



## **Transformation of Colombia's Panaela Subsector through the NAMA's Initial Implementation (CPS-NAMA)**

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

#### **GEF ID**

9581

#### **Project Type**

MSP

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

GET

#### **Project Title**

Transformation of Colombia's Panaela Subsector through the NAMA's Initial Implementation (CPS-NAMA)

#### **Countries**

Colombia

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

CAF

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

Ministry of Environment and Sustainable Development (MADS) Ministry of Agriculture and Rural Development (MADR) National Federation of Panaela (Fedepanela)

#### **Executing Partner Type**

Others

#### **GEF Focal Area**

Climate Change

#### **Taxonomy**

Focal Areas, Climate Change, Climate Change Mitigation, Renewable Energy, Technology Transfer

**Rio Markers**

**Climate Change Mitigation**

Climate Change Mitigation 2

**Climate Change Adaptation**

Climate Change Adaptation 0

**Duration**

36in Months

**Agency Fee(\$)**

180,000.00

**A. Focal Area Strategy Framework and Program**

<b>Objectives/Programs</b>	<b>Focal Area Outcomes</b>	<b>Trust Fund</b>	<b>GEF Amount(\$)</b>	<b>Co-Fin Amount(\$)</b>
CCM-1_P1	Outcome A. Accelerated adoption of innovative technologies and management practices for GHG emission reduction and carbon sequestration Outcome B. Policy, planning and regulatory frameworks foster accelerated low GHG development and emissions mitigation Outcome C. Financial mechanisms to support GHG reductions are demonstrated and operationalized.	GET	1,487,800.00	38,375,420.00
CCM-2_P4	Outcome A. Accelerated adoption of innovative technologies and management practices for GHG emission reduction and carbon sequestration Outcome B. Policy, planning and regulatory frameworks foster accelerated low GHG development and emissions mitigation	GET	512,200.00	56,484,159.00
<b>Total Project Cost(\$)</b>			<b>2,000,000.00</b>	<b>94,859,579.00</b>

## B. Project description summary

### Project Objective

Contribute to the implementation of the NAMA through the productive and technological transformation of the Panaela sub- sector.

<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(\$)
1. Improvement in Panaela Production Practices and the Restoration of Natural Systems Affected at the Local and National Levels	Investment	Outcome 1.1: Increase in crop coverage by End of Project (EOP).	Output 1.1.1 Soil studies in panaela producing areas conducted or updated in at least 40 production units in at least 6 Departments, plus an additional 400 units through the replication process	GET	349,674.00	83,687,187.00
		Outcome 1.2: Compensation Mechanisms for historic deforestation are measurable by 2030.	Output 1.1.2 Sugar cane repopulation plans developed and adopted in at least 40 production units in at least 6 departments of the country by EOP, plus an additional 400 units through the replication process.			
		Outcome 1.3: Efficient use and management of nitrogenous fertilizers based on soil studies.	Output 1.2.1 Forest Restoration Plans developed in at least 40 production units or 80 ha in at least 6 Departments, plus an additional 400			

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Integral Technological Transformation of the Panela Production Processes in Colombia.	Investment	Outcome 2.1 Improvement in the energy efficiency of panela mills results in reduction of greenhouse Gases by EOP.	Output 2.1.1 Adoption of thermal recirculation systems for the utilization of panela production process residual heat in at least 40 units in at least 6 departments of the country by EOP, and in 400 additional units through subsequent replication.	GET	1,017,371.00	8,195,168.00
		Outcome 2.2 Waste Water Treatment Systems for irrigation use as of year 2 of the project.				
		Outcome 2.3 Diversified use of waste products generated from the panela production process by EOP.	Output 2.1.2 Replacement of internal combustion engines by electric ones in at least 40 production units in at least 6 departments of the country by EOP, and in 400 additional units through subsequent replication.			
			Output 2.1.3			
			40 Panela production units eliminated tyres and reduced their consumption			

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
. Capacity Building of the Panama Sector for NAMA Implementation	Technical Assistance	Outcome 3.1. Technical assistance program updated as per the technologies adopted in the NAMA and available for technology transfer in the field throughout project implementation.	Output 3.1.1. Training plan designed and adopted as the main tool in training processes in at least 40 production units and linking at least 4 additional regional producers to the project in at least 6 departments of the country, plus an additional 400 units through the replication process.  Output 3.1.2  At least 10 training courses on the technologies adopted in the Panama NAMA, with participation of at least 64 producers.	GET	292,777.00	2,551,194.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Monitoring, Report & Verification (MRV), and Knowledge Management	Investment	<p>Outcome 4.1: Validation of the MRV system of the panela NAMA as of project year 2.</p> <p>Outcome 4.2. Systematization of lessons learned, experiences, and results on a continuous basis during project implementation.</p> <p>Outcome 4.3 Monitoring &amp; Evaluation as per the standards required by CAF /GEF</p>	<p>Output 4.1.1</p> <p>Validation of the MRV for the panela NAMA in at least 40 production units in at least 6 departments as of project year 2, plus MRV validation in 400 more units through the replicaiton process.</p> <p>Output 4.2.1.</p> <p>Orientation Guide produced which includes methods for calculating reduction of emissions, published and disseminated to a wide variety of audiences as a result of the systematization.</p> <p>Output 4.3.1</p> <p>Annual Work Plans, Biannual Progress Reports, Annual Financial Audit Reports, Mid-Term Evaluation</p>	GET	224,198.00	426,030.00



Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
				<b>Sub Total (\$)</b>	<b>1,884,020.00</b>	<b>94,859,579.00</b>
<b>Project Management Cost (PMC)</b>						
		GET	115,980.00			
<b>Sub Total(\$)</b>			<b>115,980.00</b>			<b>0.00</b>
<b>Total Project Cost(\$)</b>			<b>2,000,000.00</b>			<b>94,859,579.00</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>Amount(\$)</b>
Recipient Country Government	Ministry of Environment and Sustainable Development ? Directorate for Climate Change, and the Office of International Affairs	In-kind	200,430.00
Recipient Country Government	Ministry of Agriculture and Rural Development ? Panela Development Fund	In-kind	3,167,010.00
Other	Resources from the General Payment System, executed by Fedepanela ( Departments of Cauca, Cudinamarca and Nari?o)	In-kind	9,592,139.00
Other	FEDEPANELA	In-kind	100,000.00
Private Sector	FINAGRO	Loan	79,800,000.00
GEF Agency	CAF	Loan	2,000,000.00
<b>Total Co-Financing(\$)</b>			<b>94,859,579.00</b>

**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>NGI</b>	<b>Amount(\$)</b>	<b>Fee(\$)</b>
CAF	GET	Colombia	Climate Change		No	2,000,000	180,000
<b>Total Grant Resources(\$)</b>						<b>2,000,000.00</b>	<b>180,000.00</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

**PPG Amount (\$)**

50,000

**PPG Agency Fee (\$)**

4,500

<b>Agency</b>	<b>Trust Fund</b>	<b>Country</b>	<b>Focal Area</b>	<b>Programmin g of Funds</b>	<b>NGI</b>	<b>Amount(\$)</b>	<b>Fee(\$)</b>
CAF	GET	Colombia	Climate Change		No	50,000	4,500
<b>Total Project Costs(\$)</b>						<b>50,000.00</b>	<b>4,500.00</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)
0.00	80.00	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)
	80.00		

### 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 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)	0	495950	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)		290,184		
Expected metric tons of CO <sub>2</sub> e (indirect)				
Anticipated start year of accounting				
Duration of accounting				

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)		205,766		
Expected metric tons of CO <sub>2</sub> e (indirect)				
Anticipated start year of accounting		2020		
Duration of accounting		12		

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		64		
Male		96		
Total	0	160	0	0

## **PART II: Project JUSTIFICATION**

### **1. Project Description**

#### **1) Global environmental and/or adaptation problems, root causes and barriers that need to be addressed.**

Colombia is the world's second largest producer of panela (raw whole cane sugar) after India. The production of panela ranks second in the country's importance after coffee production, both for the area cultivated and for employment, constituting about 12% of the economically active rural population of Colombia. This figure includes 70,000 families in different links of the production chain grouped into 70,000 production units, 18,473 (data from 2019) mills in more than 564 municipalities in almost all the of the country's departments, with more than 200,000 hectares planted in sugarcane, producing nearly 1.1 million tons of panela per year, generating more than 278,000 jobs per year and contributing around 850 Million USD to the economy annually. A socioeconomic analysis of the target population identified that 90% of panela producers are small producers with less than 15 ha of cane and average incomes less than \$ 30 million Colombian pesos per year.

There is a high rate of desertion by panela-producing families from rural production areas because of the lack of employment guarantees and direct threats related to the armed conflict, violence, discrimination or intimidation. Insecurity in some regions prevented them from having access to essential services, to farm their land, sell their products or reach markets while disrupted access to health care, water supply, education and other basic services, thus generating high levels of poverty among the project's target population. The inclusion of women is central to the work of grinding, especially for the jobs of food preparation and in some villages where there is greater presence of smallholdings, they also collaborate in tasks related to the direct production of panela, such as cane lifters, mill workers or cooks due to lack of manpower in the regions, having an almost 16% participation in the activity. In recent years, due to the incursion into niche markets with products derived from Panela, women now participate in the development of packaging and traceability controls of the marketed products. Women are also responsible for the accounting functions of agribusinesses and have taken active participation in decision-making. Almost 30% of all female producers and heads of households are now linked to the activity, thus promoting gender equity in the subsector.

