a href="http://www.idiap.gob.pa/">http://www.idiap.gob.pa/</a></p>
<b>The MIDA Information System</b>	<p>The MIDA, as rector of the agricultural sector, generates data of a climatic nature from meteorological stations that it has in different geographical points. Among its projections is to establish an agri-environmental platform. On its website, it displays various programs and legal instruments that can potentially be binding on the strategies that are developed between the components of governance, sustainable land management, and financial innovation mechanisms. It is recommended that the institution provide in-depth knowledge of the infrastructure of its information system and its plans to establish an agri-environmental platform.</p> <p><a href="https://www.mida.gob.pa/proyectos.html">https://www.mida.gob.pa/proyectos.html</a></p>

<p>CONAGUA Water Analysis</p>	<p>The National Water Council is the entity in charge of coordinating the implementation of the National Water Security Plan 2015 - 2050. Its functions include advising the Cabinet Council on policies related to water governance. Currently CONAGUA does not have an infrastructure for data management; however, they have been working on the use of the Hydrobid tool for hydrological modeling, especially in the La Villa river basin. Among CONAGUA's plans for 2021 is the implementation of a National Information System on Water Resources, which will be highly relevant for the development of policies and dialogues on water governance. The information inherent to CONAGUA is found within the SINIA, in this link:</p> <p><a href="https://www.sinia.gob.pa/index.php/compendio-de-entidades-con-competencia-ambiental/212-entidades/302-consejo-nacional-del-agua-conagua">https://www.sinia.gob.pa/index.php/compendio-de-entidades-con-competencia-ambiental/212-entidades/302-consejo-nacional-del-agua-conagua</a></p> <p><a href="https://www.facebook.com/CONAGUAPANAMA/">https://www.facebook.com/CONAGUAPANAMA/</a></p>
<p>ETESA Information System</p>	<p>The Empresa de Distribuci?n El?ctrica S.A. (ETESA), is the official institution for the generation of climate data, since it manages the largest national network of meteorological and hydrological stations. It is publicly accessible through the Directorate of Hydrometeorology. The platform allows the export of hydrometeorological data in CSV format. The Government of Panama has recently announced its interest in creating an Institute of Meteorology and Hydrology.</p> <p><a href="https://www.hidromet.com.pa/es/">https://www.hidromet.com.pa/es/</a></p>
<p>Antenna Information System</p> <p>GOES 16 R of CATHALAC</p>	<p>It was financed by MiAMBIENTEc with the Water, Protected Areas and Wildlife Trust. The System generates data related to humidity, temperature, hurricane intensity, hot spots, earth surface temperature, volcanic ash and precipitation estimation. It operates in CATHALAC with a receiving antenna for data generated by the GOES 16 R satellite, combined with an infrastructure of servers for data storage integrated with internet service and a platform called MET LAB 2 that allows the input and output of user data.</p> <p><a href="http://www.cathalac.int/">http://www.cathalac.int/</a></p>
<p>WRF Climate Forecast System (CATHALAC)</p>	<p>The system allows forecasting of rain accumulation in 24 hours, based on the analysis on WRF images (Weather Research Forecast Model). The forecasts are used to be displayed daily on social networks (twitter, instagram, etc). It operates in CATHALAC. With the support of the Meteorological Institute of Cuba, they managed to have resolutions of up to 3 km that allows working at the local level at the level of hydrographic basins.</p> <p><a href="http://www.cathalac.int/">http://www.cathalac.int/</a></p>



<p>SINAPROC Information</p>	<p>The National Civil Protection System (SINAPROC) feeds on information generated by ETESA, the radar of the Panama Canal Authority and SERVIR, to generate alert bulletins against weather conditions, and on some occasions it relies on the meteorological institutes of Costa Rica and Colombia. The seismic data is received from the Institute of Geosciences of the University of Panama. SINAPROC works in regional coordination with CEPREDENAC and has physical representation in the three (3) study areas. For the dissemination of information, they use digital media such as Twitter, Instagram and Facebook, and part of their staff has been trained in interpreting images of a climate nature.</p> <p><a href="https://www.sinaproc.gob.pa/">https://www.sinaproc.gob.pa/</a></p>
<p><b>Global agri-environmental platforms</b></p>	
<p>WOCAT (World Overview of Conservation Approaches and Technologies)</p>	<p>In 2014, the UNCCD recognized this platform as the main database, recommended for best practices and adaptation measures for SLM. It also obtained the mandate to support the 196 signatory countries to register best SLM practices and use SLM knowledge from stakeholders around the world, from land users to decision makers to improve the sustainable management of the earth. Since 1992, WOCAT has a network of specialists to promote best practices and contribute to the achievement of LDN and SLM management. Its focus is on the land resource that includes soil, water, animals and plants for the satisfaction of human needs, and ensuring, in the long term, the potential productivity of the resource. WOCAT promotes the use of the free tool trends.earth developed by NASA, Lunds University with the support of the GEF for the measurement of indicators associated with soil degradation: productivity, land cover and soil organic carbon. This tool will be used by the project.</p> <p><a href="https://www.wocat.net/en/">https://www.wocat.net/en/</a></p>
<p>Sustainable Agriculture for a better world (SAI)</p>	<p>It is a chain oriented to values associated with food production and water consumption, under sustainable agriculture initiatives. It allows to establish the difference between small producers and large producers. The direction of the work is oriented towards the global challenges of developing an agriculture that measures impacts in alliance with different groups. Some of the companies that make up the platform are: TARGET and iTi Tropical from the United States and HZPC from the Netherlands. Webinars are announced on the platform and publications of experiences related to sustainable land management are displayed.</p> <p><a href="https://saiplatform.org/our-work/#Projects">https://saiplatform.org/our-work/#Projects</a></p>

National Agricultural Library (USDA)	This platform displays information on livestock, invasive species and agricultural laws. It also displays publications on alternative cropping systems, food security, nutrition, agriculture and water information center, and data related to farm management.  <a href="https://www.nal.usda.gov/main/">https://www.nal.usda.gov/main/</a>
Agroecology Knowledge Center of FAO	This platform is from FAO. It presents windows where the knowledge of acquired experiences is shared, a compilation of agroecological legislation, a database of publications of initiatives related to sustainable agriculture and the TAPE Agroecological Assessment performance tool.  <a href="http://www.fao.org/agroecology/knowledge/es/">http://www.fao.org/agroecology/knowledge/es/</a>
Sustainable Agriculture (RAS)	RAS is an international network whose priorities are the promotion of sustainable agriculture, the conservation of biodiversity and the improvement of rural livelihoods, through the application of technical solutions, the experiences and the knowledge of local partners. This network considers that long-term sustainability is only possible with the local empowerment that can be achieved through the management developed by the partners in different countries. They are working on projects related to four (4) priority themes: - Rural agriculture and landscape resilient to climate change, More prosperous producers and communities, Reduction of the environmental footprint of agriculture and Big Data Management for sustainable agriculture. It is made up of 40 organizations from America, Asia and Africa.  <a href="https://www.agriculturasostenible.eco/">https://www.agriculturasostenible.eco/</a>
North Carolina Science Initiative Plant (North Carolina State University North Carolina)	This is a platform on resilient agricultural systems. It is oriented to the development of crops to combat adverse environmental conditions, climate change, pests and pathogens. It also focuses on the prevention of economic losses in crops to maintain competitiveness in the markets, and on the development of strategies that guarantee food security. The platform is divided into windows of: Research, education programs, dissemination, alliances and collaborations.  <a href="https://cals.ncsu.edu/psi/resilient-agricultural-systems/">https://cals.ncsu.edu/psi/resilient-agricultural-systems/</a>

To gain access to these sources and strengthen national platforms, an Agro-Environmental Information System, the project proposed the following:

- i) *Centralized an Agro-Environmental Information System*, displayed on a web page that is simultaneously linked to the web pages of MIAMBIENTE, MIDA and IDIAP. This website will be an agri-environmental platform that will be set up before the first semester of the project and will be evolving in content and capabilities until the final phase of the project. It is expected that for administrative reasons between the institutions, during the development of the project, that the platform will be managed from CATHALAC, as the executing agency of the project, to have greater availability

and optimization of time to make the different changes that it will require in its evolution process and take advantage of the information bases that this institution has.

The platform will have information related to the development of the project and will be a means of communication for the project, for producers and users in general. Additionally, the platform will be enabled through the infrastructures that CATHALAC has in its information systems, to provide updated information of a climatic nature and of reference in early warning. Its design includes the hardware and software necessary for its operation. This platform will capture, generate and transmit information related to report documents, reports, news, experiences of best practices, interactive maps and a climate and early warning.

ii) *Provide information to producers, institutions and other stakeholders.* Through the proposed agri-environmental system, agricultural, climate, soil degradation, climate change and environmental issues in general would be unified in a technological platform, aimed at producers, the general public and decision makers. It will be fed with information from different sources and the data displayed can be structured or unstructured. The unstructured information refers to reports that the different issuing entities provide, such as: meteorological reports, reports of data from measurements of meteorological stations, report related to LDN, climate-smart agriculture, sustainable land management, analysis of variables such as temperature, carbon dioxide, etc. On the other hand, structured data are those that come in a format with the characteristics of being stored in a database of rows and columns. Examples of these data are those from the satellite antenna, weather forecast models, tabulated information from the measurements of the variables of meteorological stations, etc.

iii) *Establish a centralized agri-environmental information system.* Having a centralized system of agroclimatic data is guaranteed through good practice management of historical data of extreme weather events and the behavior of different key variables important for studies and take timely decisions.

[1] [https://prais.unccd.int/sites/default/files/2018-08/An%C3%A1lisis%20y%20diagn%C3%B3stico%20de%20las%20pol%C3%ADticas%20agroambientales%20FAO.%20PA\\_0.pdf](https://prais.unccd.int/sites/default/files/2018-08/An%C3%A1lisis%20y%20diagn%C3%B3stico%20de%20las%20pol%C3%ADticas%20agroambientales%20FAO.%20PA_0.pdf)

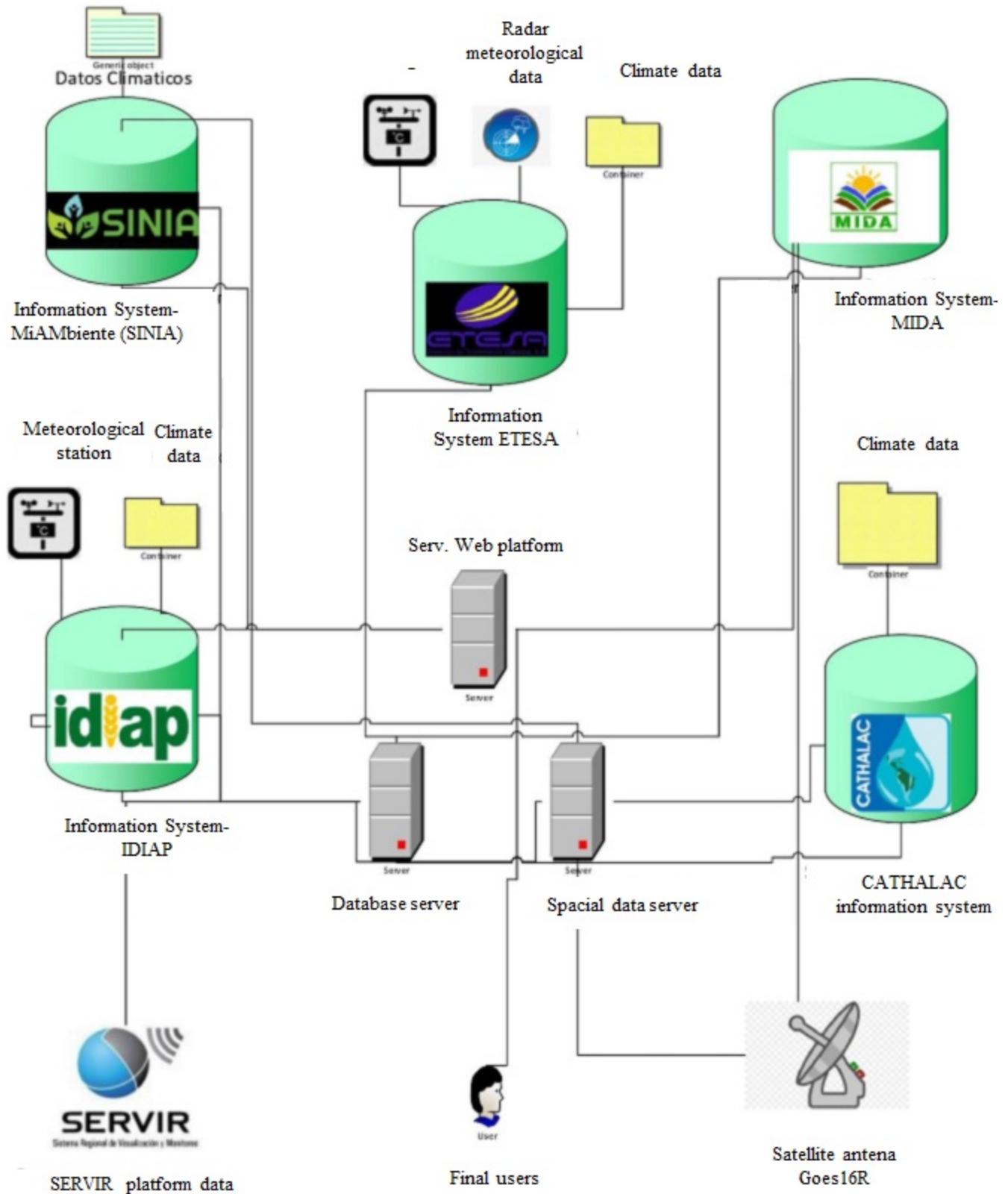
[2] Decree Law 35 of 1996, by which the use of water is regulated.

[3] <http://www.fao.org/3/i6874es/I6874ES.pdf>

[4] <https://www.sumarse.org.pa/>

[5] Smith, Octavio. Consultancy Report "Analysis of Environmental, Agroclimatic and Agricultural Information Systems." CATALAC, Panama, February 2021.

# Agroenvironmental Information System



**Figure 7, Design of the Agro-Environmental Information System of the LDN GEF Project.**

Source: Consultancy "Analysis of Environmental, Agroclimatic and Agricultural Information Systems", CATHALAC.

**1.2 Integration of LDN, SLM and CSA in the land use planning of the selected basins**

This product is aimed at strengthening land use planning processes and community participation, incorporating the LDN planning principle. Preserving or increasing the earth's resource base and its ecosystem services, including water resources, in selected watersheds can only be achieved by making the right decisions about sustainable land management and sustainable water resource management.

In order to influence the decision-making process and expand the adoption of good SLM practices, LDN should be integrated into existing policies and plans on environment, agriculture and rural development. Although it exists in the necessary legal framework (Law 6 of 2006 that establishes the Municipal Territorial Ordinance under the jurisdiction of MIVIOT and the General Environmental Law that promotes the Municipal Environmental Territorial Ordinance Plans), in practice the experiences of territorial ordinance at the municipal and watersheds is marginal due to the limited capacity of municipal management in ordering their territories.

The actions proposed to strengthen the management of land and water use in the selected sub-basins involve: (a) creating capacities in the institutional actors (which are the majority of the members of the basin committees) and representing all the public entities with a presence in that basin (Law 44 of 2002), but also in the private sector, producer organizations and community groups with local leadership such as the Rural Aqueduct Administration Boards (JAAR) responsible for the provision of water for human consumption in their respective communities. (b) Support the development of planning tools and strengthen municipal operational capacities to implement them and create local governance schemes that respond to the needs to improve the use and exploitation of resources.

*1.2.1 Up-to-date river basin planning with LDN approach, proactive drought risk management approach, SLM / CSA guidelines, ecosystem restoration with basin committees, sub-basin committees, promotion of municipal co-management and the participation of other local actors.*

To strengthen the territorial planning processes and local participation in the regulation of land and water use, this product will develop the following actions:

- i) Prepare plans for environmental land use planning with a SLM approach in sub-basins where water use is a critical factor for productive activities or people;
- ii) In the communication strategy, integrate information on the land use regulations of the Environmental Territorial Planning (POTA) of the La Villa river basin and the management plans of the Santa María and Chiriquí Viejo river basins;

- iii) Strengthen inter-institutional coordination of the basin to implement land use planning plans through basin committees that integrate all public entities with a presence in the basin. For them, technical assistance will be required to prepare the issues under discussion at least during the first year of execution;
- iv) In coordination with the Water Security Directorate, support the constitution of sub-basin committees where they have not yet been constituted[1], using as a reference the Manual to create sub-basin committees (Gat? River and Indio River models), and thus facilitate the participation of a greater number of community and civil society actors and thereby balancing non-governmental participation in decision-making in the sub-basins;
- v) Strengthen the participation and leadership of women in decision-making spaces in the basin committees, sub-basin committees to carry out the updating of the hydrographic basin planning according to the LDN, SLM, CSA and GCI approaches. Facilitate the participation of women and young people in knowledge exchanges on watershed planning and management.
- vi) Provide the municipal authorities of the 17 municipalities in the execution area with maps, reports and other planning tools that serve as a guide for granting permits, concessions and licenses within their territory, as well as operational tools (software , computer equipment) to monitor and report annually the regulatory compliance of land use in its territory;
- vii) Monitor annual results to measure the changes achieved with land use planning based on SLM best practices.

*1.2.2 Program to strengthen capacities and exchange experiences programme with basin, sub-basin and municipal committees on integrated basin management, including planning for the LDN, SLM and CSA*

This program will include actions that strengthen the management of the basin committees and subcommittees and the municipalities in the execution areas, such as: (i) training of the 3 basin committees and 9 sub-basin committees in the integrated basin management processes of hydrographic and land use planning; (ii) training of basin committees and subcommittees to prepare biannual operating plans based on the proposals of the basin management plans; (iii) updating of project profiles proposed in the management and land use plans that integrate SLAM, CSA, and GCI techniques and contribute to the LDN goals; (iv) facilitate exchanges of experiences on land use planning between the basin committees of the areas of interest and/or other basins; and (v) strengthen the curriculum with environmental components in the National Agricultural Institutes (both the National Agricultural Institute (INA), directly dependent on MIDA, and the agricultural institutes dependent on the Ministry of Education); and (vi) in coordination with Component 3, a management fund to finance projects derived from the sub-basin action plans.

**1.3 LDN Indicator monitoring system established**

LDN is a framework that operates across many processes, including: ecological, political, administrative, economic, social, and educational. The LDN is included in the SDGs and the CLD is informed in Target 15.3, which uses the ?percentage of degraded land over the total area? as an indicator. This indicator is in turn constructed with 3 indicators: 1.- Land Cover Trend, 2.- Productivity

Trend, 3.- Soil Carbon Stock Trend. This is extremely important to consider when building the LDN monitoring strategy, since the response times of these indicators are highly variable.

These indicators of **Change of State** are only one dimension in the path of LDN impact and, as such, they are a limited vision that is often not sensitive enough, and can take more than 10 years (González-Roglich et al. 2019) capture the efforts made. For example, in the case of restoration of Riparian Forests, when implanting (planting) or changing the use of these areas, they can already be automatically accounted for as profits. This is because the definition of "forests" depends on the use, and although the trees have not yet reached 5 meters, they are considered to have the potential to do so. On the contrary, Productivity and Organic Carbon in the soil, require more time to be reflected. Herein lies the importance of being able to monitor LDN throughout its entire trajectory of impact, where indicators of:

- a) **Process/Response:** Related to strengthening the enabling environment, including legislation, stakeholder capacities and information / monitoring systems.
- b) **Stress Reduction/Change in Pressure:** These are the best management of natural resources, established SLM practices, land use planning and planning activities.

Therefore, the monitoring strategy should include:

- Selection criteria and reference indicators for milestones of 1.- Process/Response; 2.- Stress Reduction/Change in Pressure; and 3.- Change of State, which can be used by the project to demonstrate progress towards LDN during implementation.

- Monitoring of baselines before starting interventions in the territory with a survey of the initial status of indicators that may reflect changes in the life of the project. Generate agreements to revisit measurements and information flow as an exit strategy to ensure measurements after the project life.

- Incorporate tools to estimate indicator values, until there are measured data. For example: use **Ex-Act** to estimate changes in CO<sub>2</sub> Stocks of interventions.

- Use tools to assist project coordination in the comprehensive record of progress. For example, **SLM Progress Calculator** or **TAPE (Tool for Agroecology Performance Evaluation)**.

Although we can assume that between the beginning and the end of the project the reference indicators, especially the SOC, will not undergo significant changes, it will be valuable for the project to perform at least one measurement in the nine sub-basins during its implementation with compatible standardized methodologies to the needs and use of local information that probably needs to be updated such as the 2012 coverage map. This process will generate additional reference information for monitoring LDN in the project area over time and will enhance technical capacities, beyond contributing to the LDN goals with the incorporation of new areas under sustainable management practices. For this it is recommended to use tools such as ExACT, Trends.Earth, Wocat [2].

*1.3.1 National baseline and LDN targets (land productivity, land cover and organic soil carbon concentration) validated and reported through SINIA.*

The baseline of the LDN goals estimated for 2010, showed the following results:

- The changes in forest cover was only 0.2% of the total area. It is presumed that the changes occurred with the increase in the area of pastures and shrubs (0.1%) and agricultural lands (0.1%), however in this new farmland 75.4% maintained their productivity.
- Regarding soil productivity, 14.5% of forest cover and 22% of agricultural land suffered some degree of productivity loss.
- The areas with the highest soil carbon reserves corresponded to the areas that conserve the greatest forest cover (forest lands in the Atlantic region and Darien National Park).
- The areas with the lowest carbon reserves corresponded to the central region of the country that coincides with the basins of the La Villa and Santa María rivers.
- The carbon stock values according to the ecosystem were: wetlands (139.6 ton / ha); croplands (126.4 ton / ha), forests (123 ton / ha) and scrub (115 ton / ha).

To measure the changes in land use reported to SINIA, the project will propose the use of the following tools is proposed:

- (i) vegetation index that allows measuring the normalized difference through a simple graphic indicator that can be used to analyze remote sensing measurements, often from a space platform, to assess whether the target being observed contains live green vegetation or not; and
- (ii) use of the carbon balance tool (EX - ACT) that allows the land accounting of GHG impacts per unit of land expressed in (tCO<sub>2</sub>-e per ha) and also to measure the carbon footprint per unit of land. product.

The use of this tool will help to measure the GHG emissions generated in the agricultural, livestock and forestry subsectors, belonging to the AFOLU sector, and show the changes in soil management and project areas. In order for producer organizations, communities and public officials who will provide



assistance to become involved in the importance of these measurements, students from technical schools will be trained in the use of GPS, drones, information management and the use of georeferencing tools for monitoring (hot spots, coverage, etc.) so that changes are recorded and reported to SINIA.

Also, as part of the co-financing, FAO in collaboration with IDIAP, will be developing during 2021 a map of potential carbon sequestration in the soil (Global Soil Organic Carbon Sequestration Potential Map - GSOCseq)[3]. This initiative will benefit Panama to: (i) identify regions, soil types and production systems that have the highest risk of decline and which have the greatest potential to increase SOC stocks, in order to establish priorities for research and policy implementation public, (ii) formulate policies in the adoption of SLM practices that promote SOC sequestration at the national level; (iii) improve technical capacities in sustainable soil management, soil data management, mapping and digital soil models. In addition, in 2021, FAO's training in the use of the EXACT tool will continue, including officials from MiAmbiente and MIDA. All the information collected and processed will feed and strengthen the SINIA.

Also, to contribute to the LDN baseline, the maps of the soil carbon indicators and change in land use, the contribution of data from permanent carbon monitoring plots could be considered. On the ground, carried out and carried out by MiAMBIENTE (REDD + monitoring and forest and carbon inventory), adjusted with the increase in surface parcels served by the project, especially for the soil carbon indicator. With this action, synergies would be established between both IDIAP and MiAMBIENTE projects.

### *1.3.2 Baseline and LDN targets, SLM and CSA indicators, established and monitored in selected watersheds*

The project must define a Baseline[4] considering LDN goals/country and its contribution at the hydrographic basin level at the beginning of the project, taking as a basis the current information for the degradation indicators already mentioned: i) Land Cover Trend, ii) Trend in Productivity, iii) Trend in soil carbon stock. Fieldwork and the use of tools like *Trends.Earth* and *Wocat* can help refine information at the site level and obtain a more accurate Baseline. In this sense, capacities should be generated/strengthened in the use of these tools. *Trends.Earth* is used for the monitoring and evaluation of land degradation at multiple scales and *Wocat*, in addition to being a flexible methodology for the systematization of practices, is a platform with a database recognized by the UNCCD that enables the exchange of opinions, lessons learned and experiences in the sustainable management of soils and waters worldwide.

For the LDN monitoring system in the selected sub-basins, it is planned to carry out an analysis of the current situation of the pilot areas on site at the beginning of the project and evaluate the changes at the end of its execution, through a zoning of the beneficiary farms, the determination whether or not it is on degraded land, water quality sampling to assess its degradation status and carry out a georeferenced overlap of the territorial plans carried out on the geographic space of the pilot areas.

An evaluation is also planned in conjunction with the inter-institutional support staff with various tools available to support monitoring exercises, which may be applied, such as: (i) GLEAM for livestock

systems; (ii) Application of the IPCC Inventory, to calculate carbon dioxide (CO<sub>2</sub>) emissions from the agricultural, agroforestry, forestry and livestock systems sector; (iii) GPS to generate georeferenced information on the land in terms of delimitation of areas of use, animals, crops, etc .; (iv) ODK (Open Data Kit), which is an open source application that allows digitally, through cell phones, to generate field forms of georeferenced information; (v) Google Maps / Google Earth very accessible and potentially useful for a comprehensive vision of the location of farms and visualization of georeferenced information taken in the field; (vi) QGIS to perform analysis on the ground combining the capabilities of integrating tabular and cartographic information typical of GIS with remote sensing technologies to perform analyzes derived from drones or satellites; (vii) Drones equipped with cameras to evaluate difficult-to-access sites that must be evaluated and that georeferenced images are generated through aerial shots that help the user to optimize their analysis and to integrate with other data related to the study area. A periodic (annual) analysis of the vulnerability of land degradation is also projected, as well as the monitoring of action plans and initiatives that arise between the different institutions that may have a direct or indirect impact on the pilot areas and the development of reports. periodic monitoring (biannual or annual).

**Component 2. Implementation of best practices on sustainable land management, climate-smart agriculture (CSA) and climate-smart livestock in production systems and restoration of productive landscapes with large-scale agroforestry to achieve LDN in selected watersheds.**

Component 2 has the objective of transferring technology and information and developing demonstration actions with producer groups for the adoption of sustainable SLM practices with a CSA/CSL approach that increase productivity, improve producers' income, increase resilience and reduce greenhouse gas emissions. All the proposed actions are incremental and strengthen the actions of MiAmbiente and MIDA already described. These actions are recognized as cost-effective and sustainable over time since they are consistent with the national strategies for addressing LDN, climate change and the National Action Program (PAN) to Fight Drought and Desertification (2015-2025), the adaptation capacity of small producers and the opportunities for available financing instruments and others that with small adjustments may be available to producers (see Component 3).

With the objective of promoting low-emission productive development, the Government of Panama, in coordination with MIDA (Agroclimatic Unit), MiAmbiente (Climate Change Directorate) and ANAGAN, with technical assistance from CATIE, designed a technical file for livestock Low emissions (NAMA Livestock) and a similar one is being prepared for the rice sector (NAMA Arroceros). Additionally, a green financing line was negotiated with the BDA (see Component 3) to finance water harvesting projects, soil conservation, productive restoration of farms with silvopastoral systems and agroforestry[5]. The workshops should be aimed at small and medium-sized producers together with a package of technical and economic assistance, from the generation of new budget items, which is the beneficiary population of the project.

According to the before mentioned, the alternative scenario of component 2 aims to achieve the Core Indicators of the project in terms of amount of restored land (500ha), sustainable management practices introduced in production systems (5000ha), avoided CO<sub>2</sub> emissions (138,068 tCO<sub>2</sub> ) and number of direct beneficiaries (4000). It also seeks to generate other indirect benefits and synergies that allow scaling the impact of the project and its investments. The management scenarios are presented in Table 6 for the selected sub-basins.

**Table 2. Scenarios with and without a project for component 2 and their relationship with the core indicators and national goals.**

<b>Land Use Systems (LUS)</b>			<b>Objectives, impacts and National Target of LDN (table 3)</b>
<b>Without project</b>	<b>With project</b>	<b>Management option with project</b>	
<b>Grasslands: with an incipient decrease and decrease in primary productivity with degradation of soil carbon stocks.</b>	<b>Grasslands: 60% With integrated management of livestock and silvopastoral systems with increased primary productivity and carbon stocks in the soil (Change of category from DPP to Stable or Increased). 100% with management and investment plans ready to implement integrated management practices.</b>	Comprehensive agricultural practices with vegetative, structural and management measures aimed at: improving pastures, increasing tree coverage, conserving the soil, efficient use of water, management and reuse of waste.	Objective: 4,600 ha (4.8% of grasslands)  Core Indicator 4.3: 4,600 ha  -78,734 tCO <sub>2</sub> emissions avoided by better use 32,863 tCO <sub>2</sub> recovered by avoided degradation  LDN Targets: Target 2 and Target 3

<p><b>Conventional Cropping Systems</b></p> <p><b>Rice:</b> Conventional rainfed systems with reduced productivity, highly vulnerable to variability and climate change. With change in land use.</p> <p><b>Corn:</b> Conventional with burning of residues. Tillage on slopes with loss of soil, decreasing productivity. Loss of native varieties and change in land use.</p>	<p><b>Integrated and diversified Production System</b></p> <p>100% with polycultures, agroecological systems, organic agriculture. Increase in primary productivity and carbon stocks in the soil (Change of category from Decreasing Productivity (DPP) to Stable or Increasing). Recovery of native varieties, increase in genetic diversity.</p>	<p><b>Rice:</b> Comprehensive agricultural practices to conserve soil and make efficient use of water. Use of certified seeds. Diversified production and incorporation of agroecological practices to reduce inputs (agrochemicals, seeds)</p> <p><b>Corn:</b> Comprehensive agricultural practices for the reuse of residues, conserve the soil and make efficient use of water. Use of certified seeds. Diversified production and incorporation of agroecological practices to reduce inputs (agrochemicals, seeds)</p>	<p><b>Goals:</b> 200 ha of Rice 200 ha of corn (5.8% and 13.7% of its surfaces)</p> <p>Core Indicator 4.3: 400 ha</p> <p>-8,009 tCO<sub>2</sub>e emissions avoided by better use</p> <p>LDN Targets: Target 3</p>
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<p><b>Coffee:</b> Monoculture with loss of quality and quantity of water. Deterioration of the soil. With incipient decrease and decrease in primary productivity.</p> <p><b>Degradation:</b> Increase in degraded areas in productive landscapes due to loss of soil, changes in vegetation cover and decrease in primary productivity</p>	<p>Environmental restoration and recovery of ecosystem services</p> <p><b>Coffee:</b> Integrated production with mixed-use agroforestry system. Improvement in the capture of GHG and efficiency in the use of water, with reduction of agrochemicals. (Category change from DPP to Stable or Increasing)</p> <p><b>Restoration:</b> Soil restoration and increase of riparian forests. Improvement of the ecosystem services for regulating the hydrological cycle. Increase of carbon in the soil and improvement in primary productivity</p>	<p><b>Coffee:</b> Shade coffee agroforestry practices combined with perennial crops to capture CO<sub>2</sub>, conserve the soil and make efficient use of water. Diversified production and incorporation of agroecological practices to reduce inputs. Management and reuse of waste.</p> <p><b>Restoration:</b> Vegetative and structural agronomic practices to restore areas with degraded soil or vegetation cover aimed at recovering soils and their carbon stock and water capture</p>	<p>objective: 200 ha of coffee (10.9% of the Cafe)</p> <p>300ha of degraded land (0.95% of degraded areas on LPD maps)</p> <p>Core Indicator 3.1: 500 ha</p> <p>-16,386 tCO<sub>2</sub>e emissions avoided by better use</p> <p>LDN Targets: Target 1 and Target 3</p>
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Use data sources: 2012 Land Cover and Use Map for the selected Sub-basins.