The Panela production process begins in the field where the sugar cane is grown and harvested. Then, it is converted into juice through grinding, followed by cleaning and evaporation of contaminants and water, and finally cooled into panela blocks. After the process of squeezing the juice of the cane by a mill or grinder, the remaining fibre (bagasse), is used as the main fuel source for the boiler. The boiler provides the heat to concentrate the juice and, in some systems, to aid bagasse drying. The dryer the bagasse, the better it performs as a fuel. If the bagasse is left too long (or takes too long) to dry out, it will partially decompose and be less useful as a fuel. Suitable storage facilities are therefore important, and some boiler systems use residual or recovered heat to speed up the drying process. Furthermore, the internal combustion engines that are used in the extraction of cane juice are not maintained as required, resulting in incomplete combustion with the release of gases and vapours that are highly polluting, as well as large quantities of volatile solids and particles.

The ADMIRE study, developed in 2017, indicates that the panela sector generates approximately 1,6 Million tCO<sub>2</sub>e per year, around 0,75% of the total net emissions of the country in 2014 according to the last inventory released. Under a BAU scenario these emissions could grow up to 2.1 Million tCO<sub>2</sub>e per year by 2030. In another study conducted in January 2018 by ONF ANDINA, the 22 thousand existing mills in the country at that moment were classified into 4 different groups depending mainly of size of production: 1) Mini-producers (1% of production). 2) Small traditional producers (55% of production) 3) medium producers (40% of production) and 4). Industrial Panela mills (4% of production). Calculations



(See Annex 7) based on these two studies show that the mitigation potential for the introduction of heat recirculators and the elimination of diesel engines, for the mills in group 2 and 3 range between 30 and 194 tCO<sub>2</sub>e/Mill/year.

According to Fedepanela, in Colombia cane is grown with the use of nitrogenous fertilizers without any prior soil analysis to determine what types and amounts of fertilizers may be most suitable. However, only 20% of the country's Panela production uses chemical-based nitrogenous fertilizers. Likewise, about 80% of the Panela production units are located on slopes, generating loss of soil resistance, landslides, and loss of crops due to the current seeding and crop cutting processes developed by farmers.

In addition to the firewood demand for the boilers, there is also a demand for natural binders used in the cane juice sedimentation process. The plants that are mostly used for the clarification of the juices are the balso (*Heliocarpus americanus* L.), the cadillo negro (*Triumfetta lappula* L.), cadillo blanco (*Triumfetta mollissima* L.), gu?simo (*Guazuma ulmifolia* Lam), cadillo de mula (*Pavonia spinifex* Cav), juan blanco (*Hemistylis macrostachis* Wedd) and the san joaqu?n (*Malva viscuspenduliflorus* Oc). In most of the panela areas of the country, these plants are threatened due to permanent and irrational use, increasing both their economic and environmental costs. Consistent with this, deforestation is evident in areas surrounding the mills and watersheds that have not been replenished, since there has been no reforestation initiative or sustainability policies targeting these timber resources used by the panela sector.

Moreover, the production process also uses large volumes of water for washing boiling pots and utensils for molds, disposing of the waste water in nearby rivers or directly to the soil with no prior treatment, contaminating the adjacent watersheds. Most mills do not have any kind of waste treatment facilities.

Other socioeconomic and environmental impacts caused by the poor production process of panela in Colombia are listed below:

Problem: Low cane yields per unit area (on average 4 tons of panela / ha - year) in crops of small producers of panela.

Cause: Poor process of transfer and adoption of technologies developed by CORPOICA CIMPA and other research led by Fedepanela.

Problem: Improved varieties of cane not used. Some production crops are over 20 years old. There is lack of expertise applying chemical and/or organic fertilizers.

Cause: Low supply of plant material from seed banks that help to renew the seed stock and reduce the average age of the primary seed material; and the presence of pests and diseases that reduce the productivity of the crops.

Problem: Low juice extraction yields and low efficiency of the panela processing equipment.

Cause: The critical point of low efficiency resides in the use of motors.

Problem: Negative effects of panela activities on the environment and human health, especially in the industrial phase.

Cause: The transfer of clean or appropriate technologies for the production process is not conducted.

Problem: Scarce organizational development culture.

Cause: Weakness of labor organizations and strengthening needed for greater coordination with the actors in the production chain.

Problem: A production system with low availability of skilled labor in the production and marketing process, limiting the overall development of farming families.

Cause: Producer organizations lack sustainability considerations from the moment of their creation.

Problem: Social breakdown due to lack of opportunities for human development.

Cause: The lack of transfers of technological progress has hindered professional development and the abilities of producer families.

Problem: Low level of social development indicated in the Human Development Index (HDI) and high levels Dissatisfaction with Basic Necessities (DBN).

Cause: Limited development opportunities for women and youth who participate in the production process. The social planning of the sector is weak and reactive, and lacks continuity of projects and programs geared towards integral human development.

As seen in the environmental situation posed, the problems of the panela sector are caused by various factors, including the lack of boundaries and planning for the exploitation of natural resources, a poor ability to enforce regulations for their management and use, and the desire of the population (producers) to seek economic gain rather than environmental sustainability and product quality. Also, clinging to traditional customs in the use of wood as a fuel source and unethical environmental practices adversely affect the possibility of a harmonious development that incorporates producers, consumers, and in general, the inhabitants of the region, for the building of a sustainable culture.

Finally, it is important to note that at this time in the country, the recent peace accord with the FARC guerrillas has created a new enabling environment where projects such as the panela NAMA may be promoted in this post-conflict era, given the important connotation of the Project in sustainable rural and low carbon development, which will certainly contribute to the growth of the rural economy in Colombia.

## 2) The baseline scenario and associated baseline projects

Since approximately 10 years ago, the producers' association has been embracing environmental actions through its Technological Reconversion Program. The main actions have been the inclusion of farmers in organic certification processes, the adoption of technologies for waste management, the improvement in energy efficiency, the replacement of obsolete equipment in production units and the strengthening of crops via renewal and replanting of crops with seeds adapted to the production area. The projects developed thus far have produced strategic information that will be used as baseline for this project. These include:

(i) Formulation of a NAMA: Low emission development strategy for the panela production chain in Colombia (NAMA Panela). 2018. The NAMA of this subsector contains the objectives, baseline, measures, barriers, MRV system, governance structure and financial resources necessary for the development of the Colombian Panela sector towards a low emission development strategy for its production chain.

(ii) Developing a transformational NAMA for Colombia's Panela Sector ? Colombia? (2017): Colombia's Ministries of the Environment and Agriculture (MADS and MADR), together with Fedepanela and Carbon Trust, received a cooperation from ADMIRE with a project aimed to develop a National Appropriate Mitigation Action (NAMA). This entailed establishing GHG scenarios, designing an MRV system and conduct a financial analysis of the interventions, which are essential components of such a NAMA.

(iii) Study ?Optimization of the panela oven combustion process in Cundinamarca Department, through the implementation of a system of bagasse application and recirculation of residual heat,? as part of the 2012 agreement between the Ministry of Foreign Affairs of Finland, the National Federation of Panela Producers (Fedepanela) and the Inter-American Institute for Cooperation on Agriculture (IICA), demonstrating the potential for reducing 521 TCO<sub>2e</sub> /yr/mill, equivalent to 60% of the emissions of the panela sub-sector and eliminating the need for additional tires and firewood in the process;

(iv) Association agreement 011-2011, subscribed with the Environmental Secretariat of the Department of Cundinamarca, for the design of the CDM Project "Reduction of greenhouse gases in the campesino panela agro-industry in the municipalities of Utica, la Pe?a, La Palma, Quebradanegra, Villeta and Caparrap? in the Department of Cundinamarca";

(v) CONTRACT FOR SERVICES REF:00062432/2011/01 ? Fedepanela between the Ministry of Environment, Housing and Land Development, and the UNDP, with the objective of validating vapor technology from the energy, technical, environment, economic, and social perspectives, with thermal recirculation in the traditional ovens as alternatives to reduce greenhouse gases from the panela production process, and other supplementary actions on the subject.

(vi) In 2012, the National Center for Cleaner Production, with the support from the Global Sustainable Biomass Fund, and in association with La Avenci?n Community Mill, the Fundaci?n Suramericana, GMSP, the Secretariat for Agriculture and Rural Development, the Office of the Mayor of Yolomb? and the Antioquia Regional Fedepanela, developed a replica of the document of the Sustainability for Small Mills project, which was developed and piloted at La Avenci?n Mill. This study evaluated the use of residual biomass energy, particularly from bagasse. It suggested therefore, the elaboration of bagasse briquettes for use in domestic stoves and to seek applications in and near areas where panela mills are located.