Degraded Land data source: LPD Map of Land Productivity Dynamics 2001-2019.

Some assumptions with the change in land use have been made for the compilation of the table above, which includes:

### 1. Grassland systems:

3,500 ha, a 76% of the surface of the pasture systems converted into Climate-Smart Livestock Systems that include the establishment of silvopastoral systems associated with other integral practices such as: rational grazing or rotation of paddocks, agricultural integral production system agro-silvo-pastoral,

introduction of multipurpose trees and shrubs: windbreaks, wood, forage, CO<sub>2</sub> capture, erosion control, shade, etc.

1,100 ha, a 24% of the systems have their producers trained in integrated pasture management and sustainable livestock practices, based on which they have been able to carry out Management Plans and implementation of good SLM practices on their farms.

These activities should also have a focus to prevent the advance of the agricultural frontier by increasing productivity and improving the animal load.

## **2. Diversified and Integrated Production Systems**

100% of the systems adapted with crop rotation, polyculture or diversified production systems (Eg: corn, beans, rice, pigeon peas, beans, cassava). With soil conservation practices and work (contour crops, terraces), agroecology, waste management, increased efficiency of water use and cultivation with organic inputs. Improvement and conservation of local genetic varieties adapted to the climate. Practices to increase resilience and reduce production losses.

**Rice** production impacted with improved management of dryland systems with IDIAP varieties adapted to local conditions and with less requirement of phytosanitary applications and crop monitoring system to reduce unnecessary applications of agrochemicals and fertilizers. Possible systems of melgas and complementary irrigation (which can be natural irrigation in areas of flooding due to river flooding).

**Corn** production incorporates agroecological management and rescue practices for native varieties (sweet corn) to conserve genetic diversity and / or use of IDIAP certified seeds, along with good soil conservation and waste management practices.

## **3. Perennial Systems: Coffee**

100% of the coffee is managed under or between shade trees (multipurpose trees: windbreaks, wood, forage, CO<sub>2</sub> capture and nitrogen fixation, erosion control and improvement of the water cycle, shade, etc.). Diversified production can also be established (such as: parchment coffee (Robusta), musaceae (plantain / banana), citrus, (soursop). 100% of monocultures will be converted into agroforestry systems with the inclusion of pest management techniques, agroecology and incorporation of genetically adapted varieties.

## **4. Restauration:**

100% of the treated surface is impacted with agronomic, vegetative or structural measures to restore areas with degraded soil or vegetation cover. Increased connectivity and restoration of riparian forests (with induced natural regeneration). Living barriers and containment slopes to control drainage and advance of gullies.

**Observations:** Different percentages were used depending on the type of crop, the type of producers (large, medium or small) and the opportunities to make effective changes in their production systems. During the execution phase, the assumptions, management options, and proposed areas will be

validated and defined in greater detail with all stakeholders, indicating that this scheme will continue to be refined during implementation. The table on the next page shows the outline of the expected results without and with the project.

## ***2.1 Innovative practices and technologies for the sustainable management and restoration of degraded lands implemented in productive landscapes***

For the design of the activities of this component, the Strategies, Programmes and Plans of MIDA, MiAmbiente, ANAGAN and the experiences of the SLM project have been taken into account, in order to make coherent and incremental proposals with the livestock development activities and agricultural that are adjusted to the characteristics and socioeconomic demands of the beneficiaries and the areas of execution. The proposed actions are aimed at helping to remove barriers 2 and 4 in the execution areas and achieve effective contributions to the national LDN goals. Both, MIDA and MiAmbiente have previous experiences of good SLM practices, organic agriculture practices, climate-smart agriculture and livestock through institutional initiatives and / or projects with international cooperation [(GEF, WB, USAID, FAO, etc.)[6] that have made the producers aware, lessons learned, application manuals (Producer's Manual (GEF / DS-SLM); 15 Best practices for Sustainable Livestock (USAID / MIDA / ANAGAN)], technical and financial models for the best practices from MIDA and FAO that the project will use as a guiding framework. In addition, the experiences and lessons learned from similar projects in the region have been taken advantage of, such as the RECSOIL Project of Costa Rica, the Climate-Smart Livestock of Ecuador, the Panama project: Forest coverage and vulnerability in selected basins (MiAMBIENTE / PV), etc. The objective is to have the greatest amount of information available for producers to make informed decisions about the best option for their type of crop, technological level, financial capacity and adaptive capacity to their environment.

### ***2.1.1 Investment plans for selected SLM / CSA practices and climate-smart livestock farming on farms, formulated in a participatory manner with producer organizations and cooperatives, with a gender perspective.***

At least 40% of the target area to improve livestock systems will promote constant technical assistance to ensure that the producer makes a real and sustainable adoption of these SLM practices implementation processes. Constant support will be the key to guaranteeing this process, and training to develop farm management and investment plans so that they have this tool to access financing. We will work with producer organizations that can support in an aggregate way the elaboration of individual and / or collective plans for financing. The experience of FAO will be useful[7] to guide the participatory preparation of farm plans using the learning by doing modality (diagnosis, planning phase, implementation phase, and monitoring and evaluation phase). We will work with groups of women (small producers) and family farming so that in at least 30% of the areas where investment plans are drawn up with women's organizations, they can have access to general financing from banks or exclusive financing for women (see Component 3) available in the BDA.

### **Strategy and action plan for the development of investment plans**

The objective of this strategy for product 2.1.1 is to achieve investment plans for the implementation of production systems that include SLM practices. In the local context, many current investment plans are not adapted and may even promote unsustainable practices. Another challenge to achieve at this point is to promote activities and undertakings for the young population and the inclusion of a gender perspective to favor equal access for female producers. For this reason, the grassroots action is to train and empower government institutions, NGOs, community-based organizations and producers in the preparation of investment plans and projects for sustainable development of the land.

The reference indicator for this activity is the: Number of investment plans for specific SLM practices agreed upon in a participatory manner with local actors under an integrated watershed management approach and with a gender perspective.

The activities to achieve these objectives can be summarized in a series of steps that are described below, which are the same for agricultural and livestock activities with the obvious differences for each system:

1. Training of Trainers and the project team in methodologies for the development of investment plans. This mainly includes RuralInvest (<http://www.fao.org/in-action/rural-invest>), and may be complemented with other WOCAT tools (<https://www.wocat.net>) y ROAM (<https://infoflr.org/what-flr/roam>).
2. Identify local actors and producer groups and start the participatory process of carrying out investment plans and parallel to the creation of local capacities in these methodologies.
3. For the design of investment plans with mixed organizations (men and women) consider the strengths of both, as well as the barriers or obstacles that must be overcome for each group. This means that the differentiated requirements of men and women will be identified to carry out the management and conservation practices that must be implemented according to each plan and the redistribution of tasks (productive and household) will be promoted so that women can have time for your participation in these activities. Take into account gender roles for training (schedules, childcare, etc.) that limit the participation of women.
4. Participatory identification of local investment problems and priorities in the selected sub-basins together with producer associations.
5. Identify the SLM practices that best adapt to the local socio-economic and productive context and prioritize them based on costs / benefits / predisposition of the producers (women/men).
6. Development of detailed small and medium-scale investment plans. Ensuring that they promote systems for the capture, storage and rational use of water, reduction of the use of agrochemicals, as well as promoting their proper use, including the correct final disposal of empty containers. The management of MIDA will be essential for this task, as the ruler of the issue of GHG emissions and land degradation and sustainable production with a gender perspective. With the support of MIDA, promote and strengthen women's organizations, especially those with small farms, so that they can present and finance joint investment plans for selected SLM / CSA practices and / or climate-smart livestock to develop on their farms.
7. Participatory validation of the investment plans carried out and adaptation to financial, government, etc. programs. (RTH Corporate and product Program, Labels, Green Stamps, Youth Employment and Training Program, etc.)



8. Analysis and identification of national and international financial institutions for the presentation of investment plans.
9. Presentation of investment plans to the government and financial institutions to leverage resources and benefits

Regarding LDN, this strategy represents a contribution to the goals:

**Goal 4:** By 2020, improve coordination between the different institutions, civil society, unions and promote participatory mechanisms.

**Goal 5:** By 2020, improve the existing legal framework to help strengthen the LDN programme.

*2.1.2 SLM/CSA practices implemented in 3 agroecological systems (including corn, rice, plantain) with fertilizer reduction, small-scale water harvesting systems and efficient irrigation systems for the dry season, etc.) with producer organizations and MIDA.*

Comprehensive agricultural practices with structural and management measures aimed at improving pastures, increasing tree coverage, conserving soil, making efficient use of water, management and reuse of waste, will be implemented in farms of small producers and family agriculture[8]. The project will support the adoption of integrated and diversified production systems. It is expected that 100% of the productive systems adapted with crop rotation, polyculture or diversified production systems (eg: corn, beans, rice, pigeon peas, beans, cassava, plantain, fruit trees, etc.) as detailed in the strategy and action plan.

#### Strategy and Plan of Action for Integrated Agroecological Systems

The objective of this strategy for output 2.1.2 is to promote the transition from conventional rice and corn cultivation systems to diversified, polyculture systems (crop association), including fast-growing and producing fruit trees (papaya, soursop, banana, plantain , etc.). In the current use scenario, these rainfed crops have reduced productivity due to climatic variability and the deterioration of the soils as a result of the type of tillage and agronomic management on inappropriate soils and slopes. If crop stubble is burned, an available forage resource is lost, valuable nutrients are removed and greenhouse gas emissions increase, further exposing bare soil to erosion.

The central axis of the proposal is to incorporate agroecology and conservation agriculture strategies[9] together with soil conservation practices, in order to increase production and water efficiency together with a reduction in degradation and the use of agrochemicals.

The project will support the development of detailed small and medium-scale investment plans that will serve as demonstration models to be replicated in other areas of the selected watersheds and / or other watersheds. Among the practices and strategies identified for the sub-basins are:

- Crop rotation and diversification (Eg: corn, beans, rice, pigeon peas, beans, cassava).
- Polycultures including fast growing fruit species, some tree species.
- Contour crops, terraces, barriers (living, dead, windbreaks), limits and infiltration ditches.
- Agroecology, green manures, waste management, intercropping, repellants.
- Use of genetic varieties adapted to the climate and less use of agrochemicals. rescue and conservation of local genetic diversity (for example, reproduction of native maize seed and native tree species in nurseries).
- Information, extension and training for the adoption of bio-pesticides, organic fertilizers and natural pest control techniques through training as well as through digital extension services.

As for rice, IDIAP has its own certified varieties adapted to the conditions of Panama and require less incorporation of agrochemicals. These varieties are both for mechanized rice as well as paddy rice. In places where water capture can occur, the incorporation of watering by melgas or complementary irrigation for small producers is also promoted. In the case of Corn, the local 'sweet corn' variety is of great interest for the conservation of genetic diversity, as well as for increasing resilience. Other local practices include the "Technologies for sustainable land management on farms in the Parita and Tonos? watersheds - Producer's Manual"

The tools and models associated with Climate Smart Agriculture[10]<sup>10</sup> (CSA) are based on improving the livelihoods of producers while reducing GHG emissions and building resilience and adaptations to climate change. One of the main tools to work on the implementation of the practices is agroecology[11]<sup>11</sup>, which may be incorporated through Field Schools[12]<sup>12</sup> who use the methodology of learning by doing.

Of the 3,455 ha of Rice and the 1,462 of Corn in the sub-basins of the study, this strategy aims to convert 200 ha (5.8%) of Rice and 200 ha (13.7%) of Corn.

This approach strategy has synergistic possibilities with the rice NAMA of Panama, the PAN 2015-2025, and the National Program Reduce Your Footprint Corporate and by products (PNRTH) for water and carbon. Regarding LDN, this strategy represents a contribution to Goal 3: By 2030, increase the productivity of 62,000 hectares of agricultural land and 12,000 hectares of scrubland and grasslands with decreasing productivity and with early stages of deterioration.

### *2.1.3 Silvopastoral systems with sustainable grassland management and climate-smart livestock established in each basin (middle and lower part).*

The Map of the Dynamics of Land Productivity (2001-2019) shows that in the execution areas the grassland systems are the ones that present the greatest loss of soil productivity (see Figure 5), considering a priority to increase the area in livestock to integrate good SLM/CSL practices. The strategy is to transform current systems with integrated livestock management and silvopastoral

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systems as shown in the approach strategy and action plan. In the remaining 40% of the livestock systems of the execution sub-basins, technical assistance will be given to prepare Management and Investment Plans to present to financial entities and producers will be trained to submit financing requests (see Component 3).

### Strategy and action plan for comprehensive livestock system

The objective of this strategy for product 2.1.3 is to generate a transition from conventional livestock systems in grasslands to climate-smart systems that allow reducing GHG emissions, improving soils and avoiding degradation, with an increase in productivity. Productivity in this context is understood as the production of milk or meat per animal per year, according to:

$PL = \frac{Pal}{Vp}$	$PC = \frac{Pac}{Af}$
PL = Dairy productivity (liters/cow/year). Pal = Annual milk production (liter/farm/year) Vp = Number of cows in production (cows/farm/year).	PC = Meat productivity (kg of carcass meat/animal/year). Pac = Annual meat production (kg of carcass meat/farm/year). Af = Number of slaughtered animals (slaughtered animals/farm/year).

Conventional systems are characterized by low productivity with degradation of soil carbon stocks, low hydrological efficiency and limited resilience to climate variability. In some basins such as La Villa and Santa Mar?a, they are also associated with the use of fire, an element of pasture management, thereby losing an available forage resource, eliminating valuable nutrients and increasing greenhouse gas emissions. The burning is generally for the clearing of old, dry and rusty pastures and to create a "green regrowth," which means that grazing opportunities and patterns are not being optimized or planned at the landscape level.

The main action proposal is to convert conventional systems into silvopastoral systems or agrosilvopastoral systems with the aim of increasing livestock yield and, at the same time, carbon stocks in soil and forest mass, as well as efficiency in the use of water. This recovery of ecosystem services will produce many benefits in the basins since it will decrease degradation and increase biodiversity both in-situ and ex-situ. In addition, the increase in productivity is expected to help reduce the need for new or more land for production, thus contributing to the regeneration of the forest and preventing further deforestation. Among the practices and strategies identified for the project's sub-basins, the highlights at this point:

- Holistic management
- Semi-stabling with the use of cut pastures, protein bank and silos (corn) for deferred grazing / improved diet.
- Improvement and integrated management of pastures for recharging soils and reducing the use of fire.
- Rational and/or Rotational grazing.

- Use of multipurpose trees and shrubs: windbreaks, wood, firewood, forage, fruits, CO2 capture, Nitrogen fixation, erosion control, shade, living fences, improvement of the water cycle, etc.

In the context of Climate-Smart Livestock, the focus is not placed on the recommendation of a specific management practice, but rather on the integral production process that includes both the producer and his socio-environmental context and the concept of "learning doing". This strategy therefore has the requirement of being adapted to the local context of implementation and of a monitoring and technical assistance system to provide feedback. For this, similar activities are proposed for the agricultural sector, but applied to the livestock sector, integrating ANAGAN through its provincial chapters of Chiriquí, Veraguas, Herrera and Los Santos. The approach strategy is similar to that of Point 2.1.2 detailed on page 48 of output 2.1.1.

Of the 95,755 ha of grasslands in the project's sub-basins, this strategy aims to address 4,600 ha (4.1%). 100% of this surface will have Management Plans and implementation of best practices, while 3,500 ha (76%) will evolve to silvopastoral systems and a total of 1,100 ha (24%) will incorporate one or some of the proposed SLM practices. This approach strategy has synergistic possibilities with the technical file of the Livestock NAMA, the National Action Program to Combat Desertification and Drought (PAN 2015-2025), the National Low Emissions Strategy for the Livestock Sector, initiatives of the Green Climate Fund (GCF), Carbon RTH and Hydric RTH Programs.

Regarding LDN, this strategy represents a contribution to the following national goals:

**Goal 2:** By 2025 reduce the conversion of 18,000 ha of forests into stubble and shrubs and / or agricultural soils.

**Goal 3:** By 2030, increase the productivity of 62,000 hectares of agricultural land and 12,000 hectares of scrubland and grasslands with decreasing productivity and early stages of deterioration.

It is advisable to establish synergies in the international context with the RECSOIL project in Costa Rica<sup>[13]</sup> and GCI in Ecuador<sup>[14]</sup>, as well as with the Global Soil Alliance, the Environmental Leadership and Training Initiative (ELTI) with its Neotropics Training Program, from the Yale University School of Forestry and Environmental Studies to exchange experiences and work methodologies. At the national level, take advantage of the knowledge and experiences of the Smithsonian Tropical Research Institute (STRI), which has a group dedicated to working on forest species<sup>[15]</sup> to restore different ecosystem services as productive for silvopastoral systems and the soil carbon map being prepared by the National Soil Alliance led by IDIAP with support from FAO and the World Soil Alliance. At the local level, the Faculty of Agricultural Sciences of the University of Panama, based in Chiriquí, has a pasture management program and the IDIAP has a research center where seeds of basic grains and beans are reproduced.

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*2.1.4 Natural and assisted restoration practices of agroforestry with permanent crops (coffee under shade on slopes of upper and middle watersheds) and riparian forest buffers along riverbanks.*

The project will support restoration work that provides improvements in the ecosystem services of regulation of the hydrological cycle, increased carbon in the soil and improvements in primary productivity, through the restoration of soils with coffee agroforestry systems and the recovery of riparian forests. The total goal includes 500 ha, of which, in 200 ha, shaded coffee agroforestry systems will be adopted, specifically in the upper parts of the Chiriqui Viejo river basins (Nacimiento sub-basin of the Chiriqui Viejo river) and Santa María (sub-basin of the Gatú River).

In these sub-basins there are experiences of crop management under this productive system adopted by a considerable number of producers<sup>[16]</sup>. The cultivation of coffee will be combined with multipurpose trees, musaceae (in the first years of cultivation) and fruit trees such as citrus and soursop. In this way, it will contribute to the production of wood, forage, CO<sub>2</sub> capture and nitrogen fixation in the soil, erosion control and improvement of the water cycle, shade, diversifying production (such as: parchment coffee (robusta), musaceae, citrus, soursop) which will help not only to improve the environment of the soil and water, but also to increase the income of producers with alternate crops<sup>[17]</sup>. It is expected that 100% of the monocultures will be converted into agroforestry systems with the inclusion of integrated pest management techniques, agroecology and replacement of varieties with improved plant material. It will work in coordination with MIDA and local producer associations.

In the remaining 300 ha, riparian forest restoration activities and recovery of water recharge micro zones will be carried out. 100% of the affected area will be treated with agronomic, vegetative or structural measures to restore areas with degraded soil or vegetation cover. These actions will increase the connectivity and restoration of riparian forests, including assisted reforestation and with induced natural regeneration, live barriers and containment slopes to control drainage and advance of gullies. Soil restoration actions and basin management plans will be carried out in agreement with the sub-basin committees in order to direct efforts at the most critical sites.

**Strategy and plan of action for the restoration of the productive landscape**

The objective of this strategy is aimed at product 2.1.4 and aimed at coffee in the productive sector and the restoration of degraded areas in various areas. In coffee there is a monoculture with loss of quality and quantity of water, deterioration of the soil and with an incipient decrease and decrease in primary productivity. In this case, an improvement is proposed towards an integrated production with a mixed-use agroforestry system (Improvement in the capture of GHG and efficiency in the use of water, with reduction of agrochemicals). 100% of the coffee will be managed under or between shade trees (multipurpose trees: windbreaks, wood, forage, CO<sub>2</sub> capture and nitrogen fixation, erosion control and improvement of the water cycle, shade, etc.), and production can also be established. diversified (such as: Parchment Coffee (Robusta), Musaceae, Citrus, Soursop). In addition, the inclusion of integrated pest management techniques, agroecology and the incorporation of genetically adapted varieties is

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proposed. The upper and middle sub-basins of Chiriqu? Viejo and the upper sub-basin of Santa Maria present opportunities for the introduction of agroforestry in Caf?.

Other degradation problems identified are associated with the removal of gallery forests in many agricultural enterprises. These forests fulfill an important ecosystem service of regulating the hydrological cycle, improving water quality[18]<sup>18</sup> and in turn are biological corridors that promote biodiversity[19]<sup>19</sup>. Although there is a riverbank protection law, it is rarely enforced and given that they are private lands, the best option is to agree with the producers on restoration as a mechanism to protect their lands and for economic purposes.

Riparian forest restoration practices include agronomic, vegetative, or structural measures to restore areas with degraded soil or vegetation cover. Increased connectivity and restoration of Riparian Forests (With induced natural regeneration), Living barriers and containment slopes to control drainage and advance of gullies. The previously cited work of the Smithsonian also takes relevance here, also that of Boeschoten et al. 2020[20]<sup>20</sup> that explores restoration techniques in fire-prone environments and proposes a method of assisted natural restoration applied in Panama. Although all the sub-basins have lands and aptitude for the recovery of riparian forests, the main ones are Quebrada Piedras, R?o Caisan, R?o Gat?.

The activity plan for this strategy is in the case of coffee, similar to the one proposed for integral agroecological systems. For the other areas:

1. Identify the producers and optimal areas for restoration, take into account the remaining forest patches to generate corridors or larger patches and the types of land degradation processes that are present.
2. Participatory selection of practices and species to be introduced in the different local contexts and depending on the availability of specimen and resources if structural measures are necessary.
3. Agree on a farm-level management plan with producers. This should include the necessary training activities and a schedule for the implementation of specific practices (budget).
4. Implement practices with technical assistance.
5. Monitor Results, Report and share experiences.

Of the 1,828 ha of coffee in the selected sub-basins, a total of 200 ha (10.9%) will be converted to agroforestry systems. While of the 31,513 degraded ha, a total of 300 ha (0.95%) will be restored. Regarding LDN, this strategy represents a contribution to **Goal 1**: By 2030 the forest cover has increased by 26%.

## ***2.2 Strengthening of capacities and information services to support the planning, implementation and monitoring of SLM/CSA/CSL and LDN.***

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The strengthening of capacities will be a constant during the implementation of the project. The capacity of the interested institutions (MiAmbiente, MIDA and IDIAP) will be improved to know/share the experiences that contribute to the LDN goals and will be consolidated at the national level as new areas are integrated with the SLM/CSA approach/CSL This includes building capacities to replicate LDN experiences in the project's pilot areas to other basins in the country, including planning and monitoring SLM practices.

*2.2.1 Program to strengthen capacities in SLM, CSA, CSL and integrated pest management in local institutions and NGOs, cooperatives, community promoters and youth, with a gender focus, adopting a participatory teaching-learning methodology.*

Solid training programs will be developed in the different thematic areas that can guarantee the internalization of capacities and the appropriation of good SLM practices in addition to awakening the concept of LDN in the land users. The trainings should train future trainers to guarantee replications and staging. Specific actions to strengthen capacities will include: (i) collection and dissemination of lessons learned; (ii) organization of workshops / meetings for the presentation and discussion of project results with national, district, and local authorities (basin and sub-basin committees) on the results of the experiences of the changes achieved in the productive systems; (iv) share experiences (exchanges and on-farm demonstrations) between producers; (v) form local technical groups under the figure of field schools, considering gender differences and women priorities; (vi) at least one annual forum with the participation of experts (national and international), technicians, NGOs and CBOs, local communities to show changes and improvements in soil productivity, recovery of water sources, carbon fixation in the soil etc. The experiences of the DS-SLM project documented in the producer's manual Technologies for Sustainable Land Management (2020) in farms of the Parita and Tonos? watersheds, the experiences in similar projects of MIDA and MiAmbiente will be used. and the training programs for farmers promoted by FAO such as the Soil Doctors Program of the Global Soil Alliance. At least 40% of the people trained in the different techniques will be women.

*2.2.2 Innovative digital technological applications (agro-environmental and climate) developed to expand the extension and provide a reliable and timely consultation and information service to producers (eg climate variability, early warning of droughts, advice on pests, etc. ), in partnership with the private sector and research centers*

Innovative mechanisms will be developed (especially mobile applications) that will become digital tools for extension services and direct technical assistance for the producers of the Field Schools that will support the extension to the project beneficiaries. It will take into account adapting the design of new applications with innovative digital technologies to the levels of knowledge and practice by producers, considering it as part of the training processes on their use. With this mechanism, direct beneficiaries (members of basin committees and producers) or not, will be able to have access to a simple and useful information service (technical information on SLM/CSA/CSL production processes, meteorological, environmental, technological, etc. . that is generated with the development of the

project or already existing in the information systems of MIDA and MiAmbiente, IDIAP, etc.) that will guide them on their production processes, among others: (i) maps of the sub-basins with information on coverage, land use, state of degradation, water network, potential for carbon fixation in the soil, etc.; (ii) agroclimatic information, rainfall forecasts, early warnings of droughts, solar radiation and hot spots, etc.; (iii) use and management of fertilizers, natural products to control weeds and pests, organic fertilizers; (iv) good SLM practices; (v) prices and markets, requirements for organic certifications or seals, etc.

Another tool for producers in areas of difficult access and without cell phone service will be the use of the radio. Through MiAmbiente agreements with local radio stations, establish a functional schedule to pass technical bulletins with information on good SLM practices (didactic, simple and with examples) and weather forecasts. As the system is consolidated, include other types of information.

A third group of tools is the use of drones and GPS. For this, an agreement will be formalized with MEDUCA<sup>[21]</sup> and MIDA to consider some agricultural institutes of the sub-basins, including the National Institute of Agriculture located in the Santa María river basin and the main agricultural school in the country to train young people (men and women) in the use of drones for monitoring farms and GPS to georeference the beneficiary farms of the project. In addition, the same training will be given to a group of qualified women. The gender and youth analysis showed that young people and women can be excellent protagonists of this initiative as intermediaries in the transmission of knowledge, which can generate a sense of belonging to their place of origin by feeling useful in this transmission of knowledge. It is hoped that this training will serve to facilitate green employment for these students and women on private farms or other projects.

### **Component 3. Innovative financial mechanisms to promote SLM/CSA/CSL and land restoration and achieve LDN.**

As in several other parts of the world, the COVID19 pandemic exposed the weaknesses of local food systems, but has provided an opportunity to "build back better". For the purposes of this project, innovative instruments are considered existing financial mechanisms whose innovative approach implies financing for the reconstruction and transformation of production systems, making them more efficient, healthy, sustainable and resilient, with a broad adoption of good SLM practices and restoration of degraded lands (see Component 2).

These financial mechanisms can be grouped into two main categories: (i) funds, trusts at the national and / or local level, programs and projects, which contemplate financing (grants and / or loans with interest below commercial interest) for conservation activities, to ecosystems at risk or for productive practices that reduce their degradation (eg, the MiAmbiente Water, Protected Areas and Wildlife Fund; and (ii) soft loans (preferential interest) offered by commercial banks (public and private) to producers for agricultural activities adapted to climate change that may have a lesser impact on hydrographic basins (eg Climate Change Adaptation Program of the Agricultural Development Bank). The diagram

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shows the existence, restrictions and operation of financial systems in the favorable country to expand the implementation of good soil management practices.

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[1] Currently, the committees of the 3 basins and the committees of the sub-basins of the Gat? and Cocob?-Las Guías rivers (Santa María basin), Upper Chiriqu? Viejo (Chiriqu? Viejo basin) and Quebrada Salitre, Quebrada Piedras, Río Quebrada Salitre and river-Quebrada Pes? (La Villa basin) are constituted.

[2] <http://www.fao.org/in-action/epic/ex-act-tool/en/>; <http://trends.earth/docs/en/>;  
<http://www.fao.org/3/a-i3741s.pdf>

[3] <http://www.fao.org/documents/card/en/c/cb0353en/>

[4] LDN Impact Pathway

[5] These tools complement the National Strategy for the Reduction of Emissions derived from actions that stop deforestation and forest degradation.

[6] Sustainable Production Systems and Biodiversity Conservation Project / GEF / BM / MiAMBIENTE (2014-2019); DS-SLM / GEF / MiAMBIENTE Project (2014-2019); Rural Productivity / MIDA / WB Project (2007-2015); Program for Adaptation to Climate Change / MIDA / NATURA (2017-2021); Conservation in the Canal Watershed / USAID (2007-2012); Agricultural Drought Monitoring for basic grains and pastures / MIDA / FAO; to name a few.

[7] *Good practice guide for the management and sustainable use of soils in rural areas*. Participatory construction of the soil diagnosis Design of intervention plans Sustainable soil management practices. FAO, Bogotá-Colombia, 2018.

[8] This is a very fragmented segment of producers with farms that occupy from 0.5 ha to 10 ha. The approach strategy through associations, cooperatives or groups of producers whose members may have farms of different sizes and therefore adopt the techniques that are feasible on their farms .

[9] <http://www.fao.org/conservation-agriculture/>

[10] <http://www.fao.org/climate-smart-agriculture/>

[11] <http://www.fao.org/agroecology/home/es/>

[12] <http://www.fao.org/farmer-field-schools/home/es/>

[13] Design of a RECSOIL Implementation Strategy in Costa Rica. Executive Summary. Vega, E. & Bertsch, F. Project derived from the global agreements on climate change by the FAO Global Soil Alliance.

[14] Project that is developed in Ecuador under the implementation of FAO using tools such as GLEAM to measure the impact of changes in CO2 emissions with Climate-Smart Livestock.

[15] Management guide of 64 native tree species of Panama and the Neo tropics? Jefferson S. Hall and Mark S. Ashtlon. [https://stri-apps.si.edu/docs/publications/pdfs/Web-2018-Guia\\_64-Arboles\\_Nativos-Spanish.pdf](https://stri-apps.si.edu/docs/publications/pdfs/Web-2018-Guia_64-Arboles_Nativos-Spanish.pdf)

[16] The Sustainable Production Systems Project ?SPSCB (2014-2019) MiAmbiente / GEF / BM in partnership with local organizations (APRE, APOSOF) supported the change from traditional coffee systems to agroforestry systems in the upper parts of the Chiriqu? Viejo river basins and the Santa Maria. MIDA (2020) has been developing the recovery of 50 ha with coffee agroforestry in Renacimiento (upper part of the Chiriqu? Viejo basin) in association with APRE (Association of Renacimiento Producers) and another 200 ha in the upper basin of the Santa River Mar?a with 120 local producers.

[17] An additional added value of this practice is agrotourism that reduces impacts to the environment and increases income to the producer. Through the initiative El Circuito del Caf?, which integrates 18 farms located in the districts of Renacimiento, Tierras Altas, Boquete, Gualaca and San Lorenzo, it seeks to expand agroforestry techniques with coffee and generate benefits for some 30,000 people in the production chain and tourist. This initiative is supported by the SPSCB / MiAMBIENTE project, CECOM-RO (Center for Competitiveness of the Western Region) and organizations of local coffee producers. <https://sertv.gob.pa/entregan-deseburgo-para-el-circuito-del-cafe/>.

[18] [http://www.ozcoasts.gov.au/pdf/CRC/57-riparian\\_guidelines.pdf](http://www.ozcoasts.gov.au/pdf/CRC/57-riparian_guidelines.pdf)

[19] <https://www.fs.usda.gov/nac/practices/riparian-forest-buffers.php>

[20] Framework Species Approach Proves Robust in Restoring Forest on Fire Prone Invasive Grass: A Case Study from Panama. <https://doi.org/10.1080/10549811.2020.1746915>

[21] MEDUCA: Chiriqu? Viejo (Manaca Agricultural Institute in Bar?; Santa Mar?a (Jes?s de Nazareno Institute). La Villa (Coronel Segundo Villarreal Institute).

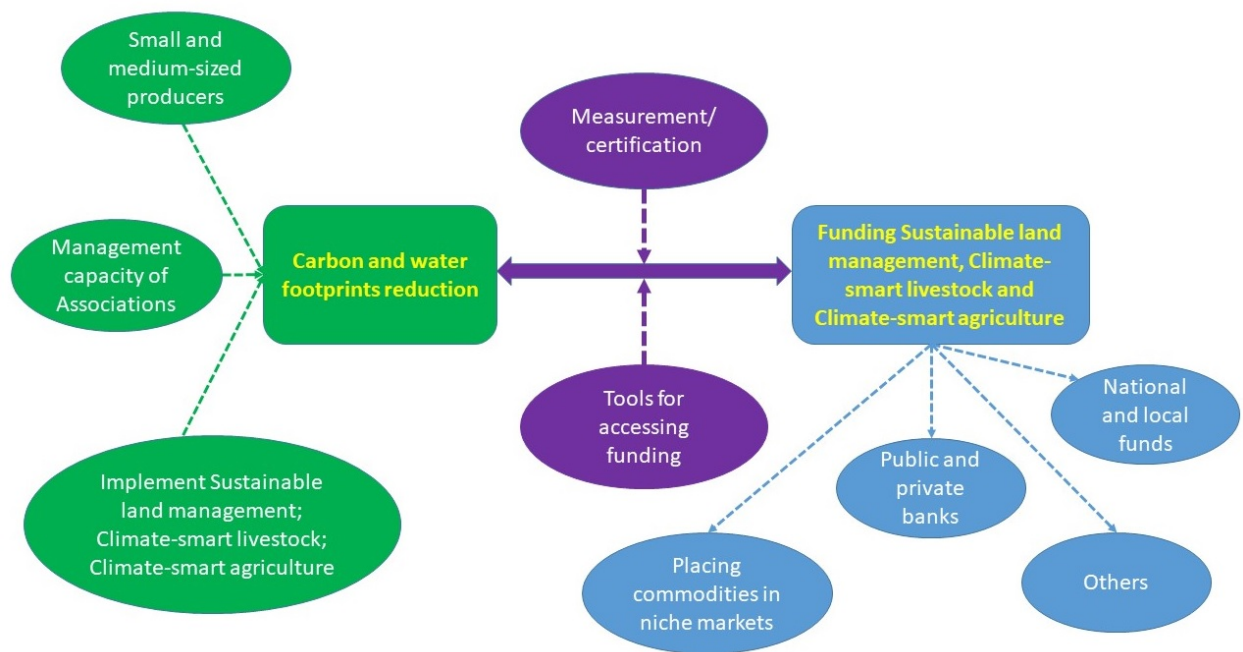


Figure 8, Scheme of the methodological approach of Component 3.  
 Source: Financial and Sustainable Management System consulting report.

**3.1 Financing mechanisms strengthened or established to mobilize resources to support SLM and CSA practices and undertakings in selected watersheds.**

New investment opportunities will be identified with key measures identified to achieve LDN. This will include the pre-identification, formulation and subsequent presentation of proposals for specific SLM projects with a CSA/CSL approach to financial entities, donors (bilateral or multilateral) or emerging financing mechanisms such as the Green Climate Fund (GCF). Some of the financing options in Panama for LDN projects are: Banco de Desarrollo Agropecuario-BDA (*Adaptation to Climate Change Programme and Women Entrepreneur Programme*), National Bank of Panama (BNP), Trust for Water, Protected Areas and Wildlife<sup>[1]</sup>, and private banks (*Global Bank, Credicorp Bank, Multicredit Bank*).

**3.1.1 Proposals for SLM projects with a CSA / GCI approach prepared and presented to financial entities**

MiAmbiente has budgeted 2 projects for 2022-2024, which will have funds allocated for the NDT issues:

1. Implementation of the Land Degradation Assessment and support for the decision on sustainable land management and application of best practices. It is a continuity project, which was the counterpart of DS-SLM, with investment funds for an amount of:

Year	Local Budget (US\$)
2022	1,250,000
2023	750,000
2024	750,000

2. Sustainable land management and restoration of productive landscapes in hydrographic basins for the implementation of the national goals of Land Degradation Neutrality (LDN) in Panama. It will be a new project, for the counterpart of the project with GEF7. You will have funds in the amount of:

Year	Local Budget (US\$)
2022	500,000
2023	750,000
2024	750,000

In addition, Water Security Plan has programmed, a list of projects for the management / protection of hydrographic basins, proposed by MiAmbiente, the following being the ones most closely linked to the project:

-Updating of watershed management plans (including project watersheds) (US \$ 5.0 million)

-watershed conservation projects that include soil and water conservation and strengthening of watershed committees (US \$ 4.5 million)

-modeling (scenarios) for monitoring changes in forest cover in the main basins of the country (US \$ 0.8 million), and,

MIDA proposed agroecological zoning on which they emphasized in the workshops. (US \$ 2.3 million)

In order to bring producers closer to these sources of financing to finance the productive practices under the SLM / CSA / GCI proposed by the project, agreements should be formalized with the public and private banks focused on: (i) defining the productive practices of the SLM / CSA / GCI subject to financing; (ii) define minimum and maximum amounts, interest rates and grace periods, repayment terms and guarantees; (iii) have procedures that are clear and accessible to plaintiffs; (iv) disclose credit

options and requirements in the execution areas, through the Communication Strategy; (v) train producers in the use of simple financial tools such as Rural Invest so that they can present projects to these financing sources; (vi) facilitate the measurement and / or certification of good SLM practices approved by MiAMBIENTE / MIDA; (vii) increase information to women so that they have more access to financial services, such as simplifying processes, providing detailed information that facilitates understanding of access requirements and mechanisms; (vii) bring women closer to innovative financial instruments, such as the portfolio of the BDA Women Entrepreneur program that accepts the registration of land rental as collateral, helping to reduce the gap in access to credit[2] that arises from distribution unequal property titles, which mainly affects rural women; and (viii) strengthen the technical and administrative capacities of women's organizations to implement value-added ventures to products from SLM and from restored systems to access markets and improve profits.[3]

For this output, key elements for investment and challenges about LDN investments from UNDCCD report 'Unlocking the market from land degradation neutrality?' specific to Panama case will be considered. 3 aspects will be part of the analysis for financial proposal on SLM/CSA/CSL: (i) enabling conditions in favour of sustainable land management and land restoration investments (ii) the existing market actors working on initiatives that combat land degradation (iii) the overall key opportunities and gaps in the nascent LDN market.[1]

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[1] Maillard S., Cheung Renee & Bonterra partners. (2016). *Unlocking the market for Land Degradation Neutrality*. September 2020, de Innpact Sitio web: <https://www.innpact.com/uploads/news/files/MIROVASTUDYUnlocking-the-Market-for-LDNEN.pdf>

### 3.1.2 *Financial mechanism for basin committees*

The basin and sub-basin committees were established by Law 44 of 2002 Integrated Watershed Management with the aim of supporting MiAmbiente management for the environmental management of basins, through a local structure made up of representatives of public entities with management in the basin, municipal authorities (mayors and village representatives) and private organizations and civil society. In the project execution basins, 3 basin committees and 13 sub-basin committees are constituted. Although their mandate is broad, they are organizations with financial, information and operational capacity limitations to have the leadership expected in watershed management. With its constitution, work plans are established with limited financing that last a maximum of 2 years. The project seeks to improve CC management conditions through training on issues such as territorial planning, management and environmental management of watersheds, soil conservation, management of water resources, mitigation and resilience, among others; But it also proposes to improve the financial situation with the facilitation of a financial mechanism that promotes or facilitates the systematic generation of projects that counteract the negative impacts on their watersheds (whether by human action or by nature) in such a way as to attract resources financial resources to develop the

necessary mitigation, prevention or restoration actions in their respective basins according to previously agreed action plans.

To this end, the project will support them in: i) Providing technical assistance for the preparation of medium-term Action Plans (3 to 5 years) focused on land use planning, POT design, and basin monitoring mechanisms; ii) train them in the preparation of investment projects with the RuralInvest tool (Component 1); iii) Training in Administrative-Financial processes: establishes the administrative steps for the operational functioning of the mechanism and the bankable actions, supported by the Department of Integrated Management of Watersheds of MiAmbiente; (iv) provide assistance in submitting projects of the Action Plan to the Water, Wildlife and Protected Areas Fund administered by MiAmbiente; iv) support the implementation of the actions proposed in the Action Plan during project execution.

### *3.1.3 Measurement of carbon footprint and water footprint in key commodities in each basin and integration in certification schemes (e.g. National Reduce Your Footprint Program) of products with low water and carbon footprint to facilitate access to certified markets*

The reduction of the carbon and/or water footprint implies a series of concrete actions linked to different environmental aspects. Generating these positive impacts requires a level of effort at the national and local level that involves public / institutional actors, local authorities and the private sector. The type of effort at each level is different, but at all levels financial resources are required to carry out concrete actions that reduce environmental impacts (ie carbon and / or water footprint), which are essentially the expected result of implementation of good SLM practices, with a CSA/CSL approach, proposed in Component 2.

To measure these impacts, it is recommended: (i) identify national or international certifications<sup>[4]</sup> that validate the impact of the implementation of productive practices under SLM/ CSA/CSL in reducing carbon emissions and / or efficient use of water; and (ii) identify / recommend specialized tools to formulate projects of this nature and submit them for approval and obtaining financing.

Currently the country is building its own certification system for the Reduce Your Corporate and Product Footprint program (in preparation by the Directorate of Climate Change/MiAmbiente). To achieve this, certification and / or measurement tools have been recommended for different sizes of producers, emphasizing those tools accessible to small producers who could not afford international certification.

The certification of the reduction of the carbon footprint and the water footprint strategy, is presented in Figure 9. To measure / certify the **Carbon Footprint**, the **ISO 14067** standard is recommended. This standard establishes a series of principles, requirements and guidelines for the quantification of the carbon footprint of products. To measure / certify the **Water Footprint**, the **ISO 14046** standard is recommended. This is the international standard that will specify the principles, requirements and Guide for the evaluation and generation of reports on the water footprint. It applies to products, processes and organizations based on evaluations of their life cycles.

[1] Executive Decree No. 69 of July 11, 2017 establishes its Regulations.

[2] <https://forbescentroamerica.com/2021/02/17/el-invertir-en-la-mujer-es-invertir-en-la-sociedad-reina-mejia>

[3] Moreno, Ana Lucia. Social and Environmental Assessment and Gender Analysis -Gender Plan for the GEF LDN Panama Project. Panama, January 2021

[4] Included GHG Protocol (GEI), ISO 14067, Gold Standard Climate Security & Sustainable Development, VERRA, ISO 14046, Water Footprint Network, etc.

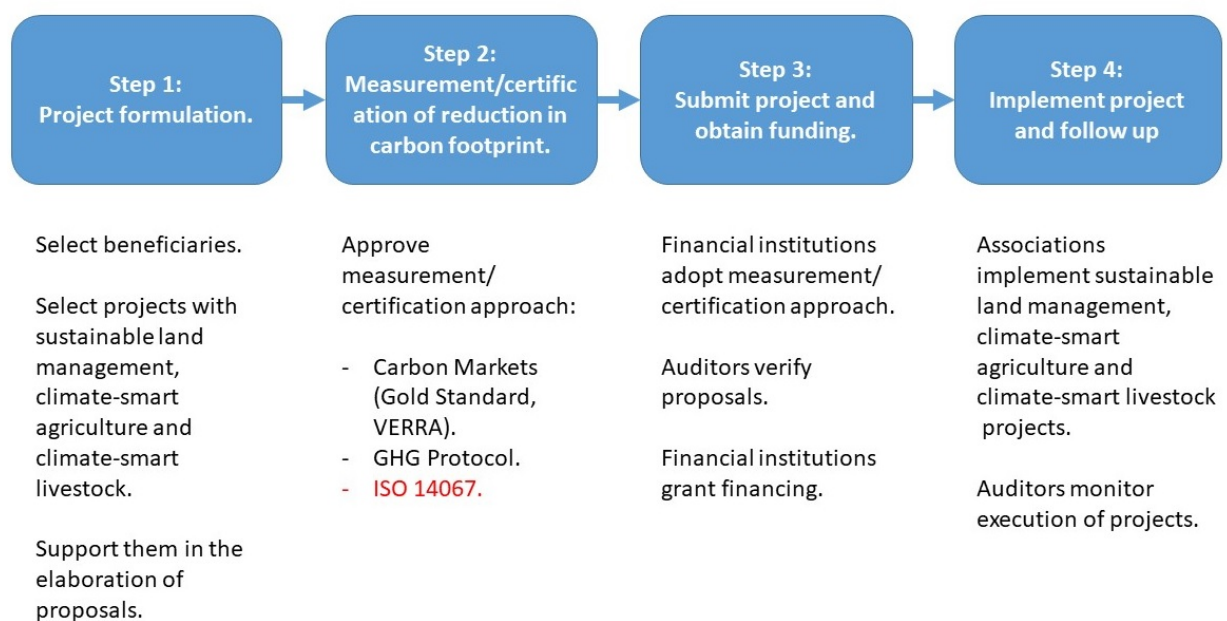


Figure 9: Steps to certify the reduction in carbon footprint and water footprint

Source: Financial and Sustainable Management System consulting report.

To facilitate the process of building Panama's own certification system, the project will support: (i) the development of protocols for applying the carbon footprint for cattle and rice; (ii) facilitate the adoption of an eco-labeling model for the project's prioritized items; (iii) the reproduction and dissemination of the contents of the Reduce Your Corporate and Product Footprint program; (iv) will advise the project beneficiaries so that they can apply to any of the aforementioned standards.

In addition, support to the Climate Change Division of the Ministry of Environment to: (i) define selection criteria for beneficiaries interested in implementing SLM practices; (ii) support them in preparing proposals; (iii) select / define the measurement standard to be applied (this must be done by MiAmbiente / MIDA); (iv) establish agreements with financial entities so that they accept this rule and grant financing; (v) monitor project execution in the field; (vi) do the final measurement to show the changes.

### ***3.2 Strengthening of organizational capacities for access to markets and certification mechanisms for agricultural products from areas with SLM and restored areas.***

The country has developed a sectorial legal framework that promotes investments in activities (productive and / or conservation) that help reduce the environmental impacts of economic activities, including agriculture, through the Reduce Your Footprint (RTH) Corporate and Products program. , approved by DE 100 of October 20, 2020/[1]. This program seeks to establish a standardized process to identify, calculate and report the water and carbon footprints, both in large projects (at the corporate level) and in small projects (at the municipal level and or of productive businesses).

#### *3.2.1 Technical capacities of institutions to adopt carbon footprint and water footprint calculation tools for at least 2 key products strengthened*

To facilitate the process of building Panama's own certification system, the project will support: (i) the development of protocols for applying the carbon footprint for cattle and rice; (ii) facilitate the adoption of an eco-labeling model for the project's prioritized items; (iii) the reproduction and dissemination of the contents of the Reduce Your Corporate and Product Footprint program; (iv) will advise the project beneficiaries so that they can apply to any of the aforementioned standards. In addition, 3 training events have been defined on certification / validation of the carbon footprint according to the protocols of livestock and rice for the sectorial entities involved in this process, especially specialized technical personnel from MIDA, MiAMBIENTE, IDIAP and the Chamber of Commerce, Industrial and Agriculture of Panama.

#### *3.2.2 Associations and cooperatives certified by the Reduce Your Corporate and Product Footprint program (sale of eco-labeled products).*

The project will support the certification of products of associations and cooperatives that have made changes in their production systems, through the hiring of certifying experts in carbon footprint and water footprint, the acquisition of licenses and the necessary equipment to make the corresponding calibrations. It is expected that at least one organization for each basin has been certified in carbon footprint or water footprint and a standardized methodology has been established for the use and evaluation of banks that collaborate with MIDA and MiAMBIENTE with green financing.

The certification of the footprints (carbon and / or water) will allow producers who apply good SLM / CSA / GCI practices to: (i) receive recognition for their management in the basin and actions against climate change; (ii) receive the necessary eco-labeling to access financing for this type of initiative; (iii) improve the environmental and economic quality of life of communities; and (iv) generate information to establish a baseline for reducing the water and / or carbon footprint in the project execution areas.



3.2.3 *Technical and administrative capacities of at least two producer cooperatives or associations (with special emphasis on women's associations) strengthened to implement value-added ventures to products from SLM and restored systems and access markets.*

The tools to promote certified production processes that contribute to LDN goals are factors that should facilitate access to more producers to financing options for sustainable production processes. To facilitate access to credit offers for low CO2 emissions production practices, the project will support: (i) the training of key actors, including youth and women, of the cooperatives and associations selected in the management of RuralInvest to formulate proposals for projects that are presented to financial entities; (ii) provide guidance on affordable and profitable agroecological production models for stakeholders; (iii) guide / inform producers on credit opportunities (including bank policies on loan guarantees), profitability, specific credit lines for women; (iv) will support productive associations in preparing project proposals with SLM, CSA, and GCI practices and will accompany or advise them to present project proposals to financial entities; and (v) will support the Measurement / Certification of the reduction of environmental impacts (carbon and water footprints) to endorse credit applications. The project will also facilitate the logistics process for the training and technical assistance program, which include: (i) establishing procedures for selecting beneficiaries; (ii) make broad calls using the proposed means (radio, written, digital, etc.) of the Communication Strategy to guarantee transparent selection processes for the selection of beneficiaries, including women's producer organizations, and (iii) facilitate market access and generating capacities (adaptation of farms, access to distribution channels, future contracts with specialized markets).

#### **Component 4. Knowledge management, project reports and evaluation.**

The actions of the project are aimed at meeting some of the objectives set by FAO to make agriculture in general, including agroforestry activities, more productive and sustainable, supporting the promotion of inclusive and efficient agricultural and food systems to increase the resilience of livelihoods to disasters, and the GEF to increase the conservation of essential natural resources for human life, and in particular rural life, such as water, soil, forests and biodiversity. Hence the importance of strengthening the knowledge of rural actors, but also, and very importantly, of decision-makers, about the importance of transforming production systems into environmentally critical basins, so that they adopt sustainable production practices and contribute to the increase of capacities to adapt to climate change, both of the productive systems and of the inhabitants of these areas. This component will help develop that knowledge and the tools necessary to disseminate it.

##### ***4.1 Communication Strategy on SLM, CSA, degraded land restoration and LDN developed.***

A main objective of the Communication Strategy is to raise awareness in the media and social networks about the multiple benefits of LDN and to encourage collective action to achieve LDN. The Communication Strategy is a project tool developed by the project to share knowledge and information taking into account the diversity of producers (large, medium, small, micro producers and family farming) in the areas of execution, including the systematization, publication and dissemination of lessons learned and best practices with a gender equality approach.

This strategy, will use different available means to strengthen local knowledge on SLM techniques and LDN goals: (i) printed material: newsletters, report documents, tables, graphs, maps; (ii) virtual / radio dissemination: news capsules, videos, reports, investigations, maps; (iii) various tools: workshops, seminars, courses, oral communication, emails and social networks. Through the establishment of an agri-environmental information system viewed online, information organized or classified by windows will be displayed, taking as a reference the agri-environmental platforms analyzed and the National Environmental Information System (SINIA).

*4.1.1 Communication strategy on the project and on SLM, CSA and LDN based on new technologies and digital tools, developed and implemented for the dissemination and expansion of the process (scaling up).*

The project will design and implement a Communication Strategy to promote the dissemination of quality technical information on climate, LDN, CSA, CSL, SLM practices, early warning, incidence of pests, bio-pesticides, sowing periods, among others, generated by environmental and agroclimatic information systems and agriculture. For this, the project must become an interlocutor and organize dialogue tables with the different actors that generate the related information and others that are linked to the extension (CATHALAC, ETESA, SINAPROC, MIDA, IDIAP, etc.). With all of them, the strengthening and the most appropriate dissemination of information should be sought to reach the producer, in an understandable language, using different information media and contents easy to understand. The Communication Strategy will have the following structure:

[1] The RTH Corporate and Products program has been considered one of the project's tools to certify the reduction of emissions or better water management in the activities promoted by the project and its contribution to the LDN targets.

**Communication Strategy**

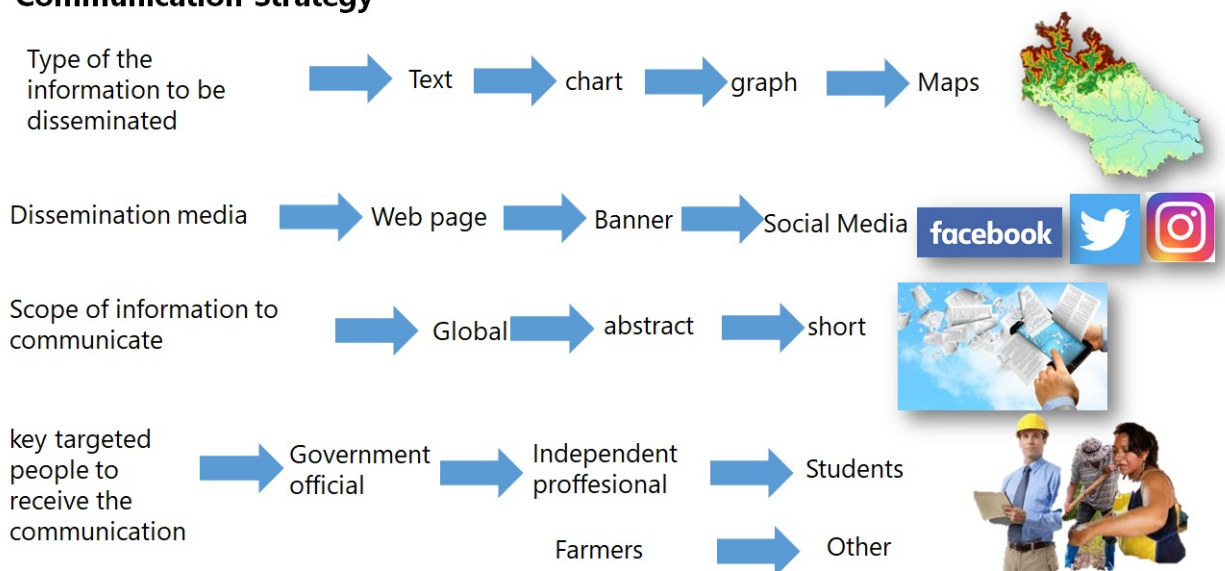


Figure 10, Structure of the Project Communication Strategy  
Source: Analysis of Environmental, Agroclimatic and Agricultural Information Systems,  
CATAHALAC, 2021.

Strategically, the information will be organized through a characterization of the way it will be disclosed as: text, table, graph or map. Regarding the means of dissemination, it is recommended to use the website of the SINIA platform, those of the other institutions involved in the project (MIDA, IDIAP with the recommendations made for the information system), the publication of posters and the networks social media (Facebook, Instagram, Twitter, WhatsApp, among others) and other traditional media such as radio. You also have to define the scope of the information that you want to communicate in: global, summarized and short.

The global information will involve reports, reference documents, maps and all the information content that can be displayed on an agri-environmental platform. The summarized information includes content highlighting the points of interest to communicate and the short information would be short messages of one or 2 paragraphs. What would be sought with the scopes of information is to try that the message reaches the target population with the greatest clarity. This target population can be grouped into: public officials, independent producers, producer organizations, students, businessmen, independent professionals and others.

In the selected basins, with the exception of the La Villa river, the rural population is the majority (71.8% in Chiriqu? Viejo and 53.3% in Santa Mar?a), households without electricity reach up to more than 50% and the only means of communication is Radio. For communities in hard-to-reach places that do not have access to internet technology, and producers who have a low educational level (see the Social Evaluation), the inclusive communication strategy has given a relevant role to radio, using local stations that culturally have a large audience especially in populations related to agriculture. The Communication Strategy will complement the outreach, information and dissemination of training materials (in support of Component 2 activities) using the radio, using local stations that culturally have a large audience, especially in populations related to agriculture. This means of communication will also be useful for the outreach work of the Field Schools. Another highly necessary form of communication is direct communication with the producer within the identified organizations, relying on the Field Schools, community leaders, local authorities and the extension officers who work in the Regional Administrations and Agencies of MiAmbiente and MIDA, located in those areas.

#### *4.1.1 Systematization, publication and dissemination of the lessons learned to support the expansion of LDN at the national level.*

A constant during the implementation of the project will be to systematize the positive and negative experiences that occur with the implementation of project activities that will remain as lessons learned for future projects and / or that are in implementation in the areas of execution or of the co-executing entities. in other areas of the country where they develop projects with similar approaches. The objective is for more people to document the positive experiences of projects focused on the expansion of good SLM practices so that they can replicate them in their areas, and on the contrary, avoid those

that are shown to be negative or did not provide benefits. neither to the beneficiaries nor to the expected changes in the use and improvement of the soil or the use of water. At the end of the project, a report on Lessons Learned will be prepared and disseminated to the beneficiaries and executors of the project. It will include the systematization, publication and dissemination of lessons learned and best practices with a gender equality approach that are relevant to promote the project and encourage the development of similar experiences. This material will be part of the dissemination of information on the Communication Strategy.

The project also plans to generate information (processes, experiences, contributions from beneficiaries, adoption of technologies, etc.) that can be of great benefit to producers and their associations that have not been project beneficiaries through the dissemination tools. of the Communication Strategy, as well as generating important information to display in the information systems of MiAmbiente, MIDA and IDIAP, Municipalities, producer associations, cooperatives, NGOs, CBOs, Agricultural Institutes, etc. To this end, it has been arranged to create a project web page with links to SINIA, MIDA and IDIAP and that is accessible to any user who wishes to know information about the project, about the best practices of SLM / CSA / CSL and the LDN. This project web page will be a useful tool to produce and share information (Component 1), it will be operated and fed from the administrative execution headquarters of the project.

## **4.2 Monitoring, reporting and evaluation of the progress and results of the project**

To verify the progress of the implementation, the limitations or difficulties that may occur, as well as to document the processes and extract the lessons learned, the project will be submitted to semi-annual and annual execution reports, audits, annual and final evaluation.

### *4.2.1 Project progress and achievements monitoring system*

The project monitoring system will report the following events and processes:

- Inception workshop
- Initial report (referring to the inception workshop)
- Monitoring of the baseline and indicators
- Monitoring of project indicators (progress and performance indicators and objective, monitoring tools)
- Incorporate the indicators of the Gender Action Plan in the monitoring system of LDN indicators and final evaluations of the project
- Semi-annual report -APR and annual report -PIR
- Project progress reports and other reports (quarterly)
- Evaluation and monitoring missions
- Meetings of the Steering Committee, Technical Committee and Project Management.
- Final evaluation
- Audits
- Project completion workshop
- Final project report

The project will have two monitoring systems:

Technical and Financial Execution: semi-annual and annual reports on the execution of project activities and their corresponding financial execution, prepared in accordance with GEF standards, which includes the measurement of the progress of the project's indicators and goals, in accordance with the schedule established for execution . It is regularly accompanied by a field report to validate the information reported. It is recommended that the executing team adopt one of the systems established for this type of report; and

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Monitoring and evaluation: It will consist of the registration of information on the progress of the execution for the national co-executors on the progress of the implementation (may be quarterly) of the project, namely: (i) report / memory of the launch workshop (start); (ii) progress reports for each component and progress in performance indicators and the tools used to measure them (reports, field trips, follow-up missions, etc.); (iii) reports of meetings of the project executing team and of coordination meetings with other institutions; (iv) reports of workshops, field visits, and training activities; (v) reports of agreements or collaborations with other projects. Supervisory staff by FAO will support the execution team in establishing a functional mechanism for this type of reporting.

#### **1) Alignment with GEF focal area and/or Impact Program strategies**

The project is aligned with the focal area Land Degradation as the axis of the project, in its specific objectives LD 1-1 " Maintain or improve the flow of agroecosystem services to sustain food production and livelihoods through Sustainable Land Management (SLM) " using SLM best practices with targeted agricultural products such as the recovery of 200 ha of landscapes with shade-grown coffee in the highlands, the recovery of at least 300 ha of riparian forests for the protection of water sources, change in the management of grasslands and pastures with the adoption of climate-smart livestock (CSL) techniques; the adoption of sustainable management of traditional agricultural systems to climate-smart agricultural systems (CSA) in key crops of the country such as rice and corn. Project it is also with LD-2-5 "Create enabling environments to support the expansion and integration of SLM and LDN ".Key action will achieve: embedding the LDN tool into the existing planning frameworks and participatory land-use planning to meaningfully involve local governments, local communities and women; providing the technical assistance required to bring bankable projects to the investment; supporting smallholders through special lending and through extension systems; building capacity at all levels required to restore and maintain functional landscapes; developing monitoring and information systems and targeted research on impacts, trade-offs, costs-benefit analysis of restoration, and identifying incremental synergies.