As a result of a collaboration between the Ministry of Agriculture and Rural Development of Colombia and Fedepanela, a mapping of the distribution of soil types is planned. This exercise will enable easy interpretation by users for environmental and land management studies, which will include sampling of plots of land in 630 production units in 12 departments, obtaining data of fertilization plans and georeferencing aimed at determining a soil distribution pattern. This input will be crucial as a baseline of current fertilization conditions of the production units under analysis. With reference to the natural resources of Colombia, the diagnosis of their status in the panela areas will be taken from previous studies developed for the country, corresponding to historical deforestation and degradation of natural ecosystems data.

In 2002, through the coordinated and concerted effort of the public and private sectors, 15 Environmental Guides for the agricultural sector were developed, one of them being for the panela sub-sector. The purpose of this guide was the adoption and implementation of best practices that enable improved environmental performance, leading to business competitiveness and sustainability, from an integrated environmental management approach. This guide is considered to be a working tool for the sector, where environmental management concepts are used and permitting the unification of criteria among the different actors, and was developed in the framework of the National Environmental Policy for Cleaner Production. With this tool, integrated management techniques were adopted with emphasis on environmentally friendly processes, which to date have resulted in a reduction in the use of fertilizers, the adoption of water management techniques, and reduction in the use of tires and firewood as supplemental fuel, although there is still a lack of coverage in both the adoption and the reproducibility of the process, mainly due to lack of resources for development of the activity.

Within the framework of the 2012 ?National Strategy Study for the Implementation of CDM in Colombia? conducted by Ministry of Environment and Sustainable Development (MADS), the production of panela is considered to be one of the sub-sectors with the highest potential to access CDM, because of the

environmental impacts that this production system generates. Nonetheless, the required mechanisms and incentives have not yet been developed in which external factors will have to be considered, such as a reduction in the market CERs. In 2011, however, with resources from the agreement between Fedepanela and the Secretariat for Environment of Cundinamarca, carbon footprints and the feasibility study to access the CDM in the panela industry in a region of the department were reviewed, supplemented by the energy and environmental characterization of the common ovens in the region. Here it was demonstrated that technology increased the thermal efficiency of the ovens by 8%, which ensures energy autonomy is achieved when the oven operates with an efficiency of 39%. The efficiencies characterized in the two ovens sampled were 32% and 35%. With the implementation of the system, efficiencies reached 40% and 43%, which indicates that in both cases, the energy auto-sufficiency of the ovens and a surplus of bagasse used for the activity are guaranteed.

Additionally, and according to the study by IICA, with efficient ovens the time of the presence of bagasse is reduced because the oven continues to be effective even when the bagasse is humid. At the Avenci?n Mill, a project developed by GMSP with the support of the government of the Netherlands, demonstrated that the surplus bagasse may be used in family kitchens, and studies by Fedepanela and Corpoica Cimpa suggest that it may also be used as animal feed and panela packaging. In addition, the country has a new regulation "Whereby the parameters and maximum allowable values set out in occasional discharges to surface water ... ", Resolution 0631 de 2015, which must be considered when establishing waste water systems in panela mills.

Moreover, Fedepanela is developing a new Strategic Plan to be implemented as of 2017, which includes the planning of the panela sector to increase the efficiency of production in associative models, with a view to reduce the 22,000 producing mills in the country to 8,000 with community characteristics, which will permit increasing production, homogeneity and quality of the panela for sale, while reducing impacts of climate change and to the environment in general. The plan also includes matters related to social security and occupational health for rural work, incursion requirement for infrastructure improvement, taking into account tertiary roads and rural aqueducts, and direct implementation of the energy and environmental management program for the panela subsector.

Fedepanela has been identified as a key player in the process of technology transfer and adoption because they know the characteristics and needs of panela producers in Colombia, and validate the measures proposed for climate change mitigation in the panela sector. In addition, Fedepanela directs and addresses the extension services provided to each producer and provides technical assistance to enhance panela production in the country. However, this critical service is limited due to insufficient resources, and it is necessary to expand these services to ensure that all producers adopt the required technology.

Colombia has made important progress in the identification, selection, and prioritization of NAMAs, using broad processes of participation with stakeholders from key sectors, within the framework of the Colombian Strategy for Low Carbon Development. The country now proposes to use the GEF support to advance to the other phase of NAMAs in the panela sector, the identification of financing and sustainability mechanisms, the initiation of NAMA implementation, capacity building for NAMA implementation, knowledge management, the initiation of the implementation of the MRV processes, and

coordination and the sharing of experiences with the implementation of the NAMAs of other productive sectors in Colombia.

3) The proposed alternative scenario, with a brief description of expected outcomes and components of the project

The overall objective of the project is "Contribute to the implementation of the NAMA through the productive and technological transformation of the Panama sub-sector".

The project aims to achieve this through the components described below.

Component 1: Improvement in Panama Production Practices and the Restoration of Natural Systems Affected at the Local and National Levels (USD\$349,674).

This component aims to achieve an increase in crop vegetation cover, measurable mechanisms to compensate for the historical deforestation and the efficient management of nitrogen fertilizers, with partial and gradual substitution by organic fertilizers, where feasible, and recognizing that in some production units it may not be feasible to eliminate nitrogenous fertilizers. The specific expected results for this component include: Mapping the distribution of soil types in 40 production units in 6 departments in the Panama area of the GEF project; Sugar Cane Re-population Plans developed and adopted in the project production units, Reforestation Plans for at least 80 ha in the areas of intervention of the project, and departments with demonstration strategies for reducing nitrogenous fertilizers with gradual substitution by organic fertilizers where feasible.

The transformative changes proposed in this component are fully based on the strategic combination of agro-ecological practices, guided by concepts of conservation, and adoption of cultural practices that are friendly to the environment, also presenting significant co-benefits of adaptation to achieve increased vegetation cover and compensate for historical deforestation, since erosion processes will be reduced in Panama production areas. A possible synergy with the restoration component of the forestry NAMA is contemplated, a program currently being designed by the Ministry of Environment and Sustainable Development.

Component 2: Integral Technological Transformation of the Panama Production Processes in Colombia (USD\$1,017,371)

This component seeks to establish through up-to-date technological processes, transformative changes at the levels of technology, management, attitudes, and the management of resources linked to the production of Panama. The production units selected will be subject to demonstrations in the application of innovative technologies. Therefore, the project will support the preparation of a fully participatory Technology Transformation Plan to guide the transformation process during the project and beyond. A Support and Monitoring Plan will be developed, and designed to provide continuous advice to Panama producers in

technical, financial, and management aspects related to the new technologies, practices, mechanisms and proposed technological transformation.

The specific results for this component include: Adoption of thermal recirculation systems for the utilization of residual heat from the panela production units in the targeted departments, reducing to 0% the use of additional fuels such as tires and firewood; additionally the replacement of internal combustion engines by electric ones in panela production units, that will result in 100% reduction of the use of conventional fuel (diesel) in production units by the end of the period of its implementation; waste water treatment systems implemented at selected production units participating in the project, with 40 hectares benefitting from treated waste water; residual waste products from the production process subject to at least one of three alternative uses at multiple departments of the country; and the establishment of at least two credit-based financial mechanisms to support panela producers in the replication and upscaling of technology transformations and enhanced sustainable panela production processes.

Component 3: Capacity Building of the Panela Sector for NAMA Implementation (USD\$292,777).

1. This component seeks to build capacity for the transformative changes contemplated in Components 1 and 2, and internalize and incorporate the requirements and recommendations of this project and its demonstrations in the panela NAMA, as well as relevant sector policies, regulatory frameworks, financing mechanisms and incentive programs that will ensure an important contribution to reducing emissions by this agricultural sector.

2. The specific results for this component include: Training plan designed and adopted as the main tool in training processes in production units and linking additional producers to the project by region, through-out the departments of the project; the implementation of training courses to panela producers in technologies adopted in the NAMA financed by the project, and the implementation of interactive forums for the transfer of knowledge and experiences with NAMAs of other productive sectors (forestry, coffee, cattle). Additionally, training will be provided to project staff and relevant project stakeholders in the use and application of the 'GHG Measurement and Reduction Framework' developed in late 2017 by the ADMIRE study, as a necessary tool for the calculation of GHG emissions and withdrawals (baselines and targets) in the panela production process, and in the financial models and scenarios developed for the Panela NAMA, based on credit mechanisms and credit performance as experienced by FINAGRO for the Panela sub-sector in 2017 and 2018, through specific lines of credit created to service the agricultural sector.

Component 4: Monitoring, Reporting & Verification (MRV), and Knowledge Management (USD\$224,198).

This component is particularly relevant in projects of this nature where the measurement and the starting point (baseline of the emissions present in the sector) require precise and frequent measurements. Therefore, it is essential to establish a Monitoring, Reporting and Verification (MRV) system, exclusively dedicated to providing systematic measurements of emissions linked to each stage of the panela production process. This MRV will be created under the national MRV rules and coordinated with the National GHG Mitigation Registry (RENARE) of the Ministry of the Environment.

The specific results for this component include: Validation of the MRV system for the panela subsector at the production units through-out departments of the country participating in this project; Orientation guide produced, published and disseminated to a variety of audiences in the panela industry as a result of the systematization; Annual Work Plans, Biannual Project Progress Reports, Annual Financial Audit Reports, Mid-Term Evaluation Report and Final Project Evaluation Report.

4) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing.

The concept of NAMAs was introduced in the Bali Plan of Action in 2007 (Decision 1 CP /13) and reinforced by the Cancun Agreements reached on December 11, 2010, in which the parties further agreed that " Parties that are developing countries will take the appropriate mitigation actions nationally in the context of sustainable development, supported and enabled by technology, financing and capacity building, aimed at achieving a deviation from the 'conventional emissions' in 2020." Consistent with these commitments, Colombia communicated its Strategy for Low Carbon Development to the UNFCCC, submitted its Intended Nationally Determined Contribution (iNDC) in September 2015 and signed the Paris Agreement on the 22nd April 2016.

As described above, a substantial amount of progress has been made in Colombia in terms of NAMAs, and most recently with the the Low Emission Development Strategy for the Panela Production Chain in Colombia produced in 2018. However, numerous challenges remain as summarized in the baseline conditions below:

- a. Current knowledge of soil composition and characteristics is insufficient to inform improved panela production strategies in the project intervention area.
- b. Current production of sugar cane for panela production has no special considerations or adaptation for a climate-smart approach which allows for the expansion and repopulation of plots, thus maximizing their contribution as sinks for greenhouse gases.
- c. Forest Restoration Plans are non-existent in the Panela sector, thus there are no significant efforts or compensation mechanisms to recover forests degraded in areas of panela production processes.
- d. The use of nitrogen based fertilizers does not follow a protocol for efficient use and the substitution to organic fertilizers, though attempted, has not yet proven to be viable in sugar cane production for panela.
- e. Notwithstanding efforts by the Government of Colombia under the framework of the CDM, thermal recirculation systems have not been embraced as an efficient, less-polluting, and alternative heat source in the Panela sector.
- f. Studies and pilot tests in the field have been conducted in Colombia, which have confirmed the benefits of using electric motors as alternative and more sustainable power source in Panela production.
- g. It is estimated that 99% of all Panela producers in the country use tyres and firewood as a heat source with significant production of pollutants and Green House Gases.
- h. Studies and pilot field tests in Colombia also have shown that diesel in Panela production is a significant source of pollution, Green House Gases, and is not cost-effective.

- i. No Panela production unit in the proposed project intervention area is currently equipped with a wastewater system and/or which is used for irrigation, resulting in direct deposit of used water to the environment.
- j. Waste products from the Panela production process is only partially used in the heat generation process, and the rest is left to lie and produce GHGs.
- k. No training tools or plans exist to assist in training producers in the use of alternative technologies under the Panela NAMA.
- l. MRV for the panela sub-sector has been introduced as part of the Low Emission Development Strategy for the Panela Production Chain in Colombia (2018), but this has not yet been implemented, thus validation and consolidation of the MRV system is pending, and is necessary in order to precisely estimate reduction in GHG emissions.
- m. No systematization of results, experiences and lessons learned in Panela production in support of knowledge management is currently underway, and there are no structured platforms for interaction and exchange of experiences with NAMAs of other productive sectors.

Without the GEF Intervention - If GEF support is not secured for the implementation of this project, a lack of knowledge of soil composition and characteristics will continue to be insufficient to inform improved panela production strategies, and the production of sugar cane for panela production will see no improvement in terms of embracing climate-smart approaches which will allow for the expansion and repopulation of plots, thus maximizing their contribution as sinks for greenhouse gases. Similarly, Forest Restoration Plans would not be developed and introduced with no significant efforts or compensation mechanisms to recover forests degraded in areas of panela production, and the inefficient application of nitrogen based fertilizers will continue, with no conscious effort to truly shift to organic fertilization.

A lack of GEF resources will mean that the use of thermal recirculation systems may remain foreign to panela production in Colombia as an alternative heat source, and all opportunities for shifting to electric motors as a more sustainable alternative will be lost. Additionally, conscious efforts in the panela production process to eliminate tyres, reduce firewood, eliminate diesel, introduce waste water systems, and subject waste products to alternative uses may be exceptionally slow with the continued production of pollutions and GHGs.

Without the support of GEF resources, the success of Fedepanela in achieving technological transformation of the panela production process will be slow and limited to the amount of resources available at this time, with predictable ineffectiveness and negligible contribution to the reduction of GHGs. Similarly, if the MRV system of the panela NAMA is not given the opportunity to be consolidated and validated, measurements of rate of reduction of GHF emissions will be inaccurate and of little credibility in terms of its contribution to global GHG reduction targets. The up-scaling and sustainability of successful NAMA implementation will require resources for systematization of results, experiences and lessons learned and for the establishment of interactive forums.

As captured in the project components above, in an effort to minimize the impact of panela production and optimize production efficiencies, resources of the GEF will support soil studies in panela producing areas in the proposed project intervention areas, which include 40 production units in at least 6 Departments, and will support the development and adoption of sugar cane repopulation plans in all of these areas. The GEF



will fund the development and implementation of Forest Restoration Plans following sustainable development principles including native species in at least 80 ha, and will fund the development and implementation of demonstration strategies for the efficient use of nitrogenized and/or organic fertilizers in all target project areas. These investments will result in an increase of the coverage of sugar cane crop for panela production, deforestation compensation mechanisms in the form of reforestation established and measurable, and nitrogenized and organic fertilization applied in an efficient manner according to standardized protocols.

The project resources will support 40 panela production units and 6 departments in the adoption of thermal recirculation systems, the installation of electric motors as an alternative and cleaner energy source, while implementing efforts to eliminate tyres and reduce firewood as heat sources, introducing waste water systems and develop Waste Management Plans, and supporting processes to achieve a 100% elimination of diesel as an energy source. This will lead to an integral technological transformation of the panela production process through the improvement in the energy efficiency of Panela mills, with panela wastewater used for irrigation purposes and other waste subjected to diversified alternative uses.

The GEF will strengthen Capacity for NAMA implementation in the panela sector through technical assistance and training as per the technologies adopted in the NAMA, this facilitating technology transfer. Project support will be provided for the design and adoption of an institutionalized Training Plan to be used by Fedepanela as the main tool in training processes in at least 40 production units and linking at least 4 additional regional producers to the project in at least 6 departments targeted by the project. The project will also support at least 10 training courses on the technologies adopted in the panela NAMA, with the participation of at least 64 producers.

The development of this project is part of the pilot implementation of Nationally Appropriate Mitigation Action ? NAMA for productive and technological transformation of the panela sub-sector, as a strategy for the reduction of Greenhouse Gases (GHG) by the country, presented as a voluntary commitment by Colombia to the UNFCCC. This GEF support will complement the country?s efforts to invest almost US\$167 million in national NAMA implementation, of which the Panela NAMA is fully integrated under the Agricultural Sector Mitigation Implementation Plan. Fedepanela will be a key partner in this national implementation plan with access to in-kind resources which will be used as additional co-financing to that already identified by the Ministry of Environment and Sustainable Development (MADS) for this GEF-funded project. Also, and in addition to co-financing already committed by CAF to the this GEF-funded project, a funding line as additional co-financing will be created by CAF aimed at the value chain of the Panela sub-sector in Colombia with a budget of USD\$2 million. This credit line will be channeled through FINAGRO and will also be available for intermediary financial institutions which can be at the service of smaller companies and producers; guides and manuals to support FIs in the development of financial solutions aimed at the Panela sub-sector; and capacity building of potential clients of the financial intermediaries. Major co-financing in the form of a credit line to panela producers will also be made available by FINAGRO, in the sum of US\$79,800,000 between 2020 and 2023, and will specifically target technological transformation and enhanced production processes, consistent with the objectives of Components 1 & 2 of this proposed project. Total project co-financing has been secured in the amount of US\$ 94,859,579, a major increase from the amount quoted in the PIF.

Baseline investments from all sources during the past five years, and including some investments that will continue during the implementation phase of this project, in support of sustainable panela production and efforts to enhance production processes in support of climate change mitigation, almost all of which is channeled via Fedepanela, represent a total sum of US\$32,036,844.13.

##### 5) Global benefits (GEFTF, NPTF) and adaptation benefits (LDCF / SCCF)

This project quantifies the reduction of GHG emissions at approximately 290,184 tons of CO<sub>2</sub>e calculated like this: 10.945 tCO<sub>2</sub>e (Lifetime direct GHG emissions avoided during implementation of the project for the period 2020-2023) + 66.329 tCO<sub>2</sub>e (Lifetime direct GHG emissions avoided during post project for the period 2023-2031) + 212.910 tCO<sub>2</sub>e (Lifetime indirect GHG emissions avoided for the period 2020-2031), and includes 40 panela production units in 6 departments of the country, and includes estimates of mitigation generated from a replication factor of 10, being an additional 400 units through to 2030. This is a higher expectation compared to what was quoted in the PIF (208,400 metric tons), and is due to more precise calculations conducted during the PPG stage. In order to establish the project replication strategy, a technology management model will be designed in a participatory manner that will integrate technological, socio-economic, organizational and institutional aspects. During the process of diagnostic, design, adjustment, evaluation and transfer, all efforts will be made to ensure that the community participates in all considerations of the technological offer and takes ownership of it, thus allowing for a greater probability of adoption of the technology by some of the other production units in the project intervention areas.