The project will also generate co benefits in climate change, with the implementation of measures to reduce CO2 emissions generated by livestock activities and rice production in the AFOLU sector, support the scope of changes in land use, using the associated tool "Reduce your water and / or carbon footprint?". In addition, the activities for the protection and conservation of biodiversity that will be carried out by other public and private actors, in the conservation areas located in the basins selected

for the implementation of the project, they will contribute to recovering or maintaining essential ecosystem services that demonstrate the environmental quality of the soil and water.

The project will contribute to support Panama in the achievement of the national land degradation goals (LDN). Between 2015-2019, the country was part of the GEF regional project Support in decision-making for the integration and expansion of Sustainable Land Management (DS-SLM), which included: defining the baselines of degraded lands, trends in degradation and critical areas, information that was converted into updated maps on the state of the country's soil; establish the carbon baseline, and the national LDN targets with a horizon to 2030. In addition, SLM techniques that are included in the Producer Manual were validated in the field, producers were trained in the use of these techniques and young people in innovative methods of farm monitoring. This experience implemented with the DS-SLM project in the Parita and Tonos? river basins, showed the importance and need to expand SLM actions to the rest of the country.

The Project will be supported by a strategy that facilitates the restoration of degraded lands on a broader scale to promote an eco-systemic approach to achieve and monitor multiple SLM benefits, using river basins as the landscape unit. It will also contribute to improving the inter-institutional coordination MiAmbiente, MIDA and IDIAP to promote LDN, and between these institutions, producers and financing entities. It will promote participatory mechanisms; It will facilitate the integration of techniques for the sustainable management of land (soil, water and biological resources) to promote sustainable and resilient food systems that contribute to the prevention, mitigation and halting of degradation processes. Tools with the PNRTM Corporate and Products program will contribute to reconvert traditional systems into low-emission and more resilient production systems. It is expected that the joint actions of the project will create synergies between the objectives of the conventions (UNCED, UNFCCC, UNCCD, UNCCD) and global agreements to support low-emission agricultural production development that provide national and global environmental benefits.

## **2) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing**

This proposal is based on the existing legal and political framework in Panama related to the environment and land use. In addition, the activities of CSA, SLM and GCI will be supported by investment initiatives and technical assistance in the agricultural and natural resource management sectors that already exist in the country and that were specified in the baseline.

The additional GEF resources are intended to complement the efforts of regional projects by improving the status of livestock and basic grain production systems (rice and corn) in the execution areas, and serve as a model to be replicated in other basins.

Under Component 1 of this proposal, the GEF investment will provide support to create an enabling environment for SLM planning and implementation, as a mechanism to contribute to the achievement of LDN goals 4 and 5. To carry out this component, the GEF investment incorporates a number of technical experts, including a land use planning expert, a soil monitoring expert, and a legal expert; Furthermore, with the contribution of the GEF, land use plans will be drawn up in priority sub-basins and an integrated public access agroclimatic information system will be established. Component 1 will contribute to monitoring CO<sub>2</sub> emissions at the farm level and at the national level, information that will

be useful for the soil organic carbon mapping that IDIAP will be carrying out with the support of FAO and the baseline for the system of soil quality monitoring that MiAmbiente will be implementing.

Component 2 will complement the phytosanitary and zoosanitary services that MIDA provides to producers in the execution areas in order to facilitate CSA and GCI practices, such as the integrated management of weeds, diseases and pests with techniques of low environmental impact. The support of the private sector (Asociación Nacional de Ganaderos -ANAGAN) to the adoption of best practices in livestock, contained in the Plan for the Environmental Improvement of Livestock in Panama (NAMA Ganadero) will reduce CO<sub>2</sub> emissions, promote change of land use from traditional livestock to silvopastoral systems, and will improve animal health, complementing the GCI proposals that the Project will develop.

Under Component 2, the GEF investment will support the implementation, on the ground, of MST. To this end, the GEF contribution will cover the expenses of field officers, experts in climate-smart agriculture and livestock, an expert in land use planning for the preparation of farm plans, and a business specialist to advise on the preparation of farm plans. businesses to access credit. This component has also allocated resources for the development of pilot projects in the field that serve as replicable models in other parts of the same basin or basins in other areas of the country. Work will be done with MIDA technical assistance teams, training them in the use of better agricultural and livestock practices so that assistance not only in priority areas, but in the rest of the region where each basin is located will have the same productive approach.

The GEF contribution in Component 3 will help to develop protocols and trainings with producers and the public sector to put into practice the Reduce your Footprint Program (water and products) implemented by the Ministry of the Environment. This Program is part of the country's commitments in Panama's First Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC), approved in March 2021. GEF resources will support the hiring of specialists in Carbon footprint (experts to prepare livestock and rice protocol), Carbon footprint certification measurement and Water footprint certification measurement, development of workshops and training events, as well as the production and reproduction of illustrative material on the subject of reducing the footprint of carbon and water footprint in production processes.

Component 4 will establish an M&E system to measure progress and impacts and disseminate lessons learned. For this purpose, the GEF investment will essentially support the contribution of the M&E and Communication Expert, the development of the Final Evaluation, as well as the exchange visits to the demonstration sites. Likewise, it will support the integration of a gender approach in all activities, complementing the efforts of MIDA and MiAmbiente to integrate the gender issue in the processes of productive land use.

### **3) Global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF)**

The proposed project will contribute to achieving Global Environmental Benefits through the sustainable management of 5,500 ha of productive landscapes in hydrographic basins prioritized by Panama by supporting the implementation in the field of SLM, CSA and CSL practices to contribute to achieving the national goals of LDN. The implementation of these practices includes: (i) the recovery of 500 ha in degraded areas (with the recovery of 200 ha of landscapes with shade-grown coffee in the highlands and the recovery of at least 300 ha of riparian forests for the protection of water sources); (ii) change in the management of grasslands and pastures in 4,600 ha with the adoption of climate-smart livestock (GCI) techniques; (iii) change in the management of 400 ha with the adoption the sustainable management of traditional agricultural systems to climate-smart agricultural systems (CSA) in key

crops of the country such as rice and corn; (iv) the adoption of better SLM, CSA and CSL techniques, including techniques that reduce the use of agrochemicals in key crops, will help avoid the emission of -138,068 tCO<sub>2</sub>e. These actions are necessary to safeguard ecosystems of high importance for the productive management and the conservation of biodiversity of global and regional importance and to avoid the net loss of ecosystem services.

During implementation, agreements will be promoted for the agricultural financial system (public and private banks, cooperatives, producer associations) to integrate productive activities associated with good SLM, CSA and CSL techniques among its lines of credit, so that producers can be direct beneficiaries of the project have access to financial resources to integrate SLM into their production systems. In addition, through the dissemination of information, expanded training, the adoption of the figure of Field Schools and the use of digital technological tools for extension work, a greater number of producers, both in the areas prioritized by the project as well as other items that are produced in the execution areas will contribute to achieving an expanded management of SLM, which is an objective of the project.

A third element that will contribute to the Global Environmental Benefits corresponds to the area of the selected sub-basins with improved land management planning (including the implementation of activities of the basin management plans and environmental land use planning plans developed in a participatory way) that have been proposed under Component 1 Strengthened Governance to achieve LDN goals. The project will implement demonstration activities in 2.5% (5,500 ha) of the total area of the selected sub-basins (219,311 ha). This surface comprises 4.6% (4,600 ha) of the landscapes occupied with traditional livestock (97,755 ha); 11.5% (200 ha) of the 3,455 ha occupied with rice; 13.7% (200 ha) of the total area with corn (1,462 ha); 10.9% (200 ha) of the surface under coffee (1,828 ha) and 0.95% (300 ha) of degraded soils (31,513 ha). The cost effectiveness of these actions (number of beneficiaries and coverage of the demonstration activities) will be verified in the initial phase of project implementation once the pilot areas are selected, and the beneficiaries and the technologies to be adopted. The direct beneficiaries of the demonstration actions of the project will be organized producers (associations, cooperatives, groups) given the multiplier character that is sought to achieve the scaling up of better land use practices in the selected sub-basins.

#### **4) Innovativeness, sustainability, potential for scaling up and capacity development ?**

This proposal was designed to be innovative and have the scaling potential expected to be replicated in other parts of the Chiriquí Viejo, Santa María and La Villa river basins or in other basins of the country. Its objective is to support the introduction of innovative practices in climate-smart agriculture and livestock, agroforestry and forestry as key elements to integrate sustainable land management as an essential part of the productive process of the AFOLU sector. The best practices that are implemented in the selected sub-basins will contribute to the national goals of LDN and will be the model to be replicated in other areas that face similar problems of land degradation and climate change, which will allow the expected scaling in the design phase.



The project, under Output 2.1.2, will implement innovative CSA and CSL practices that involve: the combination and rotation of crops, the optimization of the use of nutrients, the integrated management of weeds, diseases and pests; silvopastoral systems and pasture management with rotation of paddocks, forage banks, reduction of animal stress by incorporating shade in paddocks, recovery of gullies, etc. In addition, the proposal aims to pay attention to the recovery of degraded lands through agroforestry practices of coffee with timber, banana or fruit trees that provide short-term income to the producer, as well as the recovery of protective riparian forests that will become natural spaces essential for river banks and reducing soil erosion.

In Output 2.2.2, the project will implement innovative technologies that increase climate resilience in pilot areas, in a selected number of producer organizations (cooperatives, associations, community groups), including women's organizations, to facilitate adaptation from rural livelihoods to climate change. As a final result, the resilience of producers and their production systems to climate impacts is expected to increase so that the positive experiences generated by the project are replicated in other basins of the country to reinforce the cycle of innovation and replicability. To this end, Result 4.1 will guarantee the dissemination of technical information and lessons learned that will contribute to the multiplication and expansion of results, innovative approaches and achievements through a Communication Strategy that will be supported by various media (digital, written, radio and communication) accessible to different audiences and places. Result 4.1.2 will strengthen the capacity to generate and disseminate information so that the national information systems of MiAmbiente (SINIA), MIDA and IDIAP provide information of different levels and formats (reports, surveys, maps, plans, etc. ) accessible to officials, producers, entrepreneurs, students, professionals and anyone interested in this information.

The finalization of the project will leave a mechanism that guarantees the sustainability of the structures and programs supported by the project, which result in a greater adoption (on a large scale) of SLM practices and the contribution to the LDN goals in the country. The project should internalize its support programs in the regular work of municipal governments and basin committees as envisaged in Result 1.1. By implementing the components, the project will take advantage of synergies with other government, donor and NGO initiatives in the field to maximize its impact on the SLM at the watershed level and its contribution to LDN goals. During the preparation, collaborative links were established with other projects such as those indicated in Point 3. At the end of the project there will be an established mechanism for the sustainability of the structures and programs that receive assistance from the project and that result in the large-scale adoption of SLM practices beyond the selected watersheds and sub-watersheds. Some products that can contribute to the above are:

- ? Events for the exchange of experiences between local actors (producers, municipal staff, technicians, NGOs) of the selected hydrographic basins and others at the country level. A minimum of 3 events during the life of the project should take place.
- ? Replication and scaling up of the best SLM practices (validated with a set of compliance and sustainability indicators) through a process of awareness and dissemination of the findings in the selected basins and others at the country level. This will support the replication of projects and the dissemination of information outside the selected sub-basins as well as the integration of best practices,

methodologies and procedures in the work programs of the different institutions and organizations that implement programs and projects in hydrographic basins.

? Adoption and integration of best practices and a set of compliance and sustainability indicators in the PAN to Combat Desertification and in public policies for the development of the different river basins at the country level and the contribution to the LDN goals.

The exit strategy is supported by key elements such as:

? Develop an adequate communication strategy based on two pillars: i) the scope and dissemination of technical information for the land user: meteorological, hydrogeological, agrometeorological information, risk management based on the different platforms and servers described in the component 4); ii) the visibility and dissemination of project results for the large-scale adoption of SLM practices. One part of this work should be aimed at rural schools and colleges, another at potential replicators of best practices, that is, rural producers.

? Develop solid training programs in the different thematic areas that can guarantee the internalization of capacities and the appropriation of good SLM practices in addition to awakening the concept of LDN in the land users. The trainings should train future trainers to guarantee replications and staging.

? Existing extension mechanisms should be strengthened, that is, training aimed at those who are currently working in the field, providing technical assistance. The project must have a list of entities and technicians that work on the subject susceptible to being trained. Innovative mechanisms can be developed (such as mobile applications) that can contribute to remote technical assistance (eg: a base map with the location of plant or animal individuals related to a small database with the history). Young people can be excellent protagonists of this initiative as intermediaries in the transmission of knowledge, which can generate a sense of belonging to their place of origin by feeling useful in that transmission of knowledge.

The project should seek mechanisms that guarantee the replicability and large-scale adoption of SLM practices. An adequate strategy to face this process is essential. At the institutional level, a key point in the exit strategy is the strengthening of the SINIA in the windows of climate change, basins and water resources, and in parallel, the decided support for the draft of the Soils Law. Ways must be found to feed this process with relevant information. Ensuring that the reach of all that information will reach the land user will have made a big step forward in sustainability.

## **5) Summary of changes in alignment with the project design with the original PIF**

During the preparation of the project, extensive consultations were made on issues that could not be sufficiently investigated in the preparation of the PIF and others that were analyzed to simplify the implementation of the project. That led to some changes between the PIF and the ProDoc that improve the final design of the project.

**Table 3. Changes in alignment with the PIF Design**

Reference	Originally in PIF	Proposed for Project Design	Justification
<p><b>Component 1: Strengthened governance to achieve the implementation of LDN goals.</b></p>	<p>Output 1.1.2 Strengthened inter-institutional coordination and agri-environmental strategy developed to improve decision-making for SLM and CSA planning at the national level.</p>	<p><b>Eliminated</b></p>	<p>The project will strengthen coordination on LDN and SLM and enhance the planning and ordering processes of land use and create capacities among actors and authorities at the local and regional levels.</p> <p>At the national level, there is legally a supranational water governance structure (National Water Council) with a mandate and actions defined in the National Water Security Plan 2015-2050. The project will maintain close coordination to disseminate information generated by CONAGUA on water use regulations in the selected basins and share information related to water management at the local, regional level.</p>
<p><b>Component 3. Innovative financial mechanisms to promote SLM, CSA, CSL and land restoration, and achieve LDN.</b></p>	<p>Outcome 3.1. The product "Established financial mechanisms (Basin Funds for Basin Committees" is added)</p>	<p><b>Incorporated in Component 3 under Output 3.1.2</b></p>	<p>This product was added to strengthen the watershed committees' capacities to finance activities in their action plans and watershed management plans. The objective is to create a more significant response capacity and decision-making to regulate land and water use in their respective territories since municipal and local governments are part of the basin committees.</p>

<p><b>Component 4. Monitoring system for SLM and LDN indicators, knowledge management, evaluation and project reporting</b></p>	<p>Outcome 4.1 LDN indicator monitoring system established.</p> <p><i>Indicator: # of LDN goal reports</i></p>	<p><b>Moved to Component 1 as Outcome 1.3, Outputs 1.3.1 and 1.3.2</b></p>	<p>It was considered that Outcome 4.1 Established LDN Indicator Monitoring System is necessary to show changes that contribute to LDN goals. With this objective, Outcome 4.1 was integrated into Component 1 as Outcome 1.3 and its respective outputs.</p> <p>Component 4 modifies its content and name, remaining as follows. Component 4. Knowledge management, and project monitoring. The related resources will be transferred from Outcome 4.1 to Component 1.</p>
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**1b. Project Map and Coordinates**

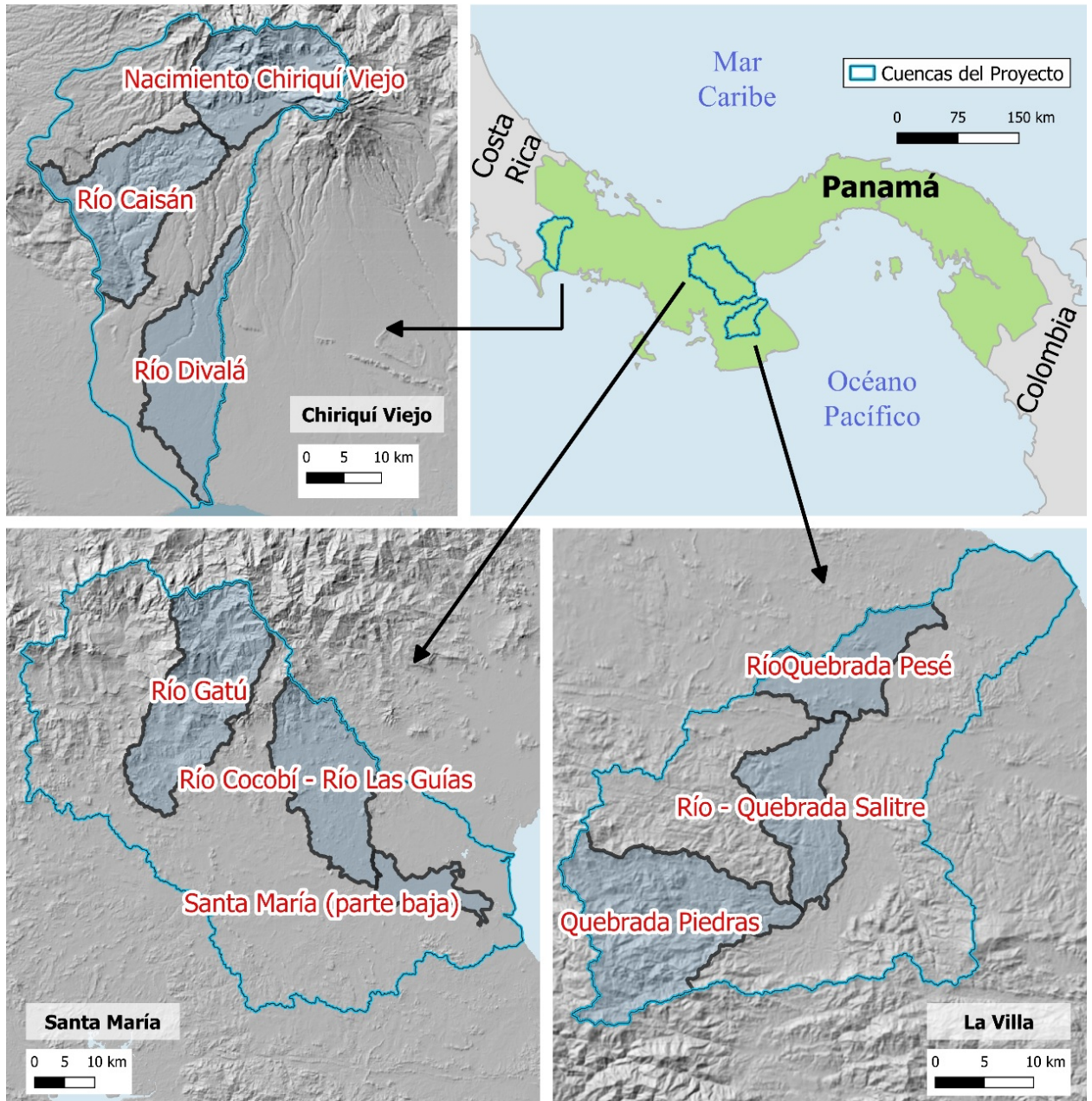
Please provide geo-referenced information and map where the project interventions will take place.

# 1.b Project Map and Geo-Coordinates

The execution area has been described in detail in Point 1.a: Description of the Project. It comprises 9 sub-basins (one for each upper, middle and lower part) of the hydrographic basins of the Chiriqu? Viejo, Santa Mar?a and La Villa rivers, located between the coordinates -82.94805,8.93687 and -80.33891,7.52704 (NO ? SE, WGS84 ? EPSG:4326). Geo-coordinates of each basin are as follows:

- Chiriqu? Viejo: -82.94805,8.93687 y -82.53367,8.80498 (NO ? SE, WGS84 ? EPSG:4326)
- ? Santa Mar?a: -81.27072,8.63706 y -80.47037,7.92960 (NO ? SE, WGS84 ? EPSG:4326)
- ? La Villa: -80.83235,8.01770 y -80.34621,7.54656 (NO ? SE, WGS84 ? EPSG:4326)

Figure 6 below shows the specific execution sub-basins and their geo-coordinates in relation to their location on the map of the Republic of Panama



All the layers of cartographic information made for the selection of the execution areas can be found in this link:

<https://drive.google.com/drive/folders/1HrRQCTVlplYyuYyHLwBkgTrZwNaej81I?usp=sharing>

As well as the link of a file that contains only the sub-basins of the project execution area, which can be viewed and downloaded in its individual link:

<https://drive.google.com/file/d/1IeKlmUI4bXErI5C4Bv5RdqSFu9dGzgqt/view?usp=sharing>

## 1c. Child Project?

**If this is a child project under a program, describe how the components contribute to the overall program impact.**

n/a

## 2. Stakeholders

**Select the stakeholders that have participated in consultations during the project identification phase:**

**Civil Society Organizations** Yes

**Indigenous Peoples and Local Communities**

**Private Sector Entities**

**If none of the above, please explain why:**

During the preparation, multiple public actors were consulted, from river basin committees, producer organizations and women's groups, which although most of them were virtual, a very wide audience was achieved. The specialists who prepared the studies for each component made direct consultations with producers, women's groups, producer organizations, field officials and managers of the entities involved. In the case of the international experts, they were accompanied by national specialists, including personnel from the Water Security Directorate who accompanied the entire preparation of Component 2, which is the axis of the execution in the field.

### ***Stakeholder engagement plan***

The project will ensure strong stakeholder participation during its execution. Outcome 1.1 sustains that the implementation of LDN will require multi-stakeholder participation and cross-sector planning, a process that will be facilitated by the basin committees. In addition, the project safeguards establish measures to avoid adverse effects on vulnerable groups due to Project activities.

Outcome 2.1 involves the participation of stakeholders in decision-making to integrate the good practices of SLM, CSA and climate-smart livestock practices in the field (Outputs 2.1.1, 2.1.2, 2.1.3 and 2.1.4 ) highlighting the need to promote a multi-stakeholder process that identifies the needs and opportunities related to the rehabilitation of agricultural and livestock lands and the participatory formulation of land use planning instruments with producer organizations, cooperatives, technicians and specialists of MIDA and MiAmbiente incorporating the gender approach.

The participatory process will also be an essential part of Component 3, including banks and the private sector (producer companies) to measure the carbon footprint and the water footprint of key products in each of the selected basins (Output 3.1.3), as well as integrating certification schemes for companies or producers that have reduced their carbon footprint to facilitate their access to carbon markets and national banks (Product 3.1.1).

The decision-making mechanism of the project is reflected in Section 6. Institutional Arrangement and Coordination. The Project Steering Committee is integrated by representatives of the Government and FAO; In addition, a Technical Committee with broad participation of all interested parties, including the private sector and NGO representatives, has been proposed to discuss the technical aspects of the annual operating plans and the progress of the project's execution.

A preliminary stakeholder engagement plan is detailed below, which will be further discussed and updated at the start of the project.

**Table 5. Preliminary stakeholders engagement plan**

Event	Participants	Execution period	Objective
Dissemination Activities	Basin committees	Previous to inception workshop	Dissemination of information of the project
Inception workshop	Asociations, producers organizations, women organizations, cooperative, basin committees, government professionals of MiAmbiente, MIDA, IDIAP, BDA, CATHALAC, CONAGUA, etc.	3 month after the first disbursement	Define and validate methodologies to be used during Project implementation, M&E and evaluation. Confirm institutional roles of project stakeholders. Define local and national focal points for project implementation. Define a participatory consultation and complain mechanism for project beneficiaries.
SLM annual forum	Asociations, producers organizations, women organizations, cooperative, basin committees, government professionals of MiAmbiente, MIDA, IDIAP, BDA, CATHALAC, CONAGUA and other entities, agricultural and livestock institutes students	Antes de finalizar cada año de ejecución del project  Before the end/ year of Project execution	Share experiences, advances and knowledge about SLM, CSA and CSL and their contribution to LDN  This forum also help to identify weaknesses to be strengthened and increase the effectiveness of the Project. It will be a public forum.
Final workshop	Co executing partners, technical officials from MiAmbiente, MIDA, IDIAP, CONAGUA, Farmer's organizations, cooperatives, women's associations, students benefiting from the project, community leaders, NGOs, etc.	3 months before Project closure	Disseminate the Project Results and discuss the lesson learned for future projects. Share success stories with and within beneficiary organizations and the other stakeholders in the national livestock sector, etc., which will be inputs for the project closure report.
Event to share the results of the final evaluation.	Officials from MiAmbiente, MIDA, CATHALAC, FAO, IDIAP	At the end of the financial execution of the project.	Share the results of the final evaluation, consult with co-executing partners and identify weaknesses and strengths at the institutional and operational level (local and national. Share experiences.
Publication of the final evaluation	MiAmbiente, FAO	After the end of the project	Public disclosure The final evaluation, approved by FAO, will be published on FAO and MiAmbiente Disclosure Portal.

**Please provide the Stakeholder Engagement Plan or equivalent assessment.**

In accordance with the GEF Policy on Stakeholder Engagement[1], a Social Evaluation analyzed the participation of different actors (institutional, civil society, private sector, producers and producers) in the implementation of the project, both directly and indirectly, and the specific role is detailed in the Project Participation Plan, described in the following Table. Annex I2 presents the template with the requirements of the Stakeholder Engagement Plan.

[1] [http://www.thegef.org/sites/default/files/documents/Stakeholder\\_Engagement\\_Guidelines.pdf](http://www.thegef.org/sites/default/files/documents/Stakeholder_Engagement_Guidelines.pdf)

**Table 7. Stakeholder Engagement Plan**

<b>PARTICIPATION PLAN OF THE MAIN STAKEHOLDERS OF THE PROJECT</b>	
<b>Stakeholders with direct participation</b>	<b>Role in the project</b>
<b>International</b>	
FAO	FAO has extensive experience of collaboration with public entities linked to the agricultural and environmental sectors, including support for policy reforms in both sectors. FAO is also the organization that leads to the issue of SLM at the regional level. The Regional Headquarters for Latin America and the Caribbean is located in Panama, favouring the exchange of knowledge between various professionals and subject areas linked to the project's attention areas. FAO will be the GEF agency and will be responsible for the supervision, technical support, and technical and financial supervision of the project's execution.
CATHALAC (Water Centre for the Humid Tropics of Latin America and the Caribbean. Panama)	CATHALAC has a long history of working with MiAmbiente on issues related to basins, climate change, modelling and analysis and risk management and information systems for Panama and Latin America. For 24 years, it has been the leading organization in water resources for the entire Latin American region. It focuses on applied research, education and technology transfer, backed by a robust state-of-the-art computer infrastructure that allows hosting and managing critical environmental databases of disasters and agroclimatic (SERVIR / NASA, DESINVENTAR, EOS). He has developed significant research in Panama on CC and water resources, including areas of execution. The Ministry of the Environment has selected CATHALAC to co-execution project activities through the coordination, management and administration of financial resources, contracting, supervision, M&E, the LDN, and project monitoring system and the strategy Communication.



Tropical Agricultural Research and Teaching Center (CATIE)	CATIE is an international organization focused on developing sustainable and inclusive human well-being in Latin America and the Caribbean, promoting education, research and assistance for the sustainable management of agriculture and the conservation of natural resources. The project will take advantage of multiple CATIE professionals' work experience and technical capacity (in Panama and at the headquarters in Costa Rica) on issues of sustainable agricultural development, agroforestry, water resource management, and sustainable forest management.
<b>National</b>	
Ministry of Environment (MiAmbiente)	MiAmbiente will exercise Project Management as the highest authority in the environmental sector; therefore, it is the GEF's political and operational focal point and focal point for the UNFCCC, UNCCD CBD conventions in Panama and the implementation of the National LDN Strategy. It is the governing body of the environmental sector and the one responsible for the management, administration and use of water resources and hydrographic basins, including the constitution, training, supervision and advice of the Basin Committees / Subcommittees. It is responsible by Law (Law 44 of 1998 General of the Environment and Law 25 of 2015 created by the Ministry of the Environment) to establish and supervise compliance with the norms related to climate change, desertification, national goals of LDN, environmental regulation of the use of the land at the national, provincial, district and county levels and to present national communications regarding Panama's contributions on the reduction of GHG emissions before the UNFCCC. MiAmbiente has technical staff specialized in soil management, watershed management, climate change, among others, at the Ministry's Headquarters (Panama) as well as in Regional Offices and Local Agencies in each of the provinces (Chiriquí, Herrera, Coclé, Los Santos and Veraguas), where execution areas are located.

<p>Ministry of Agricultural Development (MIDA)</p>	<p>MIDA is the governing body of the agricultural sector. It will be co-executor of extension activities, training, and information provision in coordination with MiAmbiente and IDIAP. It is responsible for product development and the entity that regulates, manages, plans, provides technical assistance, extension and training to micro, small and medium producers. Its management is aligned with SDGs 1 (poverty alleviation), 2 (elimination of hunger), 5 (gender equality), 12 (responsible production and consumption), 13 (climate action), 15 (protection of the ecosystems) under the objectives of MiAmbiente. MIDA has technical personnel specialized in the techniques of SLM-CSA-GCI proposed by the project. It has specialized personnel in the Central Headquarters (Veraguas), the Regional Offices in all the provinces of the selected basins, and 17 Extension Agencies and Sub-Agencies in the execution areas. The MIDA will be co-executor of applying the techniques of SLM-CSA-CSL, supervision, monitoring, training of field schools and provider of information for the in-person and digital extension system that the project will develop.</p>
<p>Institute of Agricultural Innovation of Panama (IDIAP)</p>	<p>Represents Panama in the Global Soil Alliance (GSP) and is responsible for research to generate, adapt, validate and disseminate knowledge and agricultural technologies. It has developed the most extensive soil information base in the country. It is building the National Soil System that will include maps, analyzes and databases of the soils of Panama. For more than 40 years, the Institute has conducted research to produce certified seeds of rice, corn, sorghum, beans, etc., adapted to Panama's agro-ecological and climatic conditions. The producing sector uses 70% of the certified rice seed and 50% of the IDIAP corn seed adapted to Panama's conditions and climate. It is a benchmark for research and production of high-value plant genetic material. IDIAP will be a collaborator in the project's execution on the adaptation of the proposed techniques (SLM-CSA-CSL) and the information on producers' use on soils and means of transformation.</p>
<p>Agricultural Development Bank (BDA)</p>	<p>BDA is a state bank that provides financing for agricultural development programs and agro-industrial projects, giving priority to small and medium producers. It operates various credit lines and programs, including two of interest to the project: i) Climate Change Adaptation Program for projects integrating CSA, CSL and soil management practices; and ii) Entrepreneur Women initiatives by financing agricultural, agro-industrial and aquaculture projects for rural women. In managing this project, the bank will seek agreements to support the preparation of investment plans to request credits to finance good SLM practices that the project will promote.</p>

<p>NATURA Foundation</p>	<p>It is an environmental NGO responsible for managing various ecological funds in the country and executing social and community projects. Natura is a partner of MiAmbiente in the administration of the trusts of the Dari?n and Chagres National Parks and in implementing the program Adaptation to climate change through the integrated management of water resources in Panama / MiAmbiente-MIDA, which includes adaptation actions and resilience to CC. Natura will collaborate with MiAmbiente to execute the project activities related to the design of protocols, training, dissemination, evaluation and certification proposed in the RHT Corporate and product program for water and carbon measurement.</p>
<p>National Association of Cattle Ranchers (ANAGAN)</p>	<p>ANAGAN associates more than 20,000 producers of bovine livestock throughout the country, through Chapters by province, including the selected basins' regions. It supports its members with training, information and technology transfer. In coordination with MiAmbiente and the Tropical Agricultural Research and Teaching Center (CATIE), developed the technical sheet used to prepare the Plan for the Environmental Improvement of Livestock in Panama (NAMA Livestock). This plan focuses on sustainable and productive development through low CO2 emissions and through sound practices of bovine livestock, consistent with CSL practices that the Project will develop. It will be a partner in the execution of activities in the field.</p>
<p><b>REGIONAL / LOCAL</b></p>	
<p>Local governments (mayors and municipal councils)</p>	<p>Municipal governments constitute the highest authority in the execution areas, with autonomy and authority to approve norms that govern their territory. There are 13 municipal governments with a total or partial incidence in the execution areas, whose mayors rotate the basin committees' presidency and constitute the basis of the local organization to support the implementation of the basin management plans and legally approve the Plans. Municipal Environmental Territorial Regulation (POTA). Their role in the project's execution is to enforce in their territories the regulations established for land use and those that developed during the implementation of the project in their respective regions; in the same way, strengthen the governance of water and soil at the local level.</p>

<p>Basin and sub-basin committees</p>	<p>The basin committees are under protection by the Integrated Watershed Management Law (Law 44 of 2002). They are regional multisectoral organizations that respond to the environmental, social and economic management needs of the corresponding geographic basin; They are co representatives of the public, private and civil society sectors with a presence in the basins. The Regional Director of MiAmbiente will act as president, and when more than one Regional Director has participation in the Committee, the position will rotate annually. The Mayor will serve as secretary, and in case more than one municipality participates in the Committee, the part will rotate annually. The basin committees will be the body for the review and validation of the legal reforms proposed by the project to strengthen water governance in the respective basins and validate and approve the instruments for territorial environmental ordering developed with the project. It will work with the committees and subcommittees in the areas of execution. To integrate a better representation of producer organizations, environmentalists, NGOs and CBOs, it is proposed to incorporate working commissions to the basin committees.</p>
<p>Associations, cooperatives and producers organizations</p>	<p>There are about 50 legally constituted producer organizations (associations, cooperatives and producer groups) conformed by producers of various sizes (large, medium and small) in the execution areas. These organizations are integrated into the market and family farming groups (organic, agro-ecological, agroforestry, agro-industrialization, conservation/management of forests, cattle ranching and minor species, etc.), which will be the beneficiaries of the project in training, technical assistance, advice, use of technologies, extension and digital information. They will be direct beneficiaries of the pilot projects to implement the best practices of SLM, CSA and CSL on their farms. Also, producers from the organizations will receive training to form Field Schools.</p>
<p>Producer associations, cooperatives and organizations (gender)</p>	<p>In the sub-basins of execution, 29 women's organizations of various types work in coordination with the Rural Women Program of MIDA. They will be implementers in technological innovations on SLM, CSA and CSL, training them in drones, GPS and digital technology transfer platforms through their participation in Field Schools. They will also be beneficiaries of training, technical assistance and financing that the project will provide to implement the best practices.</p>

Ministry of Education (MEDUCA)	In knowledge management, the training of young people (men and women) in using ICTs, GIS, drones, etc., is foreseen to monitor the changes generated by good SLM techniques and digital information and extension services. Following the DS-SLM project (GEF 2015-2019), young people from MEDUCA's Agricultural Technical Institutes (IPT) will receive training in applying these techniques through collaboration agreements between MiAmbiente and MEDUCA. With this action, human capital development will be increased to support the LDN GEF project, and employment opportunities for these young people may be generated with other projects or with the private sector.
Ministry of Social Development (MIDES)	In 2019, MIDES and FAO agreed on the Field Schools program within the MIDES Program for Social Cohesion and Productive Inclusion framework. The project will use the figure of Field Schools to reinforce the transfer of information and techniques from SLM-CSA-CSL, creating human and social capital and strengthening men, women, and youth's productive management capacity. The structure established between FAO-MIDES will designate at least one Field School in each execution sub-basin.
<b>Indirect Collaboration Organizations</b>	<b>Roles in Project Areas</b>
<u>International Organizations</u> (WB, GCF, CAF)	<p>Multilateral financing organizations that currently finance and/or will finance projects with similar approaches with the Ministries of Environment and Agricultural Development in the selected basins and other areas of the country, namely:</p> <p><u>WB/IBRD</u>: Credit operation with Panama for USD300 million that includes financing to improve the agricultural sector and food security, job creation and competitiveness, support the implementation of the Family Farming Law (MIDA 2020) and the RHT Corporate and product program (MiAmbiente 2020) to create the system for monitoring, reporting and evaluating the emissions registry, among others.</p> <p><u>GCF</u>: in preparation, a loan operation for USD160 million with MiAmbiente / FAO for the financing of climate resilience projects in 5 basins related to each other located in the central-western region of the country: basin 108 (Chiriqu? river),), basin 110 (between Chiriqu? and Fonseca rivers), 112 basin (between Fonseca and Tabasar? rivers), 114 basin (Tabasar? river), 118 basins (San Pablo river) and 132 basins (Santa Mar?a). The latter is also the project's execution area. These basins form a continuous space between the Chiriqu? Viejo and Santa Mar?a basins, increasing the opportunities to achieve permanent changes that will contribute to the goals of the LDN. <u>CAF (Development Bank of Latin America)</u>: in 2020, the GEF9589 / CAF03 Project's implementation for the development of sustainable livestock in the Darien region will begin under the implementation of the CAF and the execution of ANCON (National Association for the Conservation of Nature).</p>

<u>National financial bodies</u> BNP, NGOs, Cooperatives, Global Bank, Capital Bank, etc. Chamber of Commerce, Industries and Agriculture of Panama Western Region Competitiveness Center (CECOMRO)	These are providers of financial services, technical assistance and assistance in CSR plans (SUMARSE) to support the recovery of degraded areas through environmental compensation as proposed in Component 1. They will be an additional complement to assistance services, training and financing offered by the project to achieve the essential adoption of good SLM practices.
<u>Social organizations</u> Panamanian Network of Rural Women (REPAMUR)	National organization of women organized with provincial and community-based representations. They support training activities and community organization for women.
<u>Producers organizations</u> (Other associations, cooperatives and organizations of other areas in the project regions)	They will benefit indirectly from environmental improvements at SLM, CSA and CSL. The information can be downloaded from the digital platforms that will strengthen the project that will be carried out in the selected sub-basins.
<u>Enterprises/commodities (private sector)</u> Existing in the project area related to the project items	As part of the value chain, they will benefit indirectly from the progress and results of the project, mainly by increases in productivity and quality of production with the possibility of environmental seals.
<u>Other local organizations</u> Rural Aqueduct Administration Boards (JAAR)	They are responsible for the administration and management of rural aqueducts, conserve water intakes, and support reforestation efforts in water recharge areas. Strengthening water governance will strengthen their capacities to manage and conserve water sources.

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement

Stakeholder Name	Stakeholder Type	Stakeholder profile	Consultation Methodology	Consultation Findings	Date	Comments
Asociations/ Cooperative of farmers	<b>Direct beneficiary</b>	Local community	Virtual meetings, electronic survey	<i>There are at least 50 legally constituted producer organizations in the execution areas</i>	<i>October-December 2020</i>	Selection of associations / cooperatives to implement model projects
Organizations of women farmers	<b>Direct beneficiary</b>	Local community	Virtual meetings, electronic survey	<i>29 women's organizations were identified in the execution areas</i>	<i>November-December 2020</i>	Selection of women's groups for training, field schools, use of technologies, etc.

Livestock National Asociation (ANAGAN)	<b>Partner</b>	Civil Society Organization	Participation in meetings and direct meetings	<i>Groups 20,000 farmers nationwide</i>	<i>December 2020-February 2021</i>	ANAGAN has a structure of Groups (Chapters) of farmers in all areas of execution
Ministry of Agriculture (MIDA)	<b>Partner</b>	National Government Institution	Direct meetings, Workshop and meetings LFM Workshops, inception and final workshops.	<i>MIDA has 4 Regional Offices and 17 Extension Agencies in the areas of execution</i>	<i>November-2019 - February 2021</i>	It is a key partner of MiAmbiente in assistance and extension services to producers
Institute of Agricultural Innovation of Panama (IDIAP)	<b>Partner</b>	National Government Institution	Direct Meetings, Workshops and meetings, LFM Workshops, inception and final workshops.	<i>IDIAP has a Soil Laboratory of the country, base and is preparing with FAO a carbon map in the soil of Panama</i>	<i>November-2019 - February 2021</i>	It will support with a database on soil information; seed certification, research and information to the producer
Watershed committees	<b>Direct beneficiary</b>	Civil Society Organization	Direct meetings, electronic survey, LFM workshops and final workshop	<i>There are 3 basin committees and 13 sub-basin committees in the execution areas</i>	<i>November-2019 - February 2021</i>	Will be trained in watershed management, OT and watershed planning
Banking sector (BDA, BNP)	<b>Other</b>	National Government Institution	Interview in consultancy of Component 3.	<i>offer financing to agricultural producers</i>	<i>December 2020</i>	Investment plans preparation with the beneficiaries to request loans
NATURA Foundation, SUMARSE, CCIAP, etc.	<b>Other</b>	Non Governmental Organization	Virtual meetings	<i>Work experiences with CC issues and environmental management and CSR</i>	<i>January ? February 2021</i>	Potential co-executors of activities
MIDES, MEDUCA	<b>Other</b>	National Government Institution	Previous agreements	<i>Agreements with MiAmbiente, MIDA y FAO</i>	<i>Review of Agreements</i>	They will support field schools and training of young people

Select what role civil society will play in the project:

**Consulted only;**

**Member of Advisory Body; Contractor;**

**Co-financier;** Yes

**Member of project steering committee or equivalent decision-making body;**

**Executor or co-executor;**

**Other (Please explain)** Yes

In 2019, the Ministry of Social Development (MIDES) and FAO signed an agreement to expand the Field Schools program to strengthen social cohesion and productive inclusion. The project will create and/or support Field Schools in execution to create social and human capital. The lessons learned from the DS-SLM GEF project (2015-2019) showed the value and importance of this figure as a multiplying factor to expand the knowledge of producers in the management of SLM / CSA / CSL techniques. The plan is that at least 3 Field Schools are established and/or strengthened in the execution sub-basins, considering mixed groups of producers to guarantee effective gender participation. The personnel that was trained in the Field Schools will be able to support project activities (dissemination of information, extension, monitoring, etc.) and other projects with similar approaches during and after the execution of the LDN GEF project.

### **3. Gender Equality and Women's Empowerment**

**Provide the gender analysis or equivalent socio-economic assesment.**

The GEF and FAO recognize gender equality as a fundamental strategy to guarantee human rights, reduce rural poverty, improve the living conditions of the population and generate benefits for the environment. The project will benefit from the *Regional Gender Strategy 2019-2023* and the *Rural Women Women with Rights communication campaign* of the FAO Sub-Regional Office for Mesoamerica, and the experience of its staff, whose objective is to close gender gaps in the Mesoamerican region, especially in the rural world, to improve women's opportunities for food security, strengthen family agriculture, improve the sustainable use of natural resources, and increase response capacity to climate change. At the national level, it will be supported by the *Rural Women Program* (MIDA), which focuses on providing assistance to rural women's organizations with a presence in the areas of execution, and it is expected that during implementation the *Gender and Biodiversity Plan* (MiAmbiente), whose objective is to develop a gender seal for all activities in the rural world, including activities for the sustainable management and conservation of natural resources.



The project's Gender Action Plan defined activities and made recommendations to strengthen the gender role in the project, which have been integrated into the different components and institutional management for their implementation. It is based on the Analysis and action plan of gender and youth developed during the design stage, which includes a diagnostic about gender contexts into the project area of interventions, gender roles into productive activities, women time-use, education level and service access such as credits, technical assistance, associativity, decision making, participation and interest in conservation and sustainable land use activities. According to this analysis, women represent 30% of the heads of families in the project area and in agricultural producers. A quarter of the people who contribute their labor to agricultural activities are women. This, together with their interest in actively getting involved in initiatives for the conservation and sustainable use of land and natural resources, makes them an important part of the project's target population.[1]

Lack of recognition of the contribution of women to the activities carried out in the field, the burden of domestic tasks and care without support from the State or their families, as well as the limited institutional response oriented towards women in their capacity as producers and environmental and climate managers, interfere with their performance, productivity and participation in conservation and sustainable management activities of natural resources. This implies deliberately orienting the project services towards women to achieve the objectives of MST, NDT and CSA, considering the congruence between the national interest in gender equality within the framework of the MST and other natural resources and the development of policies, institutional strategies and capacities required to address this relationship. Also, young population also represents great potential for their involvement in initiatives for the conservation and sustainable use of land and natural resources, due to their interest, training and predisposition to change and innovation. Experiences that have been developed in the country demonstrate this. Their involvement in these initiatives can act as a brake on the migration of rural youth to urban areas or to activities other than those that are directly related to the MST.[2]

The objective is to integrate women throughout the execution and capacity building process. Project staff, as well as national counterparts, will receive gender awareness training at the start of the project. Throughout the project cycle, the FAO Guidelines for a Gender-Based Approach and Human Rights for Technical Officers will be taken into account, adjusted to the context of the project and the implementation team. A constant during execution will be the equitable participation of gender in all project activities, including the process of selecting pilot farms to apply the proposed SLM techniques, consultations with producers, training and evaluations carried out during the life of the project. All data reported by the project execution team will be broken down by age and gender (men, women and youth). Gender considerations and participatory approaches will be a constant in the execution of all activities.

The project will also be supported by the *Public Policy of Equal Opportunities for Women (PPIOM)* of the National Institute of Women (INAMU) focused on achieving full equality of opportunities between men and women, including the participation of women in conservation, environmental protection, use and access to natural resources, and the benefits generated by sustainable development, necessary to improve the quality of life of the population with equality and gender equity. The activities proposed in the project constitute the operational framework for the effective participation of women and youth with a gender perspective in the LDN approach,[3] helping to enhance and make visible the role of women in the agricultural sector's productive processes.

The project will be executed following the human rights-based approach, whereby all rights holders and duty bearers will be duly identified and appropriately involved in the project. This approach implies considering all human rights conventions, with particular reference to article 14 on the rights of rural women of the *Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW)*.

During the implementation, the project will make extended consultations on the beneficiaries' perception concerning the soil's state (or the crops) without and with the project. And in the final evaluation, surveys/interviews assessment will be made of the changes that have occurred in relation to the LDN. The project will make use of simple consultation tools (surveys/interviews/field visits) to find out the beneficiaries' views on land degradation and changes in LDN, with a preference on land occupied by women to also learn about their experience in the management of crops with the techniques proposed by the project and their perception of the changes taking place. The purpose will be to assist in the efficient use of natural resources as a means of sustenance by analyzing the interactions between LDN and the beneficiary population's income. The expected is that this constant evaluation-feedback process to the groups of beneficiaries and beneficiaries will serve to make the necessary adjustments in technical assistance, training, advisory services, and supervision of project implementation. The project will also integrate actions to strengthen the capacities and organizations of women and youth. One of the most exciting aspects of the project is to enable computer and technological tools in the groups of women and young people to monitor activities and disseminate information. This particular aspect will make it easier for women and youth to be members of the field schools that will be created to facilitate the dissemination of information and techniques for sustainable land management proposed in the project. Likewise, the support on knowledge management for women will lead them to play a more proactive role in local organizations to which they belong (cooperatives, associations, groups, administrative boards of rural aqueducts) and, above all, to have greater participation in the subcommittees of hydrographic basins in execution areas.

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[1] Moreno, Ana Lucia. Social and Environmental Assessment and Gender Analysis -Gender Plan for the GEF LDN Panama Project. Panama, January 2021

[2] Moreno, Ana Lucia. Social and Environmental Assessment and Gender Analysis -Gender Plan for the GEF LDN Panama Project. Panama, January 2021

[3] The lessons learned from the GEF DS-LSM project (2015-2019) showed that with clear guidelines, adequate technical assistance and participatory processes, the participation of women and youth in the project was successful (MiAmbiente, 2020).

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**Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?**

Yes

**Closing gender gaps in access to and control over natural resources; Yes**

**Improving women's participation and decision making Yes**

**Generating socio-economic benefits or services or women Yes**

**Does the project's results framework or logical framework include gender-sensitive indicators?**

Yes

#### **4. Private sector engagement**

**Elaborate on the private sector's engagement in the project, if any.**

The project will work with products organized in cooperatives, associations and producer organizations (men and female) with legal status and operate as private companies. It is planned to work with producers who within these groups have:

- Farms with a size not greater than 50 ha in livestock activity considering that between 65% and 85% of the farms their average size is less than 20 ha.
- Farms of up to 15 in agricultural activity.
- Farms smaller than 5 ha that qualify in the category of family farming.

Some of the Farmer's associations are: Cooperativa de Productores Campesinos Unidos Quebrada el Ciprian (productores de porotos), Asociaci3n de Productores de Leche de Santa Mar3a, Organizaci3n Campesina Mujer Rural Santa Rita de Casia (productores de ma3z), Asociaci3n de Mujeres Rurales Emanuel (Asoc. de Productores Agropecuarios Unidos del Potrero), Asociaci3n Chitrana de Productores, Exportadores y Comercializadores de Caf3 y Otros Rogelio Rodr3guez, Asociaci3n de Productores Agropecuarios Agroforestal La Puente, Asociaci3n de Productores Org3nicos del Distrito de Santa Fe (APOSOF), APRE (Asociaci3n de Productores de Renacimiento) (productores de caf3), GORACE (Grupo Org3nico de Productores Cerropunte3os) (hortalizas) APCE (Asociaci3n de Productores y Cultivos Exportables), etc.

A second group of private actors correspond to producer cooperatives that operate with administrative, operational and managerial systems of private management, with the benefit that many cooperatives finance the activities of their members, an important factor to expand the adoption of SLM practices more beyond project financing. Some of the cooperatives are: COPREN, R.L. (Cooperativa de Productores de Renacimiento (productores de caf3)), CACSA, R.L. (Cooperativa de Servicios M3ltiples y Financieros, San Antonio R.L.), COOLECHE (Cooperativa de Lecheros, R.L.), Cooperativa Suelo F3rtil, S.A., Cooperativa de Productores Campesinos Unidos Quebrada el Ciprian (productores de porotos), Cooperativa S/M Uni3n Agr3cola, R.L. (productores y comercializaci3n de ma3z), etc.

A third group of private actors represented by financial institutions such as public bank (Banco de Desarrollo Agropecuario, Banco Nacional) and private banks (Global Bank, Credicoorp Bank, Multicredit Bank). The project will support the preparation of farm plans (Component 2, Output 2.1.3) converting them into bankable businesses through the technical assistance of specialists in strategic

planning and financial experts (Component 3, Output 3.1.1) to Increase the number of producers who adopt the SLM, CSA and CSL practices that the project will develop as pilots experiences.

#### 5. Risks to Achieving Project Objectives

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

### Section A: Project Risks

Risk Description	Impact[1]	Probability of occurrences	Mitigation actions	Responsible party
The technical assistance organization in the field by geographic units is separate from the key institutions (MIDA and MiAmbiente). For example, MIDA works at the level of regions (provinces) and MiAmbiente at the basins level, which can include several areas. The risk is that not all MIDA Regional Directorates have the same commitment and operational capacity to execute field activities, especially extension work.	Moderate	Low	To reduce this risk, an extension strategy has been designed. It will include: <ol style="list-style-type: none"> <li>1. Defining clear responsibilities regarding the scope, methods, and target population of extension activities.</li> <li>2. Share among the institutions the contents of the practices that will be developed in each area.</li> <li>3. Complement outreach activities with the Field Schools.</li> <li>4. Create a platform or downloadable App on cell phones or another digital tool for the remote extension to producers.</li> </ol>	MiAmbiente / Regional Directorates / Agencies MIDA / Regional Directions / Extension Agencies CATHALAC
The need for focus and approaches to LDN indicators and goals to be internalized and shared at the technical, managerial level between MiAmbiente and MIDA	Low	Low	The project will mitigate this risk under Component 1, strengthening the intersectoral coordination mechanism to improve cooperation on LDN. The inter-institutional commitment around LDN will also be strengthened, with an ad hoc Technical Committee made up of various entities to make decisions on technical issues relevant to the project's implementation. The normative and programmatic framework related to land use and water use planning processes will be improved.	MIAMBIENTE MIDA ANAGAN BDA CCIAP CATHALAC NATURA

<p>Basin committees' weak capacity to guide the ordering of land and water use in their respective basins.</p>	<p>High</p>	<p>Moderate</p>	<p>The project expects to mitigate this risk by strengthening technical and operational capacities and increasing the knowledge of the members of the basin committees in land use planning, water balances, meteorological and climate information, etc.</p> <p>Also, the feasibility of creating financial resource funds will be analyzed so that the basin committees can implement their action plans and management plans of their respective ones.</p>	<p>MiAmbiente CATHALAC FAO</p>
<p>The weak indebtedness capacity of small producers and family farmers to implement the practices proposed in the project.</p>	<p>High</p>	<p>Moderate</p>	<p>The Social Evaluation and the Gender Analysis showed the low debt capacity of small producers and producers due to a lack of guarantees to guarantee loans, ignorance of the procedures to submit credit applications, lack of investment plans and very low profitability enterprises.</p> <p>To mitigate this risk, the project will support these producers with the preparation of investment plans, training, guidance to present financing requests, investment in demonstration activities that can be replicated in other areas or by other producer groups.</p> <p>Also, during the project's implementation, the feasibility of creating revolving funds administered by the producer organizations themselves to co-finance their associates will be analyzed and thus ensure that a more significant number of producers can apply the techniques that the project will promote.</p>	<p>MiAmbiente MIDA Banco Nacional BDA Global Bank Capital Bank Cooperatives</p>

Effects of the COVID-19 pandemic	Moderate	Moderate	<p>The Project preparation stage was affected by mobility restrictions that Panama put into effect in 2020 and until the first quarter of 2021 to avoid COVID-19 infections. The main effect was to carry out the activities of consultation and discussion of topics virtually, but they were largely participatory. Another mitigation mechanism was the inclusion of joint teams of a foreign specialist with national specialist to develop project component to guarantee strengthen national capacity, guaranteeing also, country vision in all the proposals.</p> <p>Another effect was the reduction of funds for project stakeholders in 2020, due to the need to address the health crisis. Nevertheless, this did not affect the project in 2020, due to stakeholders funds were not required during project formulation phase.</p> <p>To prevent the risk of not having cofinancing funds at the beginning of the project, MiAmbiente programmed in the national budget US \$ 500,000 for the first year. It is not expected significant budget cutting backs in stakeholder cofinancing funds for COVID-19, since the country has initiated an aggressive vaccination program to prevent new outbreaks and maintains alerts of possible sources of contagion, including a biosecurity plan for the visitor entry to the country. In the future, if some other confinement take place at national level, it will be possible to consider to combine virtual workshops and trainings, in order to avoid project delays due to pandemic issues.</p>	Ministry of Health MiAmbiente MIDA IDIAP
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The project could provide possible opportunities to improve the resilience of the beneficiaries against possible future pandemics, by creating conditions of resilience of people and their crops with the use of better productive practices and the conservation and protection of water sources in the execution areas. These actions are carried out by the Ministry of the Environment through the Directorate of Climate Change, one of the project's stakeholders.

Indigenous people or indigenous territories were not identified in the project intervention area.

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[1] H: High; M: Moderate; L: Low.

## 6. Institutional Arrangement and Coordination

### **Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.**

The institutional arrangements for implementing the project will contribute directly to Goal 4 of LDN "By 2020, improve coordination between the different institutions, civil society, unions and promote participatory mechanisms", including measure 4.1. Encourage collaboration between all departments and units of the Ministry of the Environment to create operational synergies to enhance the various initiatives' results and measure 4.2. Improve cooperation between ministries to develop joint strategies to generate synergies that allow meeting the goals.

For the implementation of the project, the following structures have been defined:

- **Project Director:** The Ministry of the Environment will exercise the project management through the Soil Conservation Department of the Water Safety Directorate. It will maintain close coordination with the Directorate of Climate Change, MIDA and IDIAP. This figure will be responsible for coordinating with all the stakeholders of the project, public and private, the annual agreements and the lines and strategies of action for the development of each component. The Project Management will also be responsible for presenting the operational plan proposals and the technical and financial execution reports of the project to the Steering Committee. To exercise these functions, CATHALAC will provide support, which will be the co-executor of the project's day-to-day activities.
- **Steering Committee:** The project will have a Steering Committee made up of MiAmbiente, who will preside over it, MIDA and IDIAP y FAO as an implementing agency. This committee will make decisions about the annual work plans, the definition of budgets and the making of agreements on adjustments, corrections and reorientation in the development of the project, depending on the scope of objectives, goals, indicators and investments. CATHALAC, in its role as executor, will act as the Secretariat of the Steering Committee. The aim of having this superior entity is to give strategic guidance to be able to share responsibilities and supervise the fulfilment of financial commitments, including that of counterparties; to facilitate work with other entities and organizations involved and to facilitate the relationship with the financial sector to achieve the scaling up of good SLM practices of the project. It will meet every six months after a call from the Project Management.
- **Ad Hoc Technical Committee:** A Technical Committee will be constituted made up of Mi Ambiente, MIDA, IDIAP, FAO, CATHALAC, BDA, CCIAP, ANAGAN, NATURA, and the Committee of the respective basin, to discuss technical aspects of the project by topic and those convened for the respective meeting will be only the members with an immediate decision on the matter. MiAmbiente will chair it, and CATHALAC will act as the Secretariat. They will be summoned by MiAmbiente when it is pertinent. The agreements of the Technical Committee meetings will be included in the execution reports presented by CATHALAC. Other strategic partners could be invited when necessary.
- **Project Executing Agency:** MiAmbiente has designated CATHALAC (Water Center for the Humid Tropics for Latin America and the Caribbean) to execute the project management and administration

activities. It will also include the Project Coordination Unit and act under the Steering Committee's agreements. **Project coordination unit**, will have the following responsibilities:

- o Coordination with other relevant initiatives, whether in the project or national areas.
- o Ensure a high level of collaboration between participating institutions and organizations at the national and local levels.
- o Ensure that external implementing partners comply with the relevant reports.
- o Coordination and timely monitoring of the execution of project activities;
- o Monitoring the progress of the project and guaranteeing the timely delivery of supplies and products;
- o Provide technical support and evaluate the results of the national consultants of the project hired with GEF funds, as well as the products generated in the implementation of the project;
- o Review requests from external implementing partners for the provision of financial resources;
- o Monitor project budgets to ensure the accuracy of financial reports;
- o Follow up with external implementing partners on timely submission of funding requests, financial and progress reports to FAO in accordance with external performance reporting requirements;
- o Supervision of the monitoring and communication plans of the project;
- o Lead the organization of workshops and project meetings to monitor progress and prepare Annual Work Plans and Budgets (POA/B);
- o Submit semi-annual project progress reports (PPR) with AWP / B to PSC and FAO;
- o Prepare the first draft of the Project Implementation Review Report (PIR);
- o Support the organization of the final evaluation in close coordination with the FAO Budget Officer and the independent FAO Office of Evaluation (OED);
- o Present the semi-annual technical and financial reports of the OP to FAO and facilitate the exchange of information between the OP and FAO when necessary;
- o Inform the PSC and FAO of any delays and difficulties that arise during implementation to ensure timely corrective action and support;
- o Play the role of Secretary of the Steering Committee and Technical Committee of the Project.

**Project coordination unit will be formed by two professionals: Project Coordinator, which will act also as a Land Use Planning Specialist (half time) with specific function in components 1 and 2. A Project administrative assistant, who will support to the project coordinator part time. Term of references with specific functions will be include into Annex J.**

The Project Coordination will have the support of three Sub-Coordinators in the Field (one for each basin) to facilitate the coordination and execution of activities in the field.

Component 3- Innovative financial mechanisms to promote SLM with a CSA and GCI approach and land restoration, *will be executed by Fundaci?n NATURA*, according with its technical capacity on climate change and sustainable financial management. Fundaci?n NATURA must coordinate its activities, actions, presentation of progress and final products with the Project Coordination (CATHALAC) and the Project Management (MiAMBIENTE) to guarantee the correct progress of the project component execution, as well as assist the ad-hoc technical committee when required.



- ***Co-execution in the field:*** To carry out the activities in the field, MiAMBIENTE will assign two professionals (a soil specialist and an environmental specialist) for each basin. One of them will exercise the function of Sub-Coordinator of the respective basin and his main function will be to supervise the activities in execution, to support the execution of activities with the other entities linked to the project in the basin, including the basin committees; facilitate coordination with said entities; and, prepare reports of field activities. The other will support the field activities of the specialists, especially the activities framed in Component 2 for the implementation of the productive practices proposed by the project.

These personnel are part of the personnel that is in the respective Regional Offices of MiAMBIENTE (Chiriquí, Veraguas, Herrera and Los Santos). To carry out the field activities, MiAmbiente will assign two professionals (a soil specialist and an environmental specialist) for each basin. This personnel are part of the personnel in the respective Regional Offices of MiAmbiente. Their work will facilitate the execution (identification of interest groups, selection of beneficiaries, supervision of field activities, and compliance with MIDA and IDIAP, among others. For co-execution with MIDA and IDIAP, MiAmbiente will sign inter-institutional agreements on the tasks and resources that will be assigned established in these agreements. The required personnel will be hired in addition to those available in each institution (specialists from the intervention areas of the project), which CATHALAC will contract, but whose work will be under the supervision of MIDA and/or MiAmbiente for the day-to-day implementation of the activities programmed in the POA. Under this agreement, logistics expenses (transportation, fuel, per diem, training materials, training event expenses, etc.) that are required to carry out fieldwork.