More precisely, the Project proposes the following through the operating GEF programs:

CCM1: Promote the Transfer of Technology of Innovation, and Supportive Policies and Strategies.  
Program 1: Promote timely development, demonstration and financing of low-carbon technologies and mitigation options.

Components 2 and 3 of the project address the objectives of Program 1 of the GEF Strategy for Climate Change Mitigation (CCM1). Based on the anticipated outputs of the project, a reduction in the emissions from panela production will be obtained through technological innovation of the agro-industrial process, the implementation of good environmental practices, and the demonstration of new technologies and procedures. Specifically, the projected GHG mitigation is expected through the recirculation of 50% of the heat that is lost through the chimneys, which will be re-injected into the system for the evaporation of excess water and for concentrating the cane juice. This recirculation is achieved using a heat exchange system in the ducts of the chimney, which facilitates the re-injection into the system at the point of combustion. In this manner, the thermal efficiency of the system can be increased by at least 20%, reducing the need for supplemental fuel such as firewood, and resulting in bagasse as the primary fuel source, thus offsetting the CO<sub>2</sub> which would have otherwise be produced from burning firewood and tires. This technology does not require any drastic changes to the current production and can be easily adapted to the ovens currently used. The project will conduct investments in the conversion of combustion motors into electric motors, with the objective of reducing by 100% the use of diesel within the project intervention production units. The conversion to electric motors will mean a reduction of CO<sub>2</sub> emission as a result of a positive conversion to electric motors. The range between 30 and 194 tCO<sub>2</sub>e/Mill/year referred to above, is

based on savings from the heat recirculation and the elimination of diesel engines. This component is aligned with the GEF-7 Core Indicator 6: "Greenhouse gas emissions mitigated (metric tons of carbon dioxide equivalent)" and its corresponding Sub-Indicator 6.2 Emissions Avoided Outside AFOLU.

Likewise, project investments in capacity building of capacity to induce transformative changes in technology for the production of panela will be indispensable for demonstration purposes in the panela NAMA, as well as relevant sector policies, regulatory frameworks, financing mechanisms and incentive programs that will ensure a significant contribution to reducing emissions by the panela sector in Colombia.

CCM 2: Demonstrate Systemic Impacts of Mitigation Options. Program 4: Promote conservation and the enhancement of carbon stocks in forests and other land uses, and support climate smart agriculture.

The objectives of Program 4 of the GEF Strategy for Climate Change Mitigation (CCM 2) will be addressed by project initiatives that are focused on linking good agro-industrial practices with social and environmental responsibility, and implementing a technical support plan to facilitate the adoption of the new technological system and its replication. Specifically, the project aims to contribute significantly to increased carbon stocks in panela production areas through forest conservation, the restoration of degraded ecosystems, the sustainable use of ecosystems considered as carbon sinks and CO<sub>2</sub> uptake through the renewal and repopulation of panela cane plots. Soil Management Plans and Forest Restoration Plans will be key tools in achieving these goals. It has now been demonstrated that additionally to the reforestation plans, a more integrated approach at the ecosystems level is required, geared at restoring ecosystem processes through comprehensive restoration programs. Likewise, the project will work on the adoption of environmentally friendly farming techniques by demonstrating the effective use of nitrogenous fertilizers based on plot-specific soil studies, and renewal and repopulation of sugar cane strains adapted to each production area, which will increase the density of planting and associated CO<sub>2</sub> uptake without affecting crop productivity.

This project also is aligned with the GEF-7 Core Indicator 6: "Greenhouse gas emissions mitigated (metric tons of carbon dioxide equivalent)" and its corresponding Sub-Indicator 6.1 Carbon sequestered or emissions avoided in the sector of agricultural, forestry and other land use. The project's calculation for the 80 ha of reforestation plans is 29.089 tCO<sub>2</sub>e using the Ex-Ante Carbon-balance Tool (EX-ACT).

The project's Results Framework has been modified to include the GEF-7 Core Indicator 11: "Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment" with a total number of 160 direct beneficiaries distributed into 64 women and 96 men.

#### 6) Innovation, sustainability and potential for scaling up

Innovativeness of the project - The prototypes and technologies to be developed are innovative for the panela regions and industry, considering that they seek to leverage existing knowledge in the control of stoichiometric combustion process conditions (adjusting the mixture of fuel and air to make better use of the calorific value of bagasse), and the recovery of residual heat that is normally discharged into the atmosphere. Added to this are the processes for the utilization of wastewater resulting from the production

process for inclusion in field activities aimed at indirectly contributing to maintaining the water cycle. These features allow cataloging the innovation as local, since it is not subject to massive use in the panela industry and they have implemented only a few prototypes through support projects in the different departments. However, agribusinesses that use fuels of cellulosic origin have enabled them to achieve adequate levels of energy efficiency and the cogeneration energy for other uses.

The implementation of combustion control and heat recovery permit achieving energy self-sufficiency and reducing pressure on natural resources and the reduction of greenhouse gases, generating surplus bagasse for agricultural use. The custom design and construction of the demands of each mill is innovating in the building of panela ovens that are normally built by local persons from plans copied from different sources, but which do not have a thermal engineering component in the design to support the system. With this, they are also laying the groundwork for a process of linking thermal engineering to agribusiness.

Similarly, inadequate management of water used during milling negatively affects both soil and bodies of water near the sugar mills due to the large amount of sucrose that decomposes into alcohol and lowers the pH in the surrounding environment, negatively affecting the lives of beneficial microorganisms. Due to this, the availability of water in some panela areas during the summer is exhausted, to the point of significantly affecting the amount of milling which can be conducted, since water is one of the most important resources in the panela process. For this reason, wastewater management has been considered in the project in order to generate sustainability of the panela production system.

Finally, there is the interaction and political will to guide the panela subsector to compliance with current regulations, not only for the production of panela as food, as in the case of Resolution 779/2006, but also for other provisions of an environmental nature that, in addition to generating positive impacts for reducing emissions, also generate economic and social benefits for panela producers in the country.

Upscaling and Sustainability - The sustainability of the achievements and impact of the project will be achieved through the following five strategies:

(1) Participatory technological transformation processes ? Under the leadership of Fedepanela, members of the federation will have a leading role in the development, demonstration, and adoption of new technologies to be used in the production of panela. This level of ownership by producers is essential to the success of the technological transformation. Panela producers are an essential part of identifying the need, structuring and development of the project, which provides them with a special empowerment for obtaining the knowledge required and generating the interest in new technology adoption. With the participation of communities, local producer associations and authorities make up an enabling environment to continue with a process of marketing and scaling up of the technology.

(2) Capacity Building ? The Project will invest in the development of a training plan to be designed and adopted as the primary tool in the training processes in 40 production units in 6 departments, while linking an additional 4 producers per region to the process of the Project intervention area. This focus of maximizing and institutionalizing capacity building will guarantee a continuous support process through proven and institutionalized tools.

(3) Replication ? One of the priorities of FEDEPANELA is to strengthen and consolidate the production of Panela in the country in a sustainable manner, through continuous managing, developing and promoting projects and programs that guarantee the competitiveness of the Panela subsector, under a low carbon development scheme. To this end, the guild of Panela producers of Colombia has developed a Strategic Plan that includes the planning of the subsector to increase the efficiency of production in associative models, with a view to reducing the 22,000 Panela mills in the country to 8,000. This will increase the production, homogeneity and quality of Panela, while reducing the impacts of climate change and the environment in general. Consistent with this, a Nationally Appropriate Mitigation Action (NAMA) for the Panela subsector was determined, in order to identify those mitigation activities that may be implemented given the particular conditions of panela production in Colombia, making it possible to validate the physical and financial requirements necessary for the design of the NAMA. The experiences and lessons learned from the 40 production units in the 6 departments will be used by Fedepanela in replication processes in other units and departments in the country, and thus contribute to the sustainability of the Project's achievements and maximizing their impact on GHGs in Colombia.

In the integral technological transformation of panela production processes in Colombia, 10 productive units are projected as a replication factor for each of the 40 contemplated in the pilot, thus allowing for a total replication of 400 units based on the current investments of the panela producers of the country, and in consideration of the available co-financing from FINAGRO and CAF. The mitigation of GHG emissions associated with these replicas are quantified within the Calculation tool (See Annex 7) produced for this project. The corresponding business model for financing and replication of CO<sub>2</sub> mitigation activities is based on the Fund for Financing of the Agricultural Sector (FINAGRO), which has different lines of credit available for the Panela subsector in the form of working capital, investment and portfolio normalization. The investment line is distributed in areas of commercialization, diversification, infrastructure and adaptation of lands, machinery and equipment, support services, plantings and other activities. Between 2018 and 2020 credits to the Panela sub-sector were made by FINAGRO in the amount of USD 106 million, demonstrating clear evidence of the confidence the financial sector has in Panela production, and which continues to provide a robust basis upon which to extend credit for technological transformation of the Panela sub-sector in Colombia. Using this credit lines from 2018 from 2020, FINAGRO through its credits lines placed USD 89 million for panela cultivation while over USD 17 million were placed for processing activities in sugar mills. This provides a recent and robust baseline and reference to estimate the true cost of replication and the amount of replication possible with the available co-financing, while also considering credit risk assessments.