- ***Collaboration agreements:*** The Ministry of the Environment, with the support of FAO, may establish collaboration agreements with MIDA, IDIAP, ANAGAN, NATURA, CATIE, cooperatives, and producer associations selected for the execution of specific activities. In cases where it is necessary to reinforce the personnel of these organizations to carry out the agreed tasks, the project will facilitate the hiring of specialized support personnel that will be considered as institutional strengthening to guarantee the sustainability of the actions once the project investments are completed. MiAmbiente has experience of working under this type of collaboration agreement with previous GEF projects, so the same procedure will continue to be used.

- ***Project Implementation:*** The Food and Agriculture Organization of the United Nations (FAO) will be the GEF Implementing Agency (IA) for the project, providing support services and project cycle management as established in the GEF Policy. As the GEF implementing body, FAO has overall responsibility to the GEF for the delivery of results. In the role of IA, FAO will use the GEF fees to deploy three different actors within the organization to support the project (see Annex J for details):

? Being responsible for the budget, which is usually the most decentralized FAO office, will supervise the daily execution of the project;

? Senior Technical Officers, drawn from across FAO, will oversee and support the technical work of the project in coordination with government representatives participating in the Project Steering Committee;

? The Funding Liaison Officer (s) within FAO will monitor and support the project cycle to ensure that the project is being implemented and that reporting is done under agreed standards and requirements.

The responsibilities of FAO, as a GEF body, will include:

- ? Manage GEF funds following FAO rules and procedures;
- ? Oversee the implementation of the project in accordance with the project document, work plans, budgets, agreements with co-financiers, operating partner agreements and other FAO rules and procedures;
- ? Provide technical guidance to ensure that adequate technical quality is applied to all activities in question;
- ? Carry out at least one supervision mission per year;
- ? Inform the Secretariat and the Evaluation Office of the GEF, through the Annual Review of the project's execution, the Mid-term Review, the Final Evaluation and the Project Closure Report on the project's progress;
- ? Presentation of financial reports to the GEF trustee

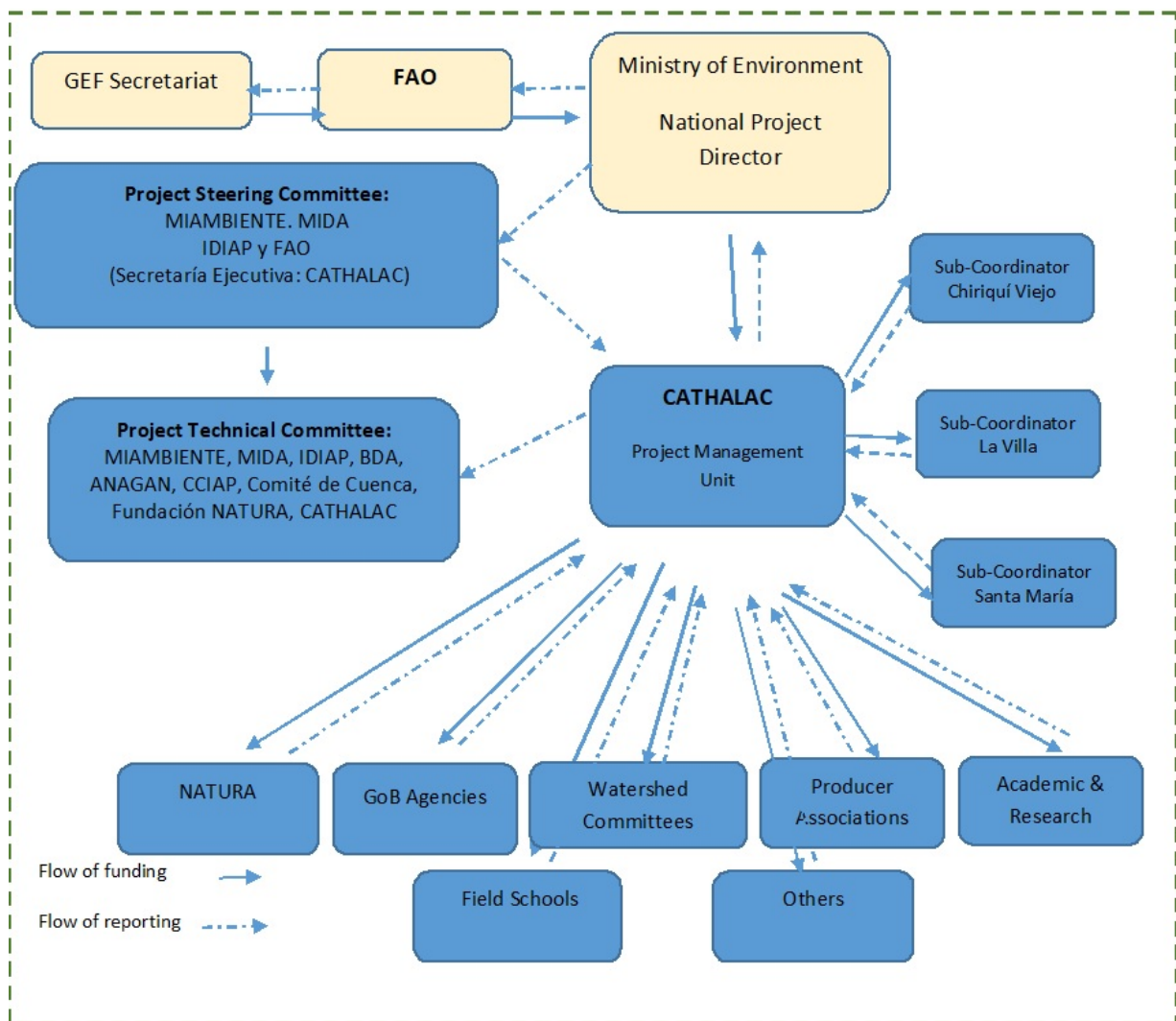


Figure 10. Organigram of implementation arrangements

## 6.b Coordination with other relevant GEF-financed projects and other initiatives

The DS-SLM Central America and Panama project (2015-2019) left important lessons learned on adaptation/restoration strategies of sustainable production systems, as did the *Sustainable Production Systems and Biodiversity Conservation* project (GEFID5546 / 2014-2019 ) on participatory processes with rural communities in the implementation of sustainable production systems, the conservation of biodiversity, the adequate protection of protected areas and ecosystem connectivity, and the strengthening of value chains.

Experiences and technical data on sustainable livestock systems will be shared with the *Biodiversity-Friendly Livestock Production* project based on the Darien Region's Ecosystem in the Republic of Panama (GEF-9589 / CAF03/ANCON) 2021-2024, creating synergies for the information and producer exchanges. The project will benefit from the research of the *Reaching the Potential of Native Microbes in the Agricultural Sector* (MiAmbiente/ GEF/UNDP/INDICASAT) project in 2020-2023 execution, under which intervention will be made in the buffer zones of the International Park La Amistad (Biosphere Reserve) and the Barú Volcano National Park, both in the area of influence of the Chiriquí Viejo river basin. This project is based on the concept of ABS of the Nagoya Protocol (shared benefits). It seeks to connect science, local development and green economy, having as its axis the cultivation of coffee, one of the project's areas. The Small Grants Program (GEF-UNDP), which will manage a new cycle with a portfolio of USD1.5 million, is an opportunity to finance small projects of rural producers, men and women, including productive projects under SLM sustainability techniques. A fourth project is *Sustainable Rural Development and Conservation of Biodiversity* (P174289)/MiAmbiente/GEF/BM under the biodiversity focal area in accordance with the *Biodiversity Action Plan (2050)*. This project has an advanced PID for final evaluation in March 2021. It will have a total amount of USD11.1 million (USD3.51 million from the GEF). Its objective is to improve the management of protected areas and promote access to inclusive economic opportunities favorable to biological diversity in the project areas. It will be implemented in several protected areas, including some that are part of the project's basins (PILA, NP Volcán Barú, NP Santa Fe).

### 7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

The focal area of the project is land degradation and its actions are focused on contributing to the 5 national goals of the Land Degradation Neutrality Strategy, in coherence with national priorities related to sustainable land management, climate change and biodiversity:

? *National Strategy on Land Neutrality (2019-2030)*. It will support the achievement of the goals at the local level and will facilitate the progress monitoring mechanism to measure the indicators at the local and national levels.

? *Government Strategic Plan 2019-2024* The project is consistent with the objectives and goals of the Plan; specifically, it will support: (i) actions to reduce the productive and climatic vulnerability of micro, small, and medium producers who are vulnerable groups; (ii) promote sustainable development through actions that improve food security and technical and economic support for producers; (iii) will strengthen the conditions for the defense and protection of the environment and the protection and rescue of biodiversity.

? *United Nations Convention to Combat Desertification (UNCCD)*, supporting the implementation of the LDN Strategy for Panama and contributing to its goals.

? *First Nationally Determined Contribution (CDNI)* of Panama to the United Nations Framework Convention on Climate Change (UNFCCC). The project is consistent with the country's commitments established to contribute to the conservation and restoration of productive ecosystems as a measure that contributes to increasing resilience and reducing Greenhouse Gas (GHG) emissions in the AFOLU sector towards neutrality in carbon by 2050.

? *United Nations Framework Convention on Climate Change (UNFCCC) and National Communication (NC)*: Panama is currently preparing its 4NCCC. This exercise will include information generated by this project with the support of the National Environmental Information System (SINIA). The project's efforts will be in line with the development of the Corporate and Products RTH program to measure the water and carbon footprint, supporting the development of application protocols for at least 2 key areas of the agricultural sector, the dissemination of the program and the creation of tools for the national evaluation and certification of low-emission ventures;

? *United Nations Convention on Biological Diversity (UNCDB)*: the project will help reduce pressure on the protected areas located in the target basins by providing techniques, information and assistance to avoid new migrations to PAs.

## **8. Knowledge Management**

**Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.**

**Knowledge management** is conceived as a knowledge management platform for informed decision-making focused on creating capacities in different actors and various modalities and techniques so that scaling up SLM practices is achieved. Within each component, training activities, exchanges, demonstrations, technical assistance and extension services have been considered to create social and human capital in the execution areas, and indirectly, through the link with the information systems of MiAmbiente, MIDA and IDIAP and the adoption of digital technologies (through internet cell phones), facilitate that an undetermined number of producers, professionals and students have access to said information. The project has paid particular attention to Field Schools' creation (at least one for each basin). Their members will be previously trained and will be provided with the logistics and material expenses to support MiAmbiente and MIDA's extension tasks.

Face-to-face training methods will be used, such as workshops, talks, field days with demonstration activities, exchanges between producers, authorities, local committees, associations and cooperatives. We will work on adopting a digital extension system (development of an application to be downloaded in the cell phone) so that producers have information on best practices proposed in the project and the weather, rainfall, information on prices and markets, among others. A third means of transferring knowledge of the project will be through messages, bulletins, news, etc., via radio for hard-to-reach areas (see details in Component 4).

The project will internalize the lessons learned from the regional DS-SLM project (2015-2019), particularly: (i) the strategy of approaching the beneficiaries by demonstrating with knowledge the environmental and economic benefits of adopting good SLM practices; (ii) the benefits of South-South cooperation[1] with experts in training in best soil and water management practices, national evaluation (use of QM) and local SLM assessment (use of OT and QA), economic and ecological valuation of the best SLM technologies; (iii) the incorporation of young people in learning monitoring technologies (GPS, drones) and their motivation to create organizations with environmentalist approaches of broad benefit for their communities; (iv) the synergies and complementarities with other projects within or not the education areas, both to complement actions and to share knowledge.

The project's Communication Strategy has been designed to provide information in various formats (newsletters, maps, reports, posters, meteorological, environmental, climatic, productive information), as well as by multiple means (print, digital, oral) that involve both men and women and young people (see Component 4).

Preliminary proposal to develop the Knowledge Management Approach activities (according to the Project Work Plan (Annex H).

**Table 6: Key KM deliverable with budget associated**

Key KM deliverables	Expected dates	Estimated budget
<p><b>Communication strategy and campaign:</b></p> <ul style="list-style-type: none"> <li>- Target stakeholders and beneficiaries</li> <li>- Identification and share of technical information</li> <li>- Appropriated means of dissemination (virtual, radio, brochures, policy briefs),</li> <li>- scope of the information to be communicated, content by type of audience, material to be disseminated, etc.</li> </ul>	<p>First-second quarter of the first year of execution</p>	<p>20,000 (communication campaign)</p>

<p><b>Dissemination of brochures, best practices and lesson learn of at least 5 key aspects:</b></p> <ul style="list-style-type: none"> <li>- Synthesis of knowledge about national and local LDN,</li> <li>- Best practices and lesson learned about SLM/CSA and CSL and - Reduce your footprint program with LDN perspective</li> <li>- Systematization of lessons learned about LDN implementation at the subnational level</li> <li>- Linking LDN and production certification with reduce your footprint program (water and products)</li> </ul>	<p>Second semester of years 1, 2, 3 of the project execution</p>	<p>10,500 (printing and advertise materials)</p> <p>12,000 (communication expert)</p>
<p><b>Total</b></p>		<p><b>42,500 USD</b></p>

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[1] Signing of a framework agreement for scientific, technical and academic cooperation in environmental matters with CITMA (Cuba).

## 9. Monitoring and Evaluation

### Describe the budgeted M and E plan

The **Monitoring and Evaluation Plan** will support the project's adaptive management so that adjustments and recommendations are allowed in the annual operating plans, allowing for necessary reviews, adjustments and adaptations to achieve a successful implementation, integrating the implementation experiences with the beneficiaries and institutional actors, as well as knowing/evaluating the evolution generated in the non-beneficiaries in adopting management that integrates SLM, for example, if it has indeed been possible to increase the number of loans for productive activities with a focus on SLM / CSA / CSL; if banks (public and private) have expanded their portfolio to this type of debt; women's access to these sources of financing, etc.

The technical and financial management of the project will be part of the semi-annual and annual reports to guarantee transparency in the use of funds and the processes of preparation, implementation, reporting and evaluation of its activities. There will be full disclosure of all information and consultation with beneficiary groups and their organizations, basin and sub-basin committees, local authorities, and leaders of the execution areas through the Communication Strategy. In addition to the technical and financial execution reports, an annual forum on sustainable land management has been planned, which will be an event of

accountability, but also, for exchange of knowledge between beneficiaries and non-beneficiaries of the project, between the basin committees/sub-committees and between the different authorities and institutions with a presence in those areas. Project reports will be widely and freely shared, and conclusions and lessons learned will be made available. A monitoring and evaluation professional (part-time) will supervise FAO to ensure compliance with the monitoring and evaluation plan for specific FAO products.

FAO will carry out the following actions to monitor and follow up on the project:

- Project inception workshop, with local project stakeholders, within 90 days of the CEO approval of this project
- Annual evaluations of the project and preparation of the AWP
- Final evaluation of the project, six (6) months after the project ends.

#### **Evaluation provisions**

The GEF evaluation policy foresees that all medium and large size projects require a separate terminal evaluation. Such evaluation provides: i) accountability on results, processes, and performance; ii) recommendations to improve the sustainability of the results achieved and iii) lessons learned as an evidence-base for decision-making to be shared with all stakeholders (government, execution agency, other national partners, the GEF and FAO) to improve the performance of future projects.

The Budget Holder (BH) will be responsible to contact the Regional Evaluation Specialist (RES) within six months prior to the actual completion date (NTE date). The RES will manage the decentralized independent terminal evaluation of this project under the guidance and support of OED and will be responsible for quality assurance. Independent external evaluators will conduct the terminal evaluation of the project taking into account the "GEF Guidelines for GEF Agencies in Conducting Terminal Evaluation for Full-sized Projects". FAO Office of Evaluation (OED) will provide technical assistance throughout the evaluation process, via the OED Decentralized Evaluation Support team " in particular, it will also give quality assurance feedback on: selection of the external evaluators, Terms of Reference of the evaluation, draft and final report. OED will be responsible for the quality assessment of the terminal evaluation report, including the GEF ratings.

After the completion of the terminal evaluation, the BH will be responsible to prepare the management response to the evaluation within 4 weeks and share it with national partners, GEF OFP, OED and the FAO-GEF CU.

<b>Monitoring and Evaluation " and " Annual Workplan</b>			
<b>GEF M&amp;E requirements</b>	<b>Responsible parties</b>	<b>Indicative costs (USD)</b>	<b>Time frame</b>
<b>Inception Workshop</b>	Directorate Coordinator/M&E Consultants Steering Committee	700	Within 90 days of CEO approval of this project.
<b>Inception report (to include M &amp; E-gender plan, SSE strategies, stakeholder engagement)</b>	Directorate Coordinator/M&E Consultants Steering Committee	Included in the costs of Consultants	Within 120 days of CEO approval of this project.

<b>Monitoring and Evaluation ? and ? Annual Workplan</b>			
<b>GEF M&amp;E requirements</b>	<b>Responsible parties</b>	<b>Indicative costs (USD)</b>	<b>Time frame</b>
<b>Monitoring of basic indicators and project results framework</b>	M&E Expert	18,000	During the process
<b>GEF Project Execution Report (PIR)</b>	Project Coordinator FAO	Included in the costs of Consultants	Annual report, usually between June and August.
<b>Supervision Missions</b>	Technical team	Nil	By agreement
<b>Monitoring of risks and management plans</b>	Project Coordinator/ M&E Consultant	Included in the costs of Consultants	During the process
<b>Gender Monitoring</b>	Gender Expert	Included in the costs of Consultants	During the process
<b>Monitoring of Stakeholders Participation Plan</b>	Project Coordinator/ M&E Consultant	Included in the costs of Consultants	During the process
<b>Monitoring of the Gender Action Plan</b>	Gender Expert /M&E Consultant	Included in the costs of Consultants	During the process
<b>Steering Committee Meetings</b>	This committee will make decisions about the annual work plans, the definition of budgets and the making of agreements on adjustments, corrections and reorientation in the development of the project, depending on the scope of objectives, goals, indicators and investments. Ministry of Environment will leads this committee.	Included in the operational cost UEP	Annually
<b>Reports of the Steering Committee</b>	Project Coordinator	Included in the costs of Consultants	Annually
<b>Closing workshop of the project</b>	Project Coordinator Consultants Directorate	3,000	At the end of the execution of project funds



<b>Monitoring and Evaluation ? and ? Annual Workplan</b>			
<b>GEF M&amp;E requirements</b>	<b>Responsible parties</b>	<b>Indicative costs (USD)</b>	<b>Time frame</b>
<b>Final evaluation made by an independent team and response from Management</b>	The BH will be responsible to contact the Regional Evaluation Specialist (RES) within six months prior to the actual completion date (NTE date). The RES will manage the decentralized independent terminal evaluation of this project under the guidance and support of OED.	30,000	Six months after project finalization date.
<b>Travel of Consultants for evaluations</b>		5,450	DSA and airplane tickets for 2 consultants x \$ 5000
<b>Final Report</b>	Project Coordinator	6,550	Two months before finalization of the project.
<b>TOTAL indicative COST</b> Excluding oversight/consultants cost. Other Project Costs included in Component 4 KM and in the PMC		63,700	

## 10. Benefits

**Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCE/SCCF)?**

Sustainable agronomic practices and treatments developed by FAO have shown improvements in soil quality, nutrient content and availability, and resistance to degradation[1]. Some of these practices such as crop rotation, the integrated use of fertilizers and bio-pesticides, organic agriculture, combined with good agricultural and livestock practices adapted to the climate, will generate environmental, social and economic benefits of impact for the beneficiaries.

The project has estimated to directly benefit 4,000 producers (1,400 women and 2,600 men), including at least 600 young people of both sexes, who will be targeted by various activities that include capacity building in the techniques proposed by the project, training of Field Schools with producers, technical assistance and extension, dissemination of climate, productive and agro-environmental information, training of young people and women in the use of ICTs and environmental monitoring technologies (drones, GPS, etc.), and direct investment in replicable production models in other parts of the selected basins or in other basins.

Therefore, direct benefits will be estimated for those who are beneficiaries of these actions, and indirect benefits for other producers and their organizations may benefit from information through the means that have been proposed in the Communication Strategy, specific training, knowledge and access to financing sources, digital extension, etc. On the other hand, the project will generate positive externalities such as, the capacity for carbon fixation and water infiltration in the areas recovered with agroforestry and / or riparian forests and conservation of local biodiversity, etc. Although the beneficiaries in general (direct and indirect) do not quantify these benefits, the positive externalities will generate a high-value social NPV that indirectly shows that the best productive practices have returns within the farms and for the community in general. With these beneficiaries and with other benefits such as access to information through digital means, greater knowledge and access to credit, digital extension, and positive externalities, it is estimated that for each direct beneficiary, at least four other people may be impacted. of the execution areas, that is, about 16,000 people.

The environmental benefits of the project include the reduction of emissions measured with the CORE Indicator 6.1 Greenhouse Gas Emissions Mitigated and the goal of -138,068 tCO<sub>2</sub>e of gases avoided in the AFOLU sector. To demonstrate the changes in the reduction of emissions and the fulfillment of this indicator and its goal, the modeling tools of FAO, the Global Livestock Environmental Assessment Model [GLEAM] and the Ex-Ante tool of Carbon Balance will be used [ EX-ACT]). Work will be done in coordination with MiAmbiente and MIDA and articulation with the platforms and commitments of the Climate Change Directorate to report and monitor the contributions of the country's commitments established in international agreements.

At the beginning of the project, the baseline will be raised in the sub-basins for the execution of greenhouse gases (GHG) generated by productive activities without a project. To measure the changes (with the project), and other measurement will be carried out for the final stage of the project. It is estimated that the changes produced with the good SLM practices should be shown and the goal established in the project should be reached.

Another expected environmental benefit is the change in the composition of the productive landscape to verify the application of good agricultural, livestock and agroforestry practices. This will demonstrate concrete results of mitigation, prevention, and restoration of specific areas identified as critical in execution areas.

FAO will implement the *GLEAM* tool for the modelling of GHG in the livestock production activity (milk/meat), which will have a training process for its use and then the application at the level of the 4,600 ha of livestock that is expected to be converted into livestock systems efficient with livestock techniques integrated to the climatic conditions of the sub-basins. It will also support the development of institutional capacities for (i) the use of these tools with specialized personnel, having started training on the use of the *EX ACT* tool; ii) the acquisition of materials and equipment for the application of the monitoring tools; iii) monitoring and reporting of LDN goals at the local level (sub-basins) that will contribute to the national LDN goals; iv) field assistance to train MIDA and MiAmbiente technical field teams in monitoring

emissions; v) development and implementation of RTH Corporate and Products program, creating national capacities for national GHG monitoring, measurement and registries; vi) transfer of information to SINIA, MIDA and IDIAP on best livestock practices, restored areas, GHG reduction by activity; and vii) coordination with MiAmbiente MIDA and ANAGAN on sustainable livestock initiatives (NAMA Ganadero, NAMA rice and the National REDD + Strategy).

The social benefits of the project include: i) Strengthening institutional capacities in the planning and ordering processes of the use of the territory and applying techniques for monitoring productive landscapes (*GLEAM, EX ACT*, others); ii) the capacity building of social and human capital in producer groups by transferring knowledge, processes, and information to informed decision-making; iii) the integration of women and youth in activities enhances their understanding of technology, communication, extension, and monitoring. The project will also develop tools in coordination with the MiAmbiente Directorate of Climate Change and the MIDA Agro-environmental Unit to design, disseminate and train in the application of the water footprint and the carbon footprint in productive systems through RTH Corporate and Products program, to make more efficient use of land and water and increase the resilience of the primary productive sector.

Regarding the economic benefits, during the preparation, an exercise was carried out with economic models of (one hectare each) of key items for the project: livestock with silvopastoral systems, agroforestry of coffee with timber, fruit trees, plantain or banana and a hectare of diversified production (rice, corn, beans, pigeon peas, beans, cassava). The result of this exercise without and with the project for an estimated period of 5 years indicates economic benefits derived from an improvement in land use and an increase in productivity per crop. Basic assumptions of the models were: i) the model is for one hectare, but the producer could replicate it in a larger area; ii) the exercise in livestock and agroforestry is long-term (20 and 10 years, respectively) because they are economic recovery activities after the third or fourth year when the project will end; iii) the producer may choose to produce one or more items on a plot depending on the plot's size and financial capacity. However, these models are guides for economic benefits with changes in better soil management with sustainable production techniques of the magnitude of the changes that can occur in the well-being of families, the following values are estimated[2]:

- One hectare with a silvopastoral system, including pasture re-boring, with an initial investment of USD3,390 / ha and annual maintenance costs of USD432, at a 5% discount rate, in 20 years would have an internal rate of return (IRR) of 21%. **Without the project**, the return at 20 years is negative because productivity remains constant, and maintenance costs almost totally absorb income.

- One hectare of plantain coffee agroforestry, with an investment of 2,954 / ha and annual maintenance costs of USD1,670, at a discount rate of 5%, by year ten would obtain an IRR 20%. With the monoculture system, the return on investment **without the project** in the first three years of establishment, there is no income (only maintenance costs). Therefore, after ten years, the return on investment is negative.

- One hectare of diversified crops (rice, corn, beans, etc.), with an investment of USD1,454 at a discount rate of 5%, would have an annual net profit of USD748. In 5 years, it represents an IRR of 75%. Net yearly profit **without the project** is USD493.

- Conversion of one hectare of pasture to one hectare of agroforestry with fruit trees (citrus, soursop, mango, etc.) and timber with an initial investment of USD2,722 and average annual maintenance costs up to year 5 of USD523, during a period of 20 years, at a discount rate of 5%, would obtain an IRR of 23%.

**Without the project**, the annual income is marginal in relation to a traditional livestock system's maintenance costs.

Although these are only indicative values, which can be improved with the demonstration models, the improvements in ecosystem services will also facilitate other benefits such as the opportunity of other agribusinesses (ecotourism, rural tourism, non-timber products, etc.) that can generate income and green jobs, improving the well-being of families and their communities and contributing directly to SDG 1 (poverty reduction) and SDG2 (food security) and indirectly to SDG10 (reduction of inequalities) in areas of execution.

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[1] <http://www.fao.org/soils-portal/soil-management/otras-herramientas-para-mst/es/>

[2] Consultancy Report on Sustainable Financial Management for the Sustainable Land Management Project (SLM) and restoration of productive landscapes in hydrographic basins for the implementation of the national goals of Land Degradation Neutrality (LDN) in Panama. R. Barzev, February 2021.

## 11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

### Overall Project/Program Risk Classification\*

PIF	CEO Endorsement/Approval	MTR	TE
Medium/Moderate	Medium/Moderate		

#### Measures to address identified risks and impacts

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any measures undertaken as well as planned management measures to address these risks during implementation.

Risk identified	Risk Classification	Mitigation Action (s)	Indicator / Mean(s) of Verification	Progress on mitigation action
<p>1.3 Does the project include an irrigation system of more than 20 hectares or that extracts more than 1,000 m<sup>3</sup> / day of water?</p>	<p>Moderate</p>	<p>According to FAOs ESS analysis This risk is rated as Moderate. During the ProDoc preparation, technical studies revealed the following mitigation measures:</p> <ol style="list-style-type: none"> <li>1. The adoption of climate-smart agriculture practices with diversified cropping systems integrates best practices of water use.</li> <li>2. Irrigation will only be used in small rice plots, under the melgas or complementary irrigation systems.</li> <li>3. The water demand projections will be much lower than those provided in the PIF.</li> </ol> <p>The strengthening of local committees is foreseen to increase the governance of co-management of the water resources of the sub-basin so that there are no downstream impacts due to water use in the upper and middle part of the basin. Component 4 will facilitate access to information systems (agricultural, environmental, and agroclimatic) to support the updating of management plans to use resources, mainly water.</p>	<p>Periodic reports</p> <p>Field visits Memories of the trainings</p> <p>Number of producers with melgas or complementary irrigation</p>	

<p>1.5 Would this project aim to improve an existing irrigation scheme (without expansion)?</p>	<p>Moderate</p>	<p>The project has taken into account the need to make better water use. It will only support small complementary irrigation systems for crops (rice, corn, vegetables) that are part of the project's good SLM practices.</p> <p>It has also planned that more producers adopt the melgas system in rice production after evaluating the soils to know if they have the infiltration speed required for this type of irrigation.</p>	<p>Project expense and investment reports</p> <p>Execution reports</p> <p>Reports of evaluation missions</p>	<p>-</p>
<p>3.2 Would this project provide seeds / planting material for cultivation?</p>	<p>Moderate</p>	<p>The project will promote the use of seeds certified by IDIAP and the reproduction of native seeds (in the case of corn seed). IDIAP, for more than 40 years, has developed varieties of seeds (mainly rice, corn and beans) with tolerance to the main pests and diseases affecting the crop, thus avoiding the introduction of weeds and increasing the resilience to climatic events. 70% of the rice seed that is grown in each agricultural cycle corresponds to IDIAP certified seeds. The project will use this type of seed to avoid introducing non-certified genetic material in the country.</p>	<p>Field reports of beneficiary assistance</p> <p>Native seed reproduction projects to recover genetic material.</p> <p>Volume of certified seed provided by the project</p> <p>Number of producers benefited with the use of certified seed</p> <p>Native corn seed reproduction projects.</p>	<p>-</p>

5.1 Would this project procure, supply and / or result in the use of pesticides on crops, livestock, aquaculture, or forestry?	Moderate	Technical support will be provided to producers to implement the regulations established by MIDA regarding restricted and/or prohibited agrochemicals (Resolution No. ALP 074 ADM-97; Resolution No. ALP 006 ADM-99) and to use biopesticides and organic fertilizers in production systems. It will be coordinated with the Plant Health Directorate (MIDA) for the control and use of agrochemicals in the project execution areas.	<p>Training in the use of organic fertilizers and the use of natural pesticides</p> <p>Number of producers using organic fertilizers and bio-pesticides.</p> <p>Technical execution reports</p> <p>Model projects</p>
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**Supporting Documents**

Upload available ESS supporting documents.

Title	Module	Submitted
<b>FAO ES Checklist- Panama PRODOC NDT NM25-2-21</b>	<b>CEO Endorsement ESS</b>	
<b>Panama LDN Risk Certification</b>	<b>Project PIF ESS</b>	

**ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).**

Results chain	Indicators	Baseline	Mid-term target	Final target	Means of verification	Assumptions	Responsible for data collection	Actions
<b>Component 1: Strengthened governance to achieve the implementation of LDN goals</b>								



<p><b>1.1:</b> Strengthened enabling environment to improve decision making and facilitate the implementation and monitoring of LDN at the national level.</p>	<p><i>Indicator: # policy, legal and regulatory instruments developed (target: at least 3)</i></p> <p><i>Indicator: One (1) consolidated agro-environmental information system</i></p> <p>This Outcome will specifically support goal 5: "Improve the existing legal framework to help strengthen the LDN program"</p>	<p>There is no land law.</p> <p>Water law dates from 1966 (obsolete)</p> <p>Other laws that regulate water and soil:</p> <p>-Law 1 of 1994 (forest legislation)</p> <p>-Law 44 of 2001 (Integrated Watershed Management)</p> <p>-DE 283 of 2013 (OTA)</p> <p>-Law 24 of 1992, modified in 2005 (reforestation)</p> <p>-Law 24 of 1995, revised in 2005)</p> <p>(wildlife)</p> <p>-DE 25, 2007</p>	<p>According to Outputs</p>	<p>By the end of the project, land use planning will be strengthened in the selected watersheds; the legal gaps addressed to improve the ecosystem's condition and promote better management of natural resources (e.g., water, food, carbon and biodiversity) with appropriate inter-institutional coordination (MiAMBIENTE and MIDA). Informed decision-making strengthened for better management of natural resources in the nine selected sub-basins. On the other hand, the national information systems between MiAmbiente, MIDA and IDIAP will be harmonized.</p>	<p>Project execution reports</p> <p>Produced documents (proposed laws, agreements, OTA plans, established information system, etc.)</p>	<p>According to Outputs</p>	<p>MiAMBIENTE</p> <p>MIDA</p> <p>IDIAP</p> <p>CATHALAC</p> <p>BASIN Committees</p> <p>MIVIOT</p> <p>GOBIERNOS MUNICIPALES</p>	<p>Defined in each Output</p>
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<p>1.1.1 Analysis of gaps and harmonization of policies, legal and regulatory frameworks between sectors to facilitate the planning, execution and monitoring of SLM with a landscape perspective.</p>	<p><i>Indicator: # policy, legal and regulatory instruments developed (target: at least 3)</i></p>	<p>There is no land law.  Water law dates from 1966 (obsolete)</p>	<p>Land law proposal prepared  Disclosure, information and review of the water law (pending in the Assembly of Deputies)</p>	<p>Water law proposal, reviewed and approved by MiAMBIENTE.  PNSH 2010-2050 disclosed in the areas of execution  Agreements reached with the private sector for the recovery of degraded areas in the prioritized basins.  Regional dialogue table on water instituted, with broad participation from all sectors (private, producer, public, community, local governments, civil society and academia).</p>	<p>Land law proposal document  Disclosure materials  Memories of events  Agreements between MiAMBIENTE and the private sector  Reports of the dialogues discussed in the dialogue tables</p>	<p>The project manages to empower local actors on the priority issues to strengthen water and soil management.  Local committees reinforce their role as a local interlocutor in water governance and improvements in the productive landscape.</p>	<p>MiAMBIENTE MIDA MIDES MIVIOT GOBIERNOS MUNICIPALES BASIN Committees CATHALAC CONAGUA</p>	<p>Actions proposed to strengthen the legal framework, disseminate information, facilitate agreements between private and public actors, establish regional dialogue tables on water use, provide information on the regulatory framework for water, soil and forest to river basin committees and local governments to strengthen their participation.</p>
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<p>1.1.2 National Environmental Information System (SINIA) consolidated between MiAMBIENTE, MIDA and IDIAP, and accessible to external users with information on the use and degradation of land, soil, biodiversity, water, early warning systems, agrochemicals in critical crops and pastures and emissions (GHG).</p>	<p><i>Indicator: One (1) consolidated Agro-environmental Information System.</i></p>	<p>There are multiple public, international, and private computer systems that operate in a non-integrated manner, although many report environmental, climate, and agricultural information.</p>	<p>Design, development and installation of the agro-environmental information system integrated between MiAMBIENTE, MIDA and IDIAP</p>	<p>Agro-environmental information system displayed on a web site simultaneously linked to the web sites of MIAMBIENTE, MIDA and IDIAP.</p> <p>The project website will be an agro-environmental platform that will be available before the first semester of the project and will be evolving in content and capabilities until the final phase of the project. Topics: water, soil, forests, climate and climatic events, disaster risks, agricultural information, SLM / CSA / GCI / LDN techniques, prices, markets, seeds, technology, alerts for droughts and rains, etc.</p>	<p>Agro-environmental platform operating and integrated in SINIA, SIGAP and IDIAP's Soil Information System.</p> <p>Links with MiAMBIENTE, MIDA and IDIAP computer systems. Use agreements with ETESA, SINAPROC, others.</p> <p>Visible on cell phones</p>	<p>There is a large amount of environmental, climatic and agricultural information produced by separate entities. The project will capture this information and transmit and process it for better knowledge of producers, people in business, academia and civil society in general.</p>	<p>MiAMBIENTE MIDA IDIAP ETESA SINAPROC FAO (ASIS)/WOCAT/A GROECOLOGY KNOWLEDGE) CONAGUA CATHALAC (EOS, DESINVENTAR, GOES, SERVIR)</p>	<p>Harmonize the environmental, climate, and agricultural information systems for informed decision-making and strengthen the knowledge of producers, entrepreneurs, academia, and society in general on integrated planning of water and land use.</p>
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<p><b>1.2 Integration of the LDN, SLM and CSA in the territorial ordering and land use planning of the selected watersheds.</b></p>	<p><i>Indicator: At least one territorial plan for each basin that better integrates LDN, SLM and CSA approaches (goal: at least 3)</i></p> <p><i>Indicator: 30% of producers participating in the capacity building and experience exchange programs are women, and 15% are young people</i></p>	<p>In the project execution areas, it has been confirmed that there are:</p> <ul style="list-style-type: none"> <li>- Management plans for the Santa María and Chiriquí Viejo basins</li> <li>- La Villa Land Use Plan</li> <li>- 3 Basin Committees</li> <li>- 7 sub-basin committees</li> </ul>	<p>According to Outputs</p>	<p>The three sub-basin plans' goal is completed according to the planning priorities agreed with the basin committees.</p> <p>Agreed methodology for the future design of land use plans that integrate LDN.</p> <p>Training completed of various actors (men and women) in the use of territorial planning tools.</p> <p>Increased capacities in the basin committees to assume the basins' governance, with the support of the municipal governments, once the project is completed.</p>	<p>Sub-basin management plans</p> <p>Methodology for integrating LDN into approved land use plans</p>	<p>According to Outputs</p>	<p>MiAMBIENTE</p> <p>MIDA</p> <p>MIDES</p> <p>MIVIOT</p> <p>MUNICIPAL GOVERNMENTS</p> <p>BASIN COMMITTEES</p> <p>CATHALAC</p> <p>CONAGUA</p>	<p>Actions include supporting the preparation of land use plans in a participatory manner; provide knowledge to make decisions on land and water use; expand knowledge for the adoption of good SLM practices; and integrating LDN into the environment, agriculture, and rural development policies plans.</p>
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<p>1.2.1 Up-to-date river basin planning with LDN approach, proactive drought risk management approach, SLM/CSA guidelines, ecosystem restoration with basin committees, sub-basin committees, promotion of municipal co-management and the participation of other local actors.</p>	<p><i>Indicator: At least one territorial plan for each basin that integrates better LDN, SLM and CSA approaches (goal: at least 3)</i></p> <p><i>Indicator: 30% of the decision-makers in producer organizations and basin and sub-basin committees linked to the planning and execution of hydrographic basins plans are women.</i></p>	<p>- 50 Producer organizations (cooperatives, group associations, etc.) with legal status</p> <p>-29 women's organizations receiving assistance from MIDA through the Rural Women Program</p>	<p>Consensual methodology for the design of land use plans that integrate LDN.</p> <p>A sub-basin plan designed and established, and groups of men and women have trained in planning tools and land use planning.</p>	<p>Three participatory land use planning plans.</p> <p>Local committees, local governments and producer organizations (men and women) trained in territorial planning and participating in exchanges of experiences.</p> <p>Agreements with MEDUCA to integrate environmental issues into the curricula of students of agricultural institutes.</p> <p>Project profiles of the basin plans redesigned to seek financing.</p>	<p>Plan documents</p> <p>Training reports, attendance lists, etc.</p> <p>Execution reports from local committees.</p> <p>Project profiles prepared</p>	<p>The watershed management plans and the territorial plan include multiple projects that have not yet been executed.</p> <p>The basin committees bring together the representatives of all public entities present in the area; however, they do not have a medium-term plan to guide their activities.</p>	<p>MiAMBIENTE</p> <p>MIDA</p> <p>MIDES</p> <p>MIVIOT</p> <p>MUNICIPAL GOVT.</p> <p>BASIN COMMITTEES CATHALAC</p> <p>CONAGUA</p>	<p>Activities have been proposed that reinforce knowledge, improve planning for land use management and train producer groups (men and women) to have more knowledge about their territories and how to protect their natural resources. Awareness is increased to support land neutrality goals.</p>
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<p><b>1.3 LDN Indicator or Monitoring System is established</b></p>	<p><i>Indicator:</i></p> <p><i>Standardized methodology established to harmonize the LDN baseline with its indicators, to monitor and report to the national LDN targets until 2030.</i></p> <p><i>Indicator:</i></p> <p><i># of LDN target reports at the local level (target: at least 3)</i></p>	<p>National Strategy for Land Degradation Neutrality (LDN)</p> <p>LDN Goals</p> <p>Land cover baseline (2000-2010)</p> <p>Soil productivity baseline (2000-2010)</p> <p>Soil carbon baseline (2000-2010)</p>	<p>According to Outputs</p>	<p>The project management is based on a strategy that contributes to the LDN in two aspects:</p> <ol style="list-style-type: none"> <li>1. Contributes to prevent/mitigate or reduce land degradation in critical watersheds through the adoption of best land-use practices; and</li> <li>2. Establishes a standardized and harmonized methodology to measure the LDN baseline with its indicators until 2030</li> </ol>	<p>Standardized and harmonized methodology for the weighing of LDN goals.</p>	<p>According to Outputs</p>	<p>MiAMBIENTE</p> <p>CATHALAC</p> <p>FAO</p>	<p>Actions aimed at reinforcing the mechanisms for weighing efforts to achieve LDN goals, as well as defining the instruments for measuring LDN in the execution areas.</p>
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<p><b>1.3.1 National baseline and LDN targets (land productivity, land cover and soil organic carbon) validated and reported through SINIA.</b></p>	<p><i>Indicator:</i></p> <p><i>Standardized methodology established to harmonize the LDN baseline with its indicators, to monitor and report to the national LDN targets until 2030.</i></p>	<p>LDN Goals:</p> <p>-Goal 1: By 2030 the forest cover has increased by 26%</p> <p>-Goal 2: By 2025 reduce the conversion of 18,000 ha of forests into stubble and shrubs and / or agricultural soils.</p> <p>-Goal 3: By 2030, increase the productivity of 62,000 ha of agricultural land and 12,000 ha of scrubland and grasslands with decreasing productivity and early stages of deterioration.</p>	<p>Activities and agreements on the technologies to be used to measure changes in LDN according to FAO recommendations</p>	<p>Standardized and harmonized methodology to measure and monitor LDN goals that is used until the final LDN goal by 2030.</p> <p>Reports on changes in land use and reports on the reduction of degradation in the execution areas and in other areas of the country.</p>	<p>Standardized methodology approved by MiAMBIENTE</p> <p>Annual reports on LDN Goals</p>	<p>A first weighing of the LDN indicators has been made to establish the goals.</p> <p>Different initiatives in the country contribute to the achievement of LDN national goals, including the GEF LDN project.</p>	<p>MiAMBIENTE</p> <p>CATHALAC</p> <p>FAO</p>	<p>Actions to measure stress reduction, pressure changes and changes in state, which can be used by the project to demonstrate progress towards LDN during implementation.</p>
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<p><b>1.3.2 Baseline and LDN targets, SLM and CSA indicators, established and monitored in the selected river basins.</b></p>	<p><i>Indicator:</i></p> <p><i># of LDN Goal reports at the local level (Target: at least 3)</i></p>	<p>The LDN baseline must be validated at the basin level in the execution areas.</p>	<p>The tools for weighing and validating the LDN baseline in the execution basins have already been defined, and the first measurement of the project's local LDN has been applied.</p>	<p>Weighing (3) reported during project execution.</p> <p>Selection and adoption of tools for weighing the changes achieved with the project techniques in the execution areas.</p>	<p>Reports of soil improvement values that contribute to national LDN goals.</p>	<p>FAO has successfully tested the tools (EXACT, SLM Progress Calculator or TAPE) in other countries and their adoption with FAO assistance will be a process of knowledge and technology transfer.</p>	<p>MiAMBIENTE</p> <p>CATHALAC</p> <p>FAO</p>	<p>? Monitor of baselines of the initial state of LDN indicators in the basins</p> <p>? Agreements to review measurements and information flow</p> <p>? Exit strategy to ensure subsequent measurements</p> <p>? Incorporate tools to estimate values of the indicators.</p> <p>? Use Ex-Act to estimate changes in CO2 Stocks</p> <p>? Use tools to measure progress with SLM Progress Calculator or TAPE</p>
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**Component 2: Implementation of best practices on sustainable land management, climate-smart agriculture (CSA) and climate-smart livestock in production systems and restoration of productive landscapes with large-scale agroforestry to achieve LDN in selected watersheds.**

<p><b>2.1. Innovative practices and technologies for the sustainable management and restoration of degraded lands, implemented in productive landscapes.</b></p>	<p><i>Core Indicator 3.1:</i> 500 ha of degraded agricultural land restored with agroforestry (permanent crops and riparian forest)</p>	<p>Land with loss of primary productivity according to Land Productivity Dynamics in the selected sub-basins is:  54,400 ha</p>	<p>According to the Outputs below</p>	<p>500 ha of degraded lands were restored in the following areas:  200 ha with agroforestry  300 ha of riparian forests recovered</p>	<p>According to the Outputs below</p>	<p>Assumptions of the Outputs</p>	<p>MiAMBIENTE  MIDA  Project Management  Other stakeholders according to Output:  ANAGAN, Producers 'Cooperatives, Producers' Associations, Organizations of Women Producers, NGOs</p>	<p>See Output activities</p>
	<p><i>Core Indicator 4.3:</i> 5,000 ha of landscape under SLM / CSA in production systems</p>	<p>Breakdown of hectares by type of production system:  Forest = 11,976 ha</p>		<p>5,000 ha in the productive landscapes of the selected watersheds incorporated SLM/CSA practices. Distributed in the following areas:  4,600 ha of grasslands with silvopastoral systems and smart</p>				
	<p><i>6.1:</i> - 138,068 tCO<sub>2</sub> emissions avoided in the AFOLU sector</p>	<p>Coffee = 393 ha  Banana = 7 ha</p>		<p>livestock practices implemented.  200 ha of Rice under SLM practices implemented</p>				
		<p>Rice = 1,117 ha  Corn = 535 ha</p>		<p>200 ha of Corn under SLM practices implemented</p>				
		<p>Pasture = 27,688 ha</p>						
		<p>Others = 12684 ha</p>						

<p><u>Output. 2.1.1</u></p> <p>Investment plans for selected SLM/C SA practices and climate-smart livestock farming, formulated in a participatory manner with producer organizations and cooperatives, with a gender perspective.</p>	<p>Number of investment plans for specific SLM practices agreed upon in a participatory manner with local stakeholders under an integrated watershed management approach and with a gender perspective.</p> <p>(Interconnection with 2.2.1)</p> <p>Number of local men and women trained in the formulation and evaluation of investment projects</p>	<p>Current investment plans do not include SLM in their investment lines, and may even promote unsustainable practices.</p> <p>The plans do not have specific proposals on gender and promotion of activities or ventures by youth.</p> <p>-It is necessary to strengthen local capacities for the development of small and medium-scale investment plans.</p>	<p>40% of the beneficiaries have investment plans and at least nine project profiles developed for bank investment (one in each selected sub-basin).</p> <p>(Interconnection with 2.2.1)</p> <p>30 local men and 30 women (20% youth) trained in the formulation and evaluation of investment projects.</p>	<p>At least one final detailed version of investment plans for the prioritized activities in each selected sub-basin presented to the national government and financial institutions for financing.</p> <p>(Interconnection with 2.2.1)</p> <p>30 local men and 30 women (20% youth) trained in the formulation and evaluation of investment projects.</p>	<p>Technical reports on the presentation of investment plans to the government and financial institutions.</p> <p>Reports from training workshops</p> <p>Letters of approval of the profiles by the institutions.</p>	<p>There is access to investment capital and working capital to finance selected projects that promote the implementation of SLM/C SA practices and climate-smart livestock.</p> <p>There are compensation or benefit mechanisms for private parties that apply an investment plan in SLM.</p>	<p>MiAMBIENTE</p> <p>MIDA</p> <p>Project Management</p> <p>Other stakeholders according to Output:</p> <p>ANAGAN, Producers 'Cooperatives, Producers' Associations, Organizations of Women Producers, NGOs</p>	<p>- Participatory identification of local investment problems and priorities in the selected sub-basins. (RuralInvest)</p> <p>-Identify SLM practices that best adapt to the local socio-economic and productive context. (WOCAT - ROAM)</p> <p>- Development of detailed small and medium-scale investment plans for each selected activity that promote systems for the capture, storage and rational use of water, the reduction of the use of agrochemicals, GHG emissions and land degradation and</p>
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<p><u>Output 2.1.2</u></p> <p>SLM / CSA practices implemented in 3 agroecological systems (including corn, rice, plantain) with fertilizer reduction, small-scale water harvesting systems and efficient irrigation systems for dry seasons, etc.) with producer organizations and MIDA.</p>	<p>Number of hectares of rice incorporating SLM practices:</p> <p>Mechanized:</p> <p>Dival? - Chiriqu?</p> <p>Santa Maria (Lower part)</p> <p>?Chuzo?</p> <p>Traditional:</p> <p>Quebrada Pes?</p> <p>Quebrada Salitre</p> <p>Number of hectares of corn incorporating SLM practices:</p> <p>Quebrada Pes?</p> <p>Quebrada Salitre</p> <p>Dival?</p> <p>Cocob?</p>	<p>Conventional rice systems with reduced productivity and highly vulnerable to climate variability, dependent on technological packages with high use of agrochemicals and high cost. In Chiriqu?, good adoption of certified seeds, while in other basins only large producers use them.</p> <p>National Production:</p> <p>Mechanized Rice: 1057 Producers and 71129 ha</p> <p>Traditional "Chuzo" rice:</p>	<p>100 ha of Rice with SLM practices implemented</p> <p>100 ha of Corn with SLM practices implemented</p> <p>(Interconnection with 2.2.1)</p> <p>(Interconnection with 2.2.1)</p> <p>At least (1) one training activity per practice and producer group</p>	<p>200 ha of Rice with SLM practices implemented</p> <p>200 of Corn with SLM practices implemented</p> <p>(Interconnection with 2.2.1)</p> <p>At least:</p> <p>1 training activity per practice and producer group</p> <p>1 workshop to exchange experience between producers (1 for each area including Inter-basin)</p>	<p>Management plans agreed upon with producers.</p> <p>Field visits and monitoring with satellite images or drone captures.</p>	<p>Producers and producer groups have an interest in incorporating SLM practices to make their systems more sustainable and profitable.</p> <p>There is government and organizations capacity to support</p> <p>SLM practices. They will be oriented to:</p> <p>i) Reduce climate vulnerability</p> <p>ii) Increase adaptive capacity;</p> <p>iii)</p>	<p>GOAL 3</p> <p>Rice? IDIAP - MIDA? MiAmbiente, Producer groups, rice cooperatives, women's associations</p> <p>Corn? IDIAP - MIDA? MiAMBIENTE, Producer groups, women's groups</p>	<p>General activity cycle:</p> <p>-Identify producers</p> <p>- Participatory selection of SLM practices adapted to the local socio-economic and productive context (WOCAT - ROAM - CSA-TAPE)</p> <p>-Agree a management plan at the farm level with producers. This should include the necessary training activities and a schedule for the implementation of specific practices (budget).</p> <p>- Implement practices with technical assistance</p> <p>-Monitor Results</p> <p>-Report and share experiences.</p>
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<p><u>Output.</u> 2.1.3. Silvopastoral systems with sustainable grassland management and climate-smart livestock established in each basin (middle and lower part)</p>	<p><i>Number of hectare s of grasslands with silvopastoral systems and smart livestock practices implemented.</i></p> <p>Quebrada Piedras Quebrada Salitre (La Villa)</p> <p>R?o Cais?n ? (Chiriqu Viejo)</p> <p>R?o Gat? R?o Cocob? ? Las Gu?as (Santa Mar?a)</p>	<p>All sub-basins were identified by experts in land use for livestock and suitable for implementing good practices. However, the Upper and Middle part's sub-basins dominate this activity and have greater importance in soil degradation, biodiversity, and conservation of ecosystem services.</p>	<p>500 ha of grasslands with silvopastoral systems and smart livestock practices implemented.</p>	<p>4,600 ha of grasslands with silvopastoral systems and smart livestock practices implemented and / or with investment plans to present to financial entities or farm management plans.</p>	<p>Management plans of involved producers</p> <p>Field surveys</p>	<p>Producers and producer groups are interested in incorporating SLM practices to make their systems more sustainable and profitable.</p> <p>There is government and organizations capacity to scale up climate-smart livestock practices. These could lead to:</p>	<p>META 2 META 3</p> <p>MIDA ? ANAGAN MiAmbiente, Milk cooperatives, farmers organizations.</p> <p>Financial entities: BDA, BNP, Global Bank, Capital Bank, Farmers' Cooperatives.</p>	<p>General activity cycle: To consider:</p> <ul style="list-style-type: none"> <li>- Establish ment of management groups for silvopastoral systems at the sub-basin scale, integrating the principles of LDN</li> <li>- Promotion of the production of drought-tolerant pasture species. -Increase of livestock areas with drought-tolerant pastures.</li> <li>-Control and management of natural or improved pastures on cattle farms. -Semi-stabling systems with the use of cut pastures or silage (from other activities) for feeding</li> </ul>
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<p><u>Output.</u> 2.1.4 Natural and assisted restoration practices of agroforestry with permanent crops (coffee under shade on slopes of the upper and middle parts of the watersheds) and riparian forest buffers along the riverbanks and streams.</p>	<p><i>Core indicator 3.1: 500 ha of degraded agricultural land restored with agroforestry (permanent crops and riparian forest)</i></p> <p>Quebrada Piedras</p> <p>Quebrada Salitre</p> <p>Nacimiento Chiriqu Viejo</p> <p>Rio Caisan</p> <p>Rio Gat</p> <p>Rio Cocob? Las Gu?as</p>	<p>The upper and middle sub-basins of Chiriqu Viejo and the upper sub-basin of Santa Mar?a provide opportunities for introducing agroforestry with Coffee (combined with plantain, fruit or timber).</p> <p>Although all the sub-basins have the lands and the aptitude for the recovery of riparian forests, the main ones are:</p> <p>Quebrada Piedras</p> <p>Caisan River</p> <p>Gat? River</p>	<p>Restoration plans for the 500 ha agreed with producers.</p> <p>Resources mobilized by project, counterpart and producers to initiate tasks in the territory. Value to be determined in the previous plans. Reference</p> <p>Supplies ready for field implementation</p>	<p>500 ha of degraded lands have been restored in the following areas:</p> <p>200 ha with agroforestry of coffee and other perennial crops</p> <p>300 ha of riparian forests recovered</p>	<p>Management plans of involved producers.</p> <p>Field surveys</p>	<p>There is a willingness of local stakeholders to restore degraded lands to:</p> <p>i) Reduce climate vulnerability</p> <p>ii) Increase adaptive capacity;</p> <p>iii) Reduce soil degradation;</p> <p>iv) Increase carbon sequestration;</p> <p>v) Reduce water consumption;</p> <p>vi) Increase the income of</p>	<p>GOAL 1</p> <p>MiAMBIENTE</p> <p>MiAMBIENTE</p> <p>MIDA</p> <p>APRE</p> <p>APOSOF</p> <p>Coffee Growers Cooperatives</p> <p>Municipalities</p> <p>Basin Committees</p> <p>Sub-basin Committees</p> <p>CECOMRO</p>	<p>General activity cycle:</p> <p>-Identify the producers and optimal areas for restoration, take into account the remaining forest patches to generate corridors or larger patches</p> <p>- Participatory selection of practices and species to be introduced in the different local contexts and depending on availability.</p> <p>-Prioritize opportunities for Natural Regeneration in nearby patches of remnant forest.</p> <p>-Agree a management plan at the farm level with producers. This should include</p>
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<p><b>2.2. Strengthening of capacities and information services to support the planning, implementation and monitoring of SLM / CSA and LDN.</b></p>	<p><i>Indicators: # of local organizations, including cooperatives and product associations with facilitators of field schools for producers (at least 40% of them women) and trained youth</i></p> <p><i>Indicator: # of digital technology applications accessible to all producers in the 3 basins</i></p>	<p>Information, communication and training mechanisms are limited.</p> <p>There is limited knowledge of producers and local authorities about the effects of unsustainable soil and water management at the farm and landscape levels. Lack of territorial ordering. Furthermore, current outreach mechanisms do not empower producers and their communities to be an integral part of the decision making on land</p>	<p>According to the Outputs that are below</p>	<p>According to the Outputs that are below</p>	<p>According to the Outputs that are below</p>	<p>Assumptions of the Outputs</p>	<p>MiAMBIENTE MIDA IDIAP FAO PROJECT SPECIALISTS OTHERS FOR SPECIFIC TOPICS</p>	<p>See activities in the Outputs</p>
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<p><u>Output. 2.2.1 (Do not overlap with 1.2.2 and 4.1.2)</u></p> <p>Capacity building program in SLM, CSA and integrated pest management in local institutions and NGOs, cooperatives, community promoters and youth, with a gender focus, adopting a participatory teaching - learning methodology</p>	<p>Number of men and women producers with better knowledge and capacities to improve their farms, increasing their climatic and economic resilience and production practices.</p> <p>Number of field schools applying sustainable practices</p> <p>Number of local organizations (cooperatives and producer associations 3 of women and 6 mixed) with strengthened capacities (greater</p>	<p>6.3% of male producers and 2.5% of female producers have received technical assistance. Being MIDA the main provider.</p> <p>In the project area there are 29 women's organizations. 30% of women are heads of families and agricultural producers</p> <p>14% of young students in secondary schools attend Technical or Vocational Institutes.</p> <p>To measure the</p>	<p>At least 2 field schools established.</p> <p>At least 200 producers participated and received training in field schools (40% women and 15% youth)</p> <p>At least 2,000 producers participated and received training in local organizations (40% women and 15% youth)</p> <p>Collection of data, experiences, agreements and results of implementations.</p>	<p>At least 3 field schools established.</p> <p>At least 500 producers participated and received training in field schools (40% women, and 15% youth)</p> <p>At least 3,500 producers participated and received training in local organizations (40% women and 15% youth)</p> <p>Dissemination of production manuals exposing the problems and solutions (1 x each sub-basin or 1 for each restoration topic, crops with SLM, agro-silvo-pastoral SLM)</p>	<p>Training materials, Agenda of the field schools, reports of the workshops held, list of participants.</p>	<p>There is interest in male and female producers to exchange experiences and participate in field schools.</p> <p>There is a need for a program to strengthen the capacities of institutions and local NGOs, cooperatives and producer organizations in planning, implementation and monitoring.</p> <p>Informational material on SLM and LDN is required to be developed and disseminated</p>	<p>GOAL 4</p> <p>MiAmbiente</p> <p>IDIAP</p> <p>MIDA</p> <p>Project Team complete (experts in the different thematic areas of the project).</p>	<p>2.2.1 VIEW CYCLES of 2.1</p> <p>-Identify the need for training for producers.</p> <p>-Training of producers in field schools (at least 40% of the participants are women and 15% are youth) on ??Degradation, SLM and specifically in the SLM / implementation sites.</p> <p>- Towards the end of the project, organize trainings with visits from producers to sites of implementation of good management practices considering intra and inter basin relationships.</p> <p>2.2.2</p> <p>- Identification of the counsellors</p>
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<p><u>Output. 2.2.2</u></p> <p>(Do not overlap with 4.1.1 and 1.3.2)</p> <p>Innovative digital technological applications (agro-environmental and climate) developed to expand the extension and provide a reliable and timely information and consultation service to producers (e.g., climate variability, early warning of droughts, advice on pests, etc.), in partnership with the private sector and research centers.</p>	<p><i>Indicator:</i> At least one (1) digital technology application accessible to all producers in the 3 basins</p>	<p>Major lines of development, according to approach:</p> <p>? GIS for decision making.</p> <p>? App / for field monitoring</p> <p>? App / information for producers</p> <p>? Agro-environmental radio service</p> <p>? Agro-environmental messaging</p> <p>? App / mobile</p> <p>There must be a system that generates and processes information for different types of public</p> <p>- Monitoring along</p>	<p>Each type of user group has at least one technology in development that provides necessary services. A technology can be useful to more than one type of user</p> <p>User types:</p> <p>? small and medium producers and family farming</p> <p>? Groups and associations</p> <p>? Municipalities and basin committees</p> <p>? Decision makers of public institutions (Provincial-National)</p>	<p>At least one technological application is designed and put into operation to provide information and extension services to producers.</p> <p>This technological application will be useful for other producers who are not beneficiaries of the Project, students, professors, businesses and anyone who needs information and wishes to learn about SLM techniques. Indirectly, the objective of scaling up good SLM practices will be supported.</p>	<p>Digital technological application in operation.</p> <p>User declarations included in the evaluation reports.</p> <p>Informative and technical material transmitted through the digital application</p>	<p>The extension system is improved and made more efficient and effective since it will be possible to reach more producers in a relatively short time</p>	<p>MIDA</p> <p>MiAMBIENTE</p> <p>CATHALAC</p> <p>IDIAP</p> <p>Universities</p>	<p>To identify the specific need for information on:</p> <p>? large producers</p> <p>? family producers</p> <p>? Groups and associations</p> <p>? Municipalities and basin committees</p> <p>? Decision makers and the real access to the technologies that each one has?</p> <p>Family producers, who have or need access to the data. Is it useful if you have an online GIS, radio alert or SMS / Smartphone Apps?</p> <p>Major lines of development, according to approach: GIS for decision-making App / for field monitoring</p>
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**Component 3. Innovative financial mechanisms to promote SLM, with CSA and CSL focus, and land restoration in order to achieve LDN.**

<p><b>3.1 Financing mechanisms strengthened and established to mobilize resources to implement SLM practices, with a CSA and CSL approach, and support undertakings in the selected watersheds</b></p>	<p>Indicator: At least USD 2.5 million mobilized to strengthen the changes towards SLM. This Outcome contributes with CORE indicators 3.1 and 4.3. It will also be an important factor in reaching the goal of beneficiaries (4,000 in total).</p>	<p>There are financing options in public agricultural banking and private banking that require adjustments to include in the credit, the environmental variables that support the LDN goals. Public Banks: -Bank for Agricultural Development (BDA) - National Bank of Panama (BNP) Private Banks: -Global Bank -Capital Bank Others: -Water, Wildlife and Protected Areas Fund, Producers Cooper</p>	<p>According to the Outputs below</p>	<p>-Investment plans prepared to present them for financing -Technical assistance and information on credit portfolios and requirements -Men and women producers applying to the financing of the banking system -Agreements for the Water, Wildlife and Protected Areas Fund to support the financing of investment plans of producer organizations  -Synergies with other projects in execution in the selected areas complementing the financing of producers who are not beneficiaries of the GEF LDN Panama project.  -Support basin committees to improve the availability of resources  -Training and information to beneficiaries</p>	<p>Number of bank financings in the execution areas  Number of producers that have investment plans Reports, notifications and announcements about the offer and credit requirements disclosed through the Communication Strategy  Producers' testimonies in the execution areas</p>	<p>Assumptions of the Outputs  This component contributes to Goal 5 of the LDN: By 2020, improve the existing legal framework to help strengthen the LDN program.</p>	<p>MiAMBIENTE BDA BNP GLOBAL BANK CAPITAL BANK Cooperatives Water, Wildlife and Protected Areas Fund GCF NGOs</p>	<p>Activities defined in each Output</p>
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3.1.1 SLM project proposals with a CSA/CSL approach prepared and presented to financial entities	<p><i>Indicator:</i> At least USD 2.5 million mobilized to strengthen the changes towards SLM</p> <p><i>Indicator:</i> # cooperatives and associations by basin with access to financial markets for SLM practices (goal by basin: 3; total goal: 9);</p>	<p>Little access of small producers to existing financial mechanisms (i) Fund for Water, Protected Areas and Wildlife of MiAMBIENTE; (ii) soft loans (preferential interest) from commercial banks (public and private) for agricultural activities adapted to the climate (e.g., Program of Adaptation to Climate Change and Women Entrepreneurs of the BDA).</p> <p>Public Banks:</p> <p>BDA, BMP</p>	9 financing proposals prepared and presented to financial entities	18 Producer organizations (at least one for each sub-basin) have investment plans submitted to the financing entities (two for each sub-basin). At least 40% of the investment plans from women's organizations .	Technical assistance for the preparation of investment plans	Improve information to beneficiaries on financing options.	<p>MiAMBIENTE</p> <p>BDA</p> <p>BNP</p> <p>GLOBAL BANK</p> <p>CAPITAL BANK</p> <p>Cooperatives</p> <p>Water, Wildlife and Protected Areas Fund</p> <p>GCF</p> <p>NGOs</p>	Technical assistance from a financial and strategic planning specialist to support investment plans and access to financing.
					Information on green financing options	Greater integration of MIDA and MiAMBIENTE with the financial sector		
					Proof of presentation of investment plans	Facilitate access to credit for women in the BDA Entrepreneurial Woman program that finances agricultural, livestock, aquaculture and agro-industrial activities.		
					Agreements with public and private banks to support the financing of SLM practices.			