The Technology Transformation Plan and the Support and Monitoring Plan to be developed by the project and adopted by Fedepanela will be instrumental in the replication process. Panela producers will be able to access resources to make effective the anticipated replication through credit mechanisms available. FINAGRO has multiple mechanisms available to facilitate access to credit by Panela producers, even with credit risk assessments. Two key mechanisms are the "Fondo Agropecuario de Garant"as "FAG-" and the "A Toda Maquina" credit line, both of which are very familiar to Panela producers. The credit line from CAF will be channelled through the mechanisms of FINAGRO, using the line of credit systems the Panela producers are already familiar with. Replication also is a key concept in the development of knowledge management to be promoted by the Project. The overall replication strategy therefore combines

institutionalization of technological transformation methodologies and enhanced sustainable production techniques, coupled with accessible and substantial credit financing for Panela producers

(4) Financial Sustainability ? With the process of innovative technological development, it is intended that Fedepanela incubates a technology and innovation development company that can be in charge of the technology management processes. In addition, the adoption of processes for the improvement of panela sugarcane production practices and the restoration of natural systems will contribute to improving environmental quality and basic resources on which agriculture depends, and meet the basic needs of production for both marketing and for self-consumption by families linked to panela production. As a result, the proposed outcomes of the project are economically viable and improve the quality of life of the panela producer, while generating efficient production mechanisms that directly contribute to the financial and economic sustainability of the panela production processes, achieving the adaptation of panela production and guaranteeing its permanence in space and time. A ?GHG Measurement and Reduction Framework? has been developed in late 2017 to determine total NAMA implementation costs, including financial scenarios, preliminary financial model for NAMA implementation, as well as a GHG Baseline Calculation Tool. This framework is currently used to assist the Government of Colombia in the national mobilization of economic resources in support of NAMA implementation at the national level. Consistent with this, recent (2017-2018) direct credit to the Panela sub-sector through financial mechanisms developed by FINAGRO were implemented to facilitate NAMA implementation, with data from 2017 & 2018 providing important contributions to the process of consolidating and validating the true costs associated with implementing the Panela NAMA. Future credit to be provided by FINAGRO and CAF in support of replicating project results will help to further consolidate the comprehensive business model post-project, which was preliminarily developed in late 2017 under the ?GHG Measurement and Reduction Framework?. Project outcomes will be upscaled and replicated with the support of a CAF Credit Line of US\$2,000,000 plus another US\$79,800,000 credit line which has been secured and made available by FINAGRO to the panela sector. These financial mechanisms will complement the institutionalization of technological transformation, production best practices, training, and capacity building by Fedepanela as a consequence of project investments, which collectively constitute the overall strategy for the replicating and upscaling of project results.

(5) Institutionalization of Policies ? The formal and institutional adoption by Fedepanela of management plans, guidelines for technological conversion, and financial sustainability strategies will ensure the existence of a formal framework within which the implementation of the NAMAs in Colombia?s panela sector will be achieved.

#### **A.2. Child Project?**

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

NA

#### **A.3. Stakeholders**

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

The Ministry of Environment and Sustainable Development (MADS), the Focal Point of the GEF in Colombia, the Ministry of Agriculture and Rural Development (MADR), and Fedepanela will be the main national project partners, with FINAGRO as a key co-financing partner. CAF will act as the GEF implementing agency.

Stakeholders participated in the identification of project priorities and in the definition of planned outputs and outcomes during interviews and consultations. Project stakeholders had the opportunity to review and comment on proposed project activities and to provide specific inputs to the project formulation process. During project implementation, inclusion and engagement of project stakeholders, Civil Society Organizations (CSOs) and the public will include the provision of co-financing, participation of technical staff in workshops, training, and tools development, the facilitation of local project events and processes, the provision of project oversight through participation on the governing bodies of the project such as the Project Steering Committee or Technical Advisory Committee, as data sources, technical expertise and knowledge management through the institutionalization of project results and lessons learned to allow for up-scaling, replication, and sustainability. In all instances, the standards and guidelines of the Environmental and Social Safeguards for CAF/GEF Projects Manual applies, including safeguards addressing indigenous peoples. Section B and Table 1A (page 15) of the CAF Project Document contains a detail description of project stakeholders.

## Documents

Title

Submitted

**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.**

**Select what role civil society will play in the project:**

**Consulted only; No**

**Member of Advisory Body; Contractor; Yes**

**Co-financier; Yes**

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

**Executor or co-executor; Yes**

**Other (Please explain)**

#### **A.4. Gender Equality and Women's Empowerment**

**Please briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis).**

Elaborate on how gender equality and women's empowerment issues are mainstreamed into the project implementation and monitoring, taking into account the differences, needs, roles and priorities of women and men.

In its efforts to fully integrate gender mainstreaming, the Project will be guided by the principles that gender elements are important drivers and incentives for achieving global environmental benefits, and in ensuring gender equity and social inclusion.

The Project seek to institutionalize gender mainstreaming at all levels of intervention and operation of the project, through the development and implementation of a Gender Mainstreaming Action Plan, which follow the Gender Analysis Approach, Guidelines and Procedures described in Section XIII of the Environmental and Social Safeguards for CAF/GEF Projects Manual, with particular attention to the potential roles, benefits, impacts and risks for women and men to ensure meaningful participation and the equitable distribution of benefits among women and men to be derived from project interventions. In consultation and with the participation of women at the levels of relevant government ministries and operational governance structures of the Project, special efforts will be made to ensure that gender equity concerns are voiced during project consultations at all levels, in all policy, program, administrative and financial activities and procedures of the project, thereby contributing to a profound organizational transformation in all entities directly involved in the Project; gender training for both men and women in all opportunities provided by the Project; increasing women's access to opportunities for continued personal growth, increasing their leadership, and their capacity as agents of change in the communities in which they live.

Since early project planning would typically define major strategies and actions which would influence the life of the project. Gender Mainstreaming Action Plan (Annex G) is mandatory project policy documents to be consulted and followed in the definition, conceptualization and implementation of all project components and investments, and will form part of the required monitoring and evaluation of the project. In order to develop the Gender Mainstreaming Action Plan for this project, the information available in the Diagnostic Study of Rural Women Producers and Panel Entrepreneurs prepared by FEDEPANELA in July 2020 and the Gender Analysis included in Annex H were considered.

Compliance with the required outputs and standards of the Gender Mainstreaming Action Plans is subject to independent external auditing to be explicitly referenced in the Project Operations Manual, in



all Subsidiary Agreements between CAF and the project's Executing Agency, and in the Terms of Reference for the Mid-Term Evaluation and the Terminal Evaluation of the project.

## Documents

Title	Submitted
<b>Gender Action Plan</b>	
<b>GENDER_ANALYSIS</b>	

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

Yes

**If yes, please upload document or equivalent here**

Gender Mainstreaming Action Plan and Gender Analysis is attached as Annexes G & H

**If possible, indicate in which results area(s) the project is expected to contribute to gender equality:**

**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**

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

Yes

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

### A.5. Risks

**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.**

Estimated risks are summarized below along with their rating category and mitigation measures as appropriate.

(1) Environmental: Region with moderate erosive capacity and occurrence of extreme weather events such as floods or droughts that may affect the panela production system

Level: Medium

Mitigation Strategy: Small farmers and medium-sized panela enterprises regularly experience harsh conditions and drought, without stopping their activities. The selection of project intervention sites is based

on regions where Fedepanela has direct intervention, which enables a significant portion of panela producers to introduce and test technologies and practical proposals. Project management will closely monitor the situation and take corrective action if necessary to maximize coverage.

(2) Social: Low participation of farmers and their families in the project, especially women involved in the panela production system.

Level: Low

Mitigation Strategy: The project includes a good environmental practices component, focusing on optimizing the use of organic matter and improving the agricultural production system, including recovery of crop cover, thus providing resilience to the production model as a collateral benefit.

It depends on the areas, and if they are production units adjacent to major cities.

(3) Political/Institutional: Lack of interest from decision makers. Implementation of stringent controls.

Level: Medium

Mitigation Strategy: Design incentives so that technological transformation processes and environmental best practices are socially, economically and environmentally sustainable.

(4) Economic/Financial: Failure to comply with the commitments made by the participating entities.

Level: Low

Mitigation Strategy: Government entities to develop incentive mechanisms, and implementation of collective dialogue for gradual and differentiated control of the raw material used in agro-industrial process. Additionally, a substantial line of credit for panela producers has been secured.

(5) COVID-19 Risk: project start is hampered by movement restrictions. The post-pandemic situation makes project assumptions invalid.

Level: Medium

Mitigation Strategy: The final stage of the formulation process has demonstrated with virtual tools that it is possible to provide continuity to project activities during the acute phase of the pandemic.

The project will start its execution with combination of virtual and physically-distanced meetings, showing that means are available for participative decision-making in the post-pandemic situation. Implementing project activities will support the economic recovery during post-COVID 19 in the panela sector.

#### **A.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.**

Project execution and coordination among the variety of actors of the project will be led by Fedepanela. Fedepanela is a national trade organization committed to research and technological, economic, social and environmental development of the panela sub-sector, with strong influence on public policies.

A Project Coordinating Unit (PCU) will be established by Fedepanela to oversee day-to-day project execution. The PCU is responsible for the fiduciary oversight and reporting of the project, including financial management and procurement consolidation according to the projects operational manual and procurement plan. It is also responsible for monitoring and evaluation (M&E), provides and coordinates

technical advice, and coordinates and assists overall orientation concerning project conception, strategies, criteria and methodologies, as well as organizes and supports regional activities at the department level. The PCU will be staffed with A Technical Project Coordinator, a Sustainable Agriculture Specialist, and an Accountant/Administrative Officer. Financial management and procurement services will be provided by Fedepanela, and technical delivery of project outputs will be complemented by specialist consultants on an as needed basis.

Two key governing bodies will be established for the project: a Project Steering Committee (PSC) and a Technical Advisory Committee (TAC). In practical terms the PSC is responsible for ensuring that the project meets goals announced in the Project Result Framework by helping to balance conflicting priorities and resources. Conclusions and recommendations produced by the PSC will be used by Fedepanela to modify implementation strategies, annual work plans and resources allocation budget and, when necessary, to adjust the project's Result Framework. This committee will meet every six months, either physically or virtually. The composition of the PSC will be defined in the Project Operations Manual (POM). The Project Steering Committee will be chaired by the Ministry of Environment, with the Ministry of Agricultural and Rural Development serving as Vice-Chair. The Technical Advisory Committee will be chaired by Fedepanela, with the Ministry of Agriculture and Rural Development serving as Vice-Chair, and will also include a representative of FINAGRO.

Further details of the project's institutional arrangements are provided in Annex 5 of the CAF Project Document.

**Additional Information not well elaborated at PIF Stage:**

#### **A.7. Benefits**

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

The beneficiaries of the implementation of the NAMAs in the panela sector are a representative sample of 2% of all the producers to whom Fedepanela provides technical support, but which will be substantially increased through the project's replication strategy to be spearheaded by Fedepanela. . Since there are peculiarities in the regions, the sample will be obtained from 6 departments (Antioquia, Boyacá, Cauca, Cundinamarca, Nariño, Santander) where Fedepanela has direct influence. The direct beneficiaries are 40 production units, 78 families established in the basins of the Cauca, Magdalena, Caquetá rivers, and the Colombian Massif, and involving at least 64 women and 96 men as direct participants in the productive activity. All benefits are expected to increase 10 fold through the replication of project results to be implemented with the co-financing identified for the project

Components 2 and 3 of the project address the objectives of Program 1 of the GEF Strategy for Climate Change Mitigation (CCM1). Based on the anticipated outputs of the project, a reduction in the emissions from panela production will be obtained through technological innovation of the agro-industrial process, the implementation of good environmental practices, and the demonstration of new technologies and procedures. Specifically, the projected GHG mitigation is expected through the recirculation of 50% of the

heat that is lost through the chimneys, which will be re-injected into the system for the evaporation of excess water and for concentrating the cane juice. The project will also conduct investments in the conversion of combustion motors into electric motors, with the objective of reducing by 100% the use of diesel within the project intervention production units. The heat recirculation systems and the conversion to electric motors will mean a reduction of CO<sub>2</sub> in the range between 30 and 194 tCO<sub>2</sub>e/Mill/year.

The objectives of Program 4 of the GEF Strategy for Climate Change Mitigation (CCM 2) will be addressed by project initiatives that are focused on linking good agro-industrial practices with social and environmental responsibility, and implementing a technical support plan to facilitate the adoption of the new technological system and its replication. Specifically, the project aims to contribute significantly to increased carbon stocks in panela production areas through forest conservation, the restoration of degraded ecosystems, the sustainable use of ecosystems considered as carbon sinks and CO<sub>2</sub> uptake through the renewal and repopulation of panela cane plots. Soil Management Plans and Forest Restoration Plans will be key tools in achieving these goals. It has now been demonstrated that additionally to the reforestation plans, a more integrated approach at the ecosystems level is required, geared at restoring ecosystem processes through comprehensive restoration programs. Likewise, the project will work on the adoption of environmentally friendly farming techniques by demonstrating the effective use of nitrogenous fertilizers based on plot-specific soil studies, and renewal and repopulation of sugar cane strains adapted to each production area, which will increase the density of planting and associated CO<sub>2</sub> uptake without affecting crop productivity.

#### **A.8. Knowledge Management**

**Elaborate on the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives (e.g. participate in trainings, conferences, stakeholder exchanges, virtual networks, project twinning) and plans for the project to assess and document in a user-friendly form (e.g. lessons learned briefs, engaging websites, guidebooks based on experience) and share these experiences and expertise (e.g. participate in community of practices, organize seminars, trainings and conferences) with relevant stakeholders.**

This project takes the approach that knowledge is not only information, but also the skills and tools used in capacity building for the generation, revision and improvement of the knowledge bases. The Project will implement demonstration transformational activities as part of a broad process of building knowledge for the mitigation of GHG. The testing of tools and methodologies and the identification of those that best adapt to the specific needs of the panela productive units will form the basis on which local capacities for analysis, planning and transformation to new production technologies will be developed.

Lessons learned and experiences will be recorded, analyzed and applied in updating training tools in a systematic and continuous manner throughout Project implementation. The products of knowledge management will be available to productive units in other sectors and projects via the institutional websites of Fedepanela and MADS. Where possible, this project will seek opportunities to exchange information and experiences with other projects and initiatives, in order to take advantage of other experiences and lessons for continuous improvement of project impacts through feedback.

To complement the above, it is necessary to develop a strategy for the replication and dissemination of technology, which is part of one of the objectives of the Project, making use of the practical experiences of 40 production units, with the possibility to design a project specifically based on the results obtained for the replication and scaling up to other units and areas, both nationally and internationally. Likewise, and in an effort to maximize the exchange of experiences and lessons learned, the project will support a forum for knowledge exchange with other NAMAs at the national level, initially targetting the coffee NAMA.

## **B. Description of the consistency of the project with:**

### **B.1. Consistency with National Priorities**

**Describe the consistency of the project with nation strategies and plans or reports and assessments under relevant conventions such as NAPAs, NAPS, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.**

The Conference of the Parties (COP) of the UN Framework Convention on Climate Change (UNFCCC), in the Bali Action Plan of 2007, called on developing countries to deepen efforts by implementing Nationally Appropriate Mitigation Actions (NAMAs). During the Cancun Agreements (2010), the Conference of the Parties added that NAMAs should divert GHG emissions from the trends seen in developing countries. However, it is important to note that there is no international agreement that determines the definition, scope, mode of operation, the applicability or eligibility of NAMAs. In this context, the NAMA is much more flexible than other instruments of the Clean Development Mechanisms (CDM). The main difference is that NAMAs, unlike the CDM, do not aim to issue and sell Certified Emission Reductions (CERs). In short, the NAMAs are policies, regulations, programs or other actions that reduce GHG emissions from their trend levels or "business as usual" (BAU), and in turn contribute to achieving the country's sustainable development goals. Currently, there is no approval process common to all countries, nor are there methodologies for baselines, monitoring, reporting and verifying of emissions established for NAMAs.

At the national level, NAMAs are framed within the national climate change policy and specifically, within the Colombian Strategy for Low Carbon Development. This strategy is being implemented since 2011, and its objectives are to support the different sectors in the formulation and implementation of sector plans to mitigate climate change, and the establishment of a system of reporting and monitoring through the development of studies for decision making and capacity building and strengthening.

The current proposal for the GEF project is part of a NAMA project, according to the classification proposed by MADS. This NAMA group is defined as follows: "they are mitigation actions at the sector or sub-sector level that are replicable and scalable to the national level. Although they may initially be formulated and implemented through pilot projects, the NAMA should be formulated to be a sector or sub-sector action and its scope must be broader than those of a project," mutually complementing one another.