<p>3.1.2. Financial mechanisms established (Basin Funds for Basin Committees).</p>	<p><i>Indicator:</i> three basin committees with the capacity to manage funds to implement their action plans</p>	<p>Three basin committees are legally constituted:</p> <p>Santa Maria River</p> <p>Chiriqu? Viejo River</p> <p>La Villa River</p> <p>There are 7 committees constituted in the execution on sub-basins:</p> <p>Gat? River and Las Guias-Cocob? River (Santa Mar?a)</p> <p>Quebrada Piedras, Quebrada Salitre and river-Quebrada Pes? (La Villa)</p> <p>Naciminto</p>	<p>Action plans for 4 sub-basins prepared and training done in the use of Rural Invest to prepare investment projects</p> <p>Members of the Basin Committees trained in Administrative-Financial processes: with support from the Department of Integrated Watershed Management of MiAMBIENTE;</p> <p>Basin committees approach to submit proposals to the Water, Wildlife and Protected Areas Fund.</p>	<p>3 Medium-term Action Plans (3 to 5 years) to finance activities to improve water and land use in the respective basins.</p> <p>Members of the basin committees trained in Administrative-Financial processes: with support from the Department of Integrated Watershed Management of MiAMBIENTE;</p> <p>Basin committees approach to submit proposals to the Water, Wildlife and Protected Areas Fund.</p>	<p>Project execution reports</p> <p>Memories of the training workshops</p> <p>Documents of the action plans by basin</p>	<p>The basin and sub-basin committees have been trained by MiAMBIENTE to exercise this role but they lack resources and more information on the options to finance their activities.</p>	<p>MiAMBIENTE</p> <p>Basin Committees</p> <p>Municipal governments</p> <p>Water, Protected Areas and Wildlife Fund.</p>	<p>Hiring of financial and land management specialists</p> <p>This Output interconnects with Result 1.2 of Component 1.</p>
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<p>3.1.3 Measurement of carbon footprint and water footprint in key products in each basin and integration in certification schemes of the Reduce Your Corporate Footprint Program and Products (water and/or carbon footprint) to facilitate access to certified markets.</p>	<p>Indicator: a standardized system for measuring the water and carbon footprint has been established</p>	<p>Legal approval of the Reduce Your Corporate and Product Footprint program that establishes the government's approach to promoting low-emission production systems</p>	<p>Defined selection criteria for beneficiaries interested in measuring the water footprint</p> <p>Defined measurement standard to be applied (this must be done by MiAMBIENTE/MIDA)</p>	<p>Agreements on measurement standards (ISO 14067 or 14046) for carbon footprint and water footprint, respectively.</p> <p>Adoption of an eco-labeling for items prioritized by the project by MiAMBIENTE and MIDA.</p> <p>Reproduction and dissemination of the contents of the Reduce Your Corporate and Product Footprint program to producers and entrepreneurs</p>	<p>Information on low-carbon national production integrated into SINIA</p> <p>Outreach material</p> <p>Training reports</p> <p>Eco-labeling in key products of the project areas</p>	<p>Panama is preparing to show the UNFCCC progress to promote low-emission development with more efficient water resources use.</p>	<p>MiAMBIENTE MIDA FAO CATHALAC NATURA FOUNDATION ANAGAN</p>	<p>Specialized personnel will be hired to develop protocols and training activities</p>
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<p><b>3.2 Strengthening of organizational capacities for access to markets and certification mechanisms for agricultural products from areas with SLM and restored areas.</b></p>	<p><i>Indicator:</i> At least one association / cooperative in each basin demonstrating reduction of the carbon footprint and water footprint (goal per basin: 1; total goal: 3)</p> <p># of cooperatives and women's associations with access to markets for the certification of key crops in SLM areas and restored areas. (total goal: 2 per basin)</p>	<p>Legally established producer organizations, including women's organizations that develop products that can be certified</p> <p>Use in the country of International Certifications such as ISO 14067 for carbon and ISO 14046 for water footprint that is not always accessible to small producers and entrepreneurs.</p>	<p>According to Outputs</p>	<p>Producers/entrepreneurs recognized for their management in the basin and actions against climate change.</p> <p>Application of the necessary eco-labeling to access financing for this type of initiative.</p>	<p>According to Outputs</p>	<p>Assumptions of the Outputs</p>	<p>MIAMBIENTE MIDA NATURA FOUNDATION INTERNATIONAL CERTIFIERS</p>	<p>E Provision of technical assistance with highly qualified personnel in the international carbon market to guide the capacity-building process in the country.</p>
	<p>This Outcome contributes with CORE</p>	<p>The country is building its own carbon and</p>						

<p>3.2.1 Technical capacities of institutions to adopt carbon footprint and water footprint calculation tools for at least 2 key products strengthened (development of protocols for livestock and rice).</p>	<p><i>Indicator:</i> The protocols for certification of the carbon footprint of livestock and rice and the water footprint of key crops have been established.</p>	<p>Legal approval of the Reduce Your Corporate and Product Footprint program.  Panama is building a certification system for carbon footprint and water footprint products and the project will support this process.</p>	<p>Application protocols to certify the carbon footprint in livestock and rice</p>	<p>Application protocols for carbon footprint in livestock and rice legally approved by MiAMBIENTE, and implemented in the livestock sector and the rice sector.  Training of sector personnel on the application protocols for livestock and rice.</p>	<p>Legally approved protocols.  Project execution reports.</p>	<p>There is an active carbon market that represents an opportunity to expand businesses in the agricultural sector by increasing exports to markets that are more demanding in reducing emissions.</p>	<p>MIAMBIENTE MIDA NATURA FOUNDATION INTERNATIONAL CERTIFIERS</p>	<p>E Provision of technical assistance with highly qualified personnel in the international carbon market to guide the capacity-building process in the country.</p>
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<p>3.2.2. Associations and cooperatives certified by the Reduce Your Corporate and Product Footprint program (sale of eco-labeled products).</p>	<p><i>Indicator:</i> At least one association / cooperative in each basin demonstrating reduction of the carbon footprint and water footprint (goal per basin: 1; total goal: 3)</p>	<p>50 producer organizations, including cooperatives and associations, legally established.</p>	<p>At least one producer organization certified in accordance with the certification protocols for carbon and/or water footprint by other certification systems</p> <p>Information has been generated to establish a baseline for reducing the water and/or carbon footprint in the project execution areas.</p>	<p>Development and application of the necessary eco-labeling to access financing for this type of initiative.</p> <p>At least 3 producer and business organizations trained in the use of certifications for water footprint and carbon footprint to access green financing.</p>	<p>Number of training events on markets and certifications for low-emission and/or water-efficient products.</p>	<p>More efficient use of water is achieved in the execution areas.</p>	<p>MIAMBIENTE MIDA NATURA FOUNDATION INTERNATIONAL CERTIFIERS</p>	<p>Provision of technical assistance with highly qualified personnel in the international carbon market to guide the capacity-building process in the country.</p>
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<p>3.2.3 Technical and functional capacities of cooperatives or producer associations (with special emphasis on women's associations) strengthened to implement value-added ventures to products from SLM and restored systems and access markets.</p>	<p><i>Indicator:</i> # of cooperatives and women's associations with access to markets for the certification of key crops in areas with SLM and restored areas. (total goal: 2 per basin)</p>	<p>29 women's organizations (including both - those legally established and those that are not) that work in coordination with the MIDA Rural Women's Unit</p>	<p>3 women's organizations have been trained in the preparation of investment plans and low-emission products to request financing</p>	<p>Training in RuralInvest and preparation of investment plans that include products that have been certified with a water footprint or carbon footprint.</p> <p>Information on green financing options and financing for women.</p> <p>The measurement/certification of the reduction of environmental impacts (carbon and water footprints) to support credit applications.</p>	<p>Project execution reports.</p> <p>Memories of training events.</p> <p>Testimonies of the beneficiaries.</p>	<p>There are conditions to develop low-emission production systems, but it is necessary to achieve a greater rapprochement between producers and financing systems.</p>	<p>MIAMBIENTE</p> <p>MIDA</p> <p>NATURA FOUNDATION</p> <p>INTERNATIONAL CERTIFIERS</p>	<p>Experts in finance, strategic planning and product certification will be hired.</p>
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**Component 4. Knowledge management, evaluation and project report**

<p>4.1 Communication strategy on SLM, CSA, CSL and restoration of degraded lands developed.</p>	<p><i>Indicator:</i> At least 3 institutions reporting on SLM, CSA and CSL.</p> <p>This Outcome contributes to:</p> <p>Goal 4 of the LDN: By 2020, improve coordination between the different institutions, civil society, unions, and promote participatory mechanisms.</p>	<p>There is no communication strategy on SLM at the basin level</p>	<p>According to Outputs</p>	<p>Integration of entities related to LSM / CSA and LDN MiAMBIENTE, IGN (Tommy Guardia National Geographic Institute), MEF, MIDA, IDIAP, SENACYT, MICI, ETESA, SINAPROC that generate and provide information on the topics of interest of the project and the producers.</p> <p>Systematization, publication and dissemination of lessons learned and good practices with a gender equality approach.</p>	<p>Information dissemination campaigns during the life of the project</p>	<p>Assumptions of the Outputs</p>	<p>MIAMBIENTE MIDA IDIAP FAO SINAPROC ETESA CATHALAC SENACYT MICI ANAGAN BDA BNP</p>	<p>Participation of professionals and institutions in: communication, sociologist or social worker, web programmer, information system programmer.</p> <p>gender, youth leadership, etc. Sensitization in SLM/CSA/LDN.</p>
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<p>4.1.1 Communication strategy on the project and on SLM / CSA and LDN based on new technologies and digital tools, developed and implemented for the dissemination and expansion of the process (scaling up).</p>	<p>Indicator: At least 3 institutions reporting on SLM, CSA and CSL.</p> <p>The Communication Strategy will contribute to CORE indicators 3.1, 4.3 and the target of beneficiaries (4000).</p>	<p>There is no communication strategy on SLM at the basin level.</p> <p>There are environmental, climatic and agricultural information systems, research and technological innovation that will provide the information for the Communication Strategy</p>	<p>Communication Strategy designed and implemented.</p>	<p>Information will be generated and disseminated through: (i) printed material: bulletins, report documents, tables, graphs, maps; (ii) virtual / radio dissemination: news capsules, videos, reports, investigations, maps; (iii) various tools: workshops, seminars, courses, oral communication, emails and social networks.</p>	<p>Number of reports of the Communication Strategy .</p> <p>Institutions providing information to share and disseminate to beneficiaries and non-beneficiaries.</p> <p>Outreach materials produced and communicated by the project</p>	<p>The Communication Strategy will help more people to document the positive experiences of projects focused on expanding good SLM practices so that they can be replicated in other basins.</p>	<p>MIAMBIENTE MIDA IDIAP FAO SINAPROC ETESA CATHALAC SENACYT MICI ANAGAN BDA BNP</p>	<p>Collaboration agreements with the information generating entities. Use of simple language so that it is easily accessible to more producers. Dissemination of useful information adapted to each type of beneficiary.</p>
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4.1.2 Systematization, publication and dissemination of the lessons learned to support the expansion of LDN at the national level	<i>Indicator:</i> A systematization of lessons learned and good practices with a gender equality approach	The DS-LSM Project left lessons learned and systematized experiences that serve as guidance.	Record of experiences with beneficiaries	Systematization, publication and dissemination of lessons learned and good practices, with a gender approach and relevant to promote the project by encouraging similar developing initiatives.	Document that systematizes the experiences of the project and the good SLM practices.	The systematization of experiences helps to develop better projects with better results.	MIAMBIENTE MIDA IDIAP FAO CATHALAC NATURA	Assistance for the documentation and systematization of project experiences. Publication and dissemination.
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**ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).**

n/a

**ANNEX C: Status of Utilization of Project Preparation Grant (PPG). (Provide detailed funding amount of the PPG activities financing status in the table below:**

PPG Grant Approved at PIF: GCP /PAN/006/GFF			
<i>Project Preparation Activities Implemented</i>	<i>GETF/LDCF/SCCF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
5011 Budget & Operations Services	2,381.00	2,381.00	0.00
5578 Letter of Agreement CATHALAC	18,900.00	18,900.00	0.00
5650 Budget Contracts (other contracts)	8,300.00	8,300.00	0.00
5543 National Consultants	14,345.00	14,345.00	0.00
5685 National Trips	2,000.00	0.00	2,000.00
5023 Workshops	4,074.00	0.00	4,074.00
-			
<b>Total</b>	50,000.00	<b>43,926.00</b>	6,074.00

**ANNEX D: Project Map(s) and Coordinates**

**Please attach the geographical location of the project area, if possible.**

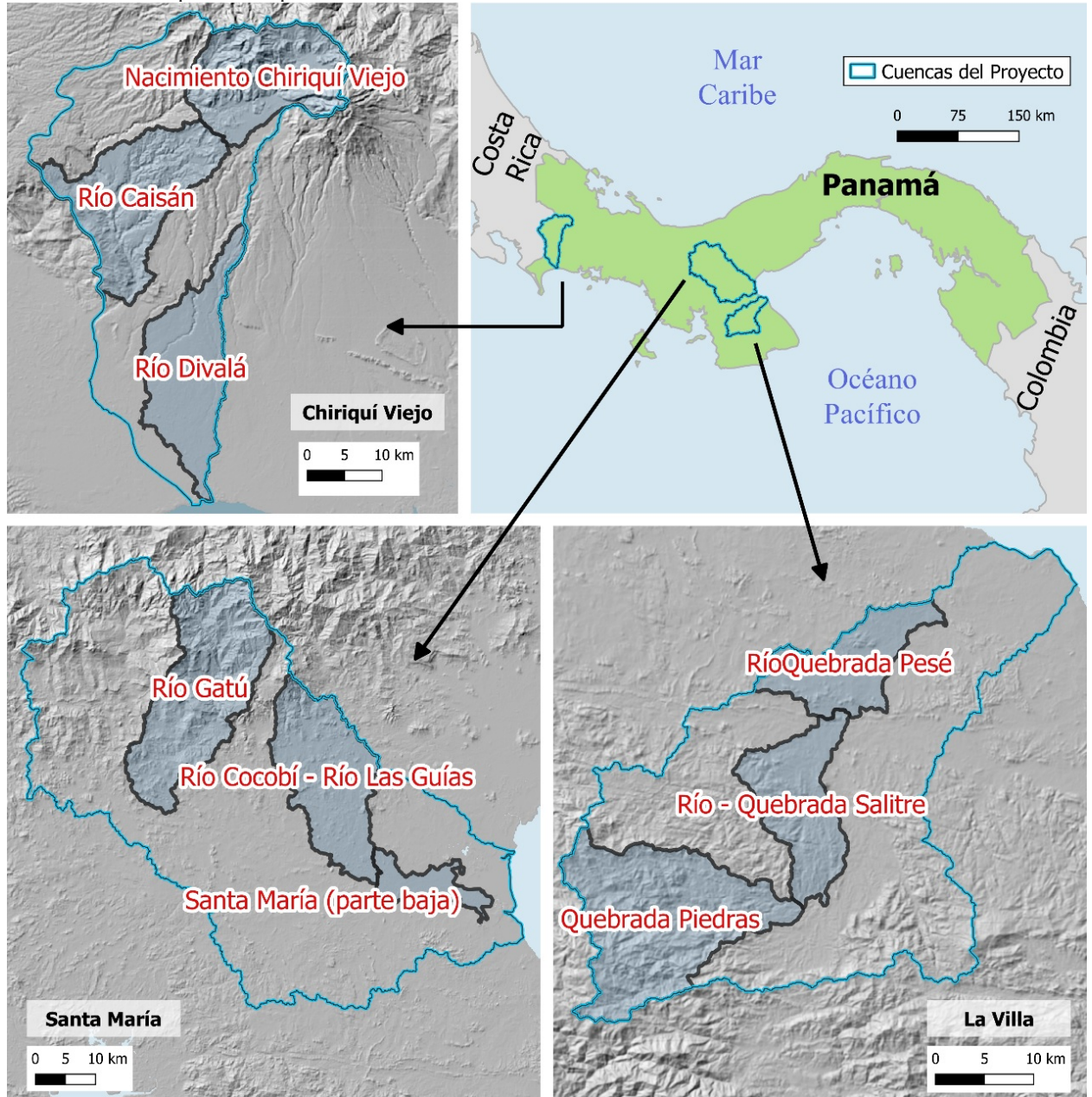
The execution area has been described in detail in Point 1. Description of the Project. It comprises 9 sub-basins (one for each upper, middle and lower part) of the hydrographic basins of the Chiriquí Viejo, Santa María and La Villa rivers located between the coordinates -82.94805,8.93687 and -80.33891,7.52704 (NO - SE, WGS84 - EPSG: 4326). The geographical coordinates of each basin are the following:

? Chiriquí Viejo: -82.94805,8.93687 y -82.53367,8.80498 (NO ? SE, WGS84 ? EPSG:4326)

? Santa María: -81.27072,8.63706 y -80.47037,7.92960 (NO ? SE, WGS84 ? EPSG:4326)

? La Villa: -80.83235,8.01770 y -80.34621,7.54656 (NO ? SE, WGS84 ? EPSG:4326)

Map below shows the specific execution sub-basins and their geo-coordinates in relation to their location on the map of the Republic of Panama.



## ANNEX E: Project Budget Table

Please attach a project budget table.

FAO Cost Categories	Unit	No. of units	Unit Cost	Component 1	Component 2	Component 3	Component 4	M&E	PMC	CATHALAC	NATURA	FAO	TOTAL
				Total	Totals	Totals	Totals						
<b>5013 Consultants</b>													
Carbon footprint (2 experts to prepare livestock and rice protocol)	Days (each)	160	240	0	0	38,400	0	0	0	0	38,400	0	38,400
Carbon footprint certification measurement (2 Experts)	Days (each)	300	240	0	0	72,000	0	0	0	0	72,000	0	72,000
Water footprint certification measurement (1 Experts)	Days	150	240	0	0	36,000	0	0	0	0	36,000	0	36,000
LDN monitoring systems expert	Days	30	300	9,000	0	0	0	0	0	9,000	0	0	9,000
<b>5013 Sub-Total International Consultants</b>				<b>9,000</b>	<b>0</b>	<b>146,400</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,000</b>	<b>146,400</b>	<b>0</b>	<b>155,400</b>
<b>5543 National consultants</b>													
Project Coordinator (half time) & Expert in land use planning (half time)	Month	36	3,000	27,000	27,000	0	0	0	54,000	108,000	0	0	108,000
Project Admin assistant (half time)	Month	36	1,386	0	0	0	0	0	24,943	24,943	0	0	24,943
Computer expert	Month	10	1,527	0	0	0	15,265	0	0	15,265	0	0	15,265
Legal Consultant	Days	90	150	9,000	0	4,500	0	0	0	9,000	4,500	0	13,500
Business plan specialist (farm business plans)	Days	180	150	0	18,000	9,000	0	0	0	18,000	9,000	0	27,000
Conservation agriculture and CSA expert/Integrate Agriculture/Agroforestry Specialist	Month	18	2,000	0	36,000	0	0	0	0	36,000	0	0	36,000
Integrated livestock / sustainable livestock / climate-smart livestock specialist	Month	30	2,200	0	66,000	0	0	0	0	66,000	0	0	66,000
Water footprint expert for methodology priority items	Days	730	55	0	0	40,150	0	0	0	0	40,150	0	40,150
Strategic planning expert	Days	150	150	0	0	22,500	0	0	0	0	22,500	0	22,500
Gender Expert	Month	13	1,800	5,400	12,600	5,400	0	0	0	18,000	5,400	0	23,400
M&E Expert	Days	120	150	0	0	0	0	18,000	0	18,000	0	0	18,000
Communication expert	Month	8	1,500	0	0	0	12,000	0	0	12,000	0	0	12,000
GIS Specialist	Days	80	150	0	12,000	0	0	0	0	12,000	0	0	12,000
Technical Field Assistant (2 x watershed)	Month	84	1,000	0	84,000	0	0	0	0	84,000	0	0	84,000
<b>5013 Sub-Total National Consultants</b>				<b>41,400</b>	<b>255,600</b>	<b>81,550</b>	<b>27,265</b>	<b>18,000</b>	<b>78,943</b>	<b>421,208</b>	<b>81,550</b>	<b>0</b>	<b>502,758</b>
<b>5650 Contracts</b>													
Terminal Evaluation	Lump Sum	1	30,000	0	0	0	0	30,000	0	0	0	30,000	30,000
Final report	Lump Sum	1	6,550	0	0	0	0	6,550	0	0	6,550	0	6,550
Licenses and equipment for water and carbon footprint.	Lump Sum	1	14,500	0	0	14,500	0	0	0	0	14,500	0	14,500
<b>5650 Sub-Total Contracts</b>													
				<b>0</b>	<b>0</b>	<b>14,500</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14,500</b>	<b>0</b>	<b>14,500</b>
<b>5650 Sub-Total</b>													
				<b>41,400</b>	<b>255,600</b>	<b>81,550</b>	<b>27,265</b>	<b>18,000</b>	<b>78,943</b>	<b>421,208</b>	<b>81,550</b>	<b>0</b>	<b>502,758</b>
<b>5021 Travel</b>													
National policy coordination meeting	Number	9	1,000	0	0	0	9,000	0	0	9,000	0	0	9,000
Exchange visits by land users to demonstration sites Component 2 (2 x year)	Number	6	1,000	0	6,000	0	0	0	0	6,000	0	0	6,000
International Travel /Terminal Evaluation	Lump Sum	1	5,450	0	0	0	0	5,450	0	0	5,450	0	5,450
Training students for field work (drones, GPS)	Lump Sum	1	5,000	5,000	0	0	0	0	0	5,000	0	0	5,000
Field visits and supervision (1 x month x year)	Number of tr	96	500	12,000	36,000	0	0	0	0	48,000	0	0	48,000
Field visit logistics expenses for RTH (2 x year)	Number	6	1,000	0	0	6,000	0	0	0	0	6,000	0	6,000
<b>5021 Sub-Total Travel</b>				<b>17,000</b>	<b>42,000</b>	<b>6,000</b>	<b>9,000</b>	<b>5,450</b>	<b>0</b>	<b>68,000</b>	<b>6,000</b>	<b>5,450</b>	<b>79,450</b>
<b>5023 Training</b>													
Annual work planning meetings and steering committee meetings	Meetings	3	1,500	0	0	0	4,500	0	-	4,500	0	0	4,500
Meetings of the Technical Committee	Meetings	6	500	0	0	0	3,000	0	-	3,000	0	0	3,000
Training on climate-smart agriculture	Event	9	1,000	0	9,000	0	0	0	0	9,000	0	0	9,000
Training on climate-smart livestock	Event	15	1,200	0	18,000	0	0	0	0	18,000	0	0	18,000

FAO Cost Categories	Unit	No. of units	Unit Cost	Component 1	Component 2	Component 3	Component 4	M&E	PMC	CATHALAC	NATURA	FAO	TOTAL
				Total	Totals	Totals	Totals						
Inception Workshop	Event	1	700	0	0	0	0	700	0	700.00	0.00	0.00	700.00
Land-Use Planning Workshops	Workshop	18	1,000	9,000	9,000	0	0	0	0	18,000.00	0.00	0.00	18,000.00
Watershed Committee Workshops	Workshop	10	1,375	13,750	0	0	0	0	0	13,750.00	0.00	0.00	13,750.00
Farmer Field School	Lump Sum	3	10,000	0	30,000	0	0	0	0	30,000.00	0.00	0.00	30,000.00
Training in business Planning / Financial management training workshops	Event	5	1,350	0	0	6,750	0	0	0	0.00	6,750.00	0.00	6,750.00
Certification / Assessment Workshops water and carbon footprint for entrepreneurs	Event	3	1,350	0	0	4,050	0	0	0	0.00	4,050.00	0.00	4,050.00
Certification / Assessment Workshops water and carbon footprint sectorial institutions	Event	3	1,500	0	0	4,500	0	0	0	0.00	4,500.00	0.00	4,500.00
Knowledge exchange on RTH at the international level to present results to the CMNUCC	Lump Sum	1	20,000	0	0	20,000	0	0	0	0.00	20,000.00	0.00	20,000.00
Terminal Workshop	Event	1	3,000	0	0	0	0	3,000	0	3,000.00	0.00	0.00	3,000.00
Training in opportunities for women in LDN, CSA, CSL and agroforestry	Event	6	1,000	0	6,000	0	0	0	0	6,000.00	0.00	0.00	6,000.00
<b>Sub-Total Training</b>				22,750	72,000	35,300	7,500	3,700	0	105,950.00	35,300.00	0.00	141,250.00
<b>5024 Expendable Procurement</b>										0.00	0.00	0.00	
Knowledge Management materials	Lump Sum	1	10,500	0	10,500	0	0	0	0	10,500.00	0.00	0.00	10,500.00
Aerial/ Satellite Photometry	Lump Sum	1	15,000	15,000	0	0	0	0	0	15,000.00	0.00	0.00	15,000.00
Office materials	Lump Sum	1	5,000	0	0	0	0	0	5,000	5,000.00	0.00	0.00	5,000.00
<b>Sub-Total Expendable Procurement</b>				15,000	10,500	0	0	0	5,000	30,500.00	0.00	0.00	30,500.00
<b>5025 Non-Expendable Procurement</b>										0.00	0.00	0.00	
Drones	Number	3	5,000	0	15,000	0	0	0	0	15,000.00	0.00	0.00	15,000.00
GPS and Monitoring equipment	Lump Sum	1	15,000	0	15,000	0	0	0	0	15,000.00	0.00	0.00	15,000.00
<b>Sub-Total Non-Expendable Procurement</b>				0	30,000	0	0	0	0	30,000.00	0.00	0.00	30,000.00
<b>5028 GOE Budget</b>													
Printing and advertising material for CSA & CSL	Lump Sum	1	10,500	0	0	0	10,500	0	0	10,500.00	0.00	0.00	10,500.00
Designing & reproduction of HRT dissemination materials and rice and livestock protocols	Lump Sum	1	12,100	0	0	12,100	0	0	0	0.00	12,100.00	0.00	12,100.00
Best practices and lessons learned publications	Publication	1	3,500	0	3,500	0	0	0	0	3,500.00	0.00	0.00	3,500.00
Telephone costs	Lump Sum	1	5,000	0	0	0	0	0	5,000	5,000.00	0.00	0.00	5,000.00
Miscellaneous	Lump Sum	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00
<b>5028 Sub-Total GOE Budget</b>				0	3,500	12,100	10,500	0	5,000	19,000.00	12,100.00	0.00	31,100.00
<b>TOTAL</b>				206,450	1,093,600	340,850	74,265	63,700	88,943	1,484,958	340,850	42,000	1,867,808

**ANNEX F: (For NGI only) Termsheet**

Instructions. Please submit a finalized termsheet in this section. The NGI Program Call for Proposals provided a template in Annex A of the Call for Proposals that can be used by the Agency. Agencies can use their own termsheets but must add sections on Currency Risk, Co-financing Ratio and Financial Additionality as defined in the template provided in Annex A of the Call for proposals. Termsheets submitted at CEO endorsement stage should include final terms and conditions of the financing.

**ANNEX G: (For NGI only) Reflows**

Instructions. Please submit a reflows table as provided in Annex B of the NGI Program Call for Proposals and the Trustee excel sheet for reflows (as provided by the Secretariat or the Trustee) in the Document Section of the CEO endorsement. The Agency is required to quantify any expected financial return/gains/interests earned on non-grant instruments that will be transferred to the GEF Trust Fund as noted in the Guidelines on the Project and Program Cycle Policy. Partner Agencies will be required to comply with the reflows procedures established in their respective Financial Procedures Agreement with the GEF Trustee. Agencies are welcomed to provide assumptions that explain expected financial reflow schedules.

**ANNEX H: (For NGI only) Agency Capacity to generate reflows**

Instructions. The GEF Agency submitting the CEO endorsement request is required to respond to any questions raised as part of the PIF review process that required clarifications on the Agency Capacity to manage reflows. This Annex seeks to demonstrate Agencies' capacity and eligibility to administer NGI resources as established in the Guidelines on the Project and Program Cycle Policy, GEF/C.52/Inf.06/Rev.01, June 9, 2017 (Annex 5).