The main elements of building a NAMA are:

- ? Definition of a baseline and abatement potential, the presentation of which should be more flexible than the CDM
- ? Implementation time
- ? Other benefits and contribution to sustainable development
- ? Monitoring and Reporting; the system must be simple and as clear as possible
- ? Support the national government and consistent with development priorities
- ? Identification of risks and barriers
- ? Costs, required support, and financing

The proposed Project complements the "NAMA Information Note (NINO)" developed in 2015 by the teams from the Colombia Low Carbon Development Strategy, MADS, MADR and Fedepanela, and with the "Estrategia de desarrollo baja en emisiones para la cadena de producci3n de la panela en Colombia (NAMA Panela)" " Low Emission Development Strategy for the Panela Production Chain in Colombia - developed by ONF-Andina in 2018 and funded by CAF, and adopted by MADS. Additionally, this project is consistent with the country's commitments as illustrated by its signing of the Paris Agreement on the 22nd April 2016 and prior submission of its Intended Nationally Determined Contribution (iNDC) in September 2015. Within the framework of the Paris Agreement, Colombia committed to the progressive reduction of national emissions of greenhouse gases by 20% (and up to 30% conditioned) with respect to projected emissions by the year 2030. Furthermore, the Panela NAMA is consistent with the National REDD+ Strategy, and is part of Colombia's Agricultural Sector Mitigation Implementation Plan, therefore the project will contribute directly to NDC goals at both the sector level and the national level.

**C. Describe The Budgeted M & E Plan:**

The project's M&E plan is consistent with the GEF Monitoring and Evaluation policy. The Project Results Framework presented in Annex 1 of the CAF Project Document includes SMART indicators and means of verification for each expected outcome. An inception workshop will be held at the onset of project implementation to ensure all actors understand their roles and responsibilities vis-?-vis project monitoring and evaluation, but specifically to produce: the project's Annual Work Plan; discuss the Project Operations Manual; discuss roles, responsibilities, and decision-making structures; discuss need and details of a Gender Action Plan; and discuss Financial Reporting and Project Progress Reporting. Immediately after the Inception Workshop, Fedepanela will proceed to development a detailed long-term M&E plan for the project, based on the results framework and the Monitoring and Evaluation of indicators in project results framework. The Project Steering Committee (PSC) will meet twice yearly and will issue reports every 6 months on progress by the project and make recommendations concerning the need to revise any aspects of the Project Results Framework, or the M&E plan, and will be responsible for approving Quarterly Financial Reports, Statement of Expenses (SOEs) produced by Fedepanela, and Annual External Financial Audit Reports. Field monitoring visits will be conducted periodically by CAF and Fedepanela to ascertain details presented in project progress reports. A Mid-Term Evaluation will be conducted at the mid-point in

the project. An independent consultant will be hired to conduct this evaluation. Fedepanela will manage the mid-term evaluation (MTE) process, under close supervision of CAF. The MTE will address evaluation parameters recommended by the GEF Evaluation Office and will verify information gathered through the Project Results Framework, as relevant. The PSC will participate in the mid-term evaluation and will support Fedepanela in the development of a management response to the evaluation recommendations along with an implementation plan. An Independent Terminal Evaluation will take place within the last semester of project implementation. CAF will manage the terminal evaluation process. A review of the quality of the evaluation report will be done by CAF and submitted along with the report to the GEF Evaluation Office not later than 6 months after the completion of the evaluation. All relevant M&E reports of the project will be printed and/or published for distribution to project stakeholders.

### Monitoring & Evaluation Plan

M & E Activity	Responsibility	Estimated Budget (US\$) (Excluding Staff Time)	Time Frame
Inception Workshop (one day) to produce: Annual Work Plan; Discuss Project Operations Manual; Discuss Roles, Responsibilities, and Decision-making Structures; Discuss need and details of Gender Action Plan; and Discuss Financial Reporting and Project Progress Reporting	? CAF ? PCU/Project Coordinator ? Project Team ? Consultant to assist with planning and facilitation	Indicative Cost: <b>\$15,000</b>	Within first 6 weeks of project start-up
Develop long-term M&E Plan	? Project Coordinator will develop TORs to be vetted by CAF  ? Consultant hired to assist with development of long-term M&E Plan.	Indicative Cost: <b>\$10,000</b>  (Consultant's cost plus costs associated with vetting of means of verification in the field through-out project implementation)	To be developed at start up, and applied at start-up, mid-term and end of project
Monitoring and Evaluation of indicators in project results framework (Biodiversity and Climate Change)	? CAF ? PCU ? Project Team	Indicative Cost: <b>\$5,000</b>	Annually
Project Steering Committee Meetings and Project Technical Committee Meetings (with formally	? CAF	Indicative Cost: <b>\$15,000</b>	One physical meeting per

prepared minutes and resolutions)	? PCU		year and at least one virtual meeting per year
Quarterly Financial Reports & SOEs	? PCU ? Project Team	Indicative Cost: <b>\$15,000</b>	Within 30 days of each completed quarter
Project Progress Reports	? PCU ? Project Team ? National Project Focal Points ? National Committees	Indicative Cost: <b>\$10,000</b>	At least every 6 months and due within 30 days of each completed semester.
Publication of Project Progress Reports and other informative materials	? PCU ? Project Team	Indicative Cost: <b>\$ 0</b> <b>(To be covered by the project itself)</b>	Every semester (bi-annually)
External Mid-Term Review	? CAF ? PCU ? Project Team ? International Consultants (2) ? National Consultants (4)	Indicative Cost: <b>\$0</b> (Professional Fees and logistical costs for Consultant) (To be covered by CAF)	Within 90 days of completion of the project's mid-term
External Final Evaluation	? CAF ? PCU ? Project Team ? International Consultants (2) ? National Consultants (4)	Indicative Cost: <b>\$0</b> (Professional Fees and logistical costs of Consultant) (To be covered by CAF)	At the end of project implementation
Terminal Report	? PCU ? Project Team ? Consultant	Indicative Cost: <b>\$0</b> (To be covered by CAF)	At least one month before the end of the project
Monitoring Visits to Project Sites	? PCU ? CAF ? Project Team	Indicative Cost: <b>\$10,000</b> (cost of CAF travel to be charged to GEF IA Fees)	At least yearly



<b>TOTAL INDICATIVE COST, EXCLUDING STAFF TIME AND CAF STAFF TRAVEL</b>
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<b>US\$80,000</b>
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**PART III: Certification by GEF partner agency(ies)**

**A. GEF Agency(ies) certification**

<b>GEF Agency Coordinator</b>	<b>Date</b>	<b>Project Contact Person</b>	<b>Telephone</b>	<b>Email</b>
Ren? G?mez-Garc?a	8/8/2019	Jessica Palomeque	525511026947	jpalomeque@caf.com

**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).**

Please refer to the Results Framework presented in Annex A. Please, see Roadmap document

**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).**

RESPONSES TO COMMENTS FROM GEF SECRETARIAT (All comments have been 'cleared' as per PIF approval of 19<sup>th</sup> October 2017).

Secretariat Comment of August 3<sup>rd</sup> 2016:

However, from the activities presented in the PIF, it appears that that the amount programmed under Program 1 should be higher than Program 4. Consider re-evaluating the distribution of resources based the activities planned.

CAF Response: The distribution of resources across the GEF Focal Areas has been re-evaluated and required adjustments made in Table A in the PIF, with 73.4% of GEF Financing now programmed under CCM-1 Program 1, geared towards improving the energy efficiency of the Panela milling process through thermal recirculation systems, thus minimizing GHG emissions from said process. This adjustment can also be appreciated in Table 2, page 21 of the CAF Project Document and in Table A of this CEO Endorsement Request.

Secretariat Comment of August 3<sup>rd</sup> 2016:

1) Please address how the project is consistent with Colombia's INDC. Specifically please answer the following questions: When was the INDC submitted to the UNFCCC? Has Colombia signed the Paris agreement? Has Colombia provided an indication that the INDC will used as is for its first NDC, or is it expected that the INDC will be updated before submission? How does the project propose to align with and contribute to implementation of the INDC? Please document how project activities align with specific priorities, measures or policies in the INDC, or if it aligns with the INDC is at a general level. 2) We note that the NAMA has been registered in the UNFCCC Registry. Once the project is approved, we request the Agency to ensure that the support received from the GEF is registered as well, both for preparation and implementation.

CAF Response:

1) The Colombia INDC was submitted in September 2015. The Colombia INDC is not expected to be updated anytime soon, therefore it will be used as is for its first NDC. The Panela NAMA is part of the Agricultural Sector Mitigation Plan, contributing directly with agricultural sector mitigation goals. The country is currently developing a national plan to distribute the NDC goals among all economic sectors at the level of the head of the relevant government ministries, with the Panela NAMA directly contributing as part of the Agricultural Sector Mitigation Plan. 2) CAF takes note of this request and will proceed accordingly. The responses provided here can be appreciated in paragraphs 14-17 in the CAF Project Document and in Section B of this CEO Endorsement Request.

Secretariat Comment of August 3<sup>rd</sup> 2016:

1) The project objective is too broad and it does not reflect the main aim of the project, which is to contribute to the implementation of the NAMA on the productive and technological transformation of the panela sub- sector. Please rephrase. 2) The level of co-financing for the project is low, especially considering the vast majority of it is in-kind. We do not believe this is enough co- financing to enable the project to make the investments in plant energy efficiency, improved soil management and reduced

nitrogen use needed to transform the sub-sector. Please clarify. In addition, clarify if CAF is considering supporting the project with additional co-financing in the form of loans or technical assistance grants been considered.

#### Component 1

1) Please explain the logic behind choosing the 45 production units in 14 departments to carry out Component

1 and correct reference to 630 production units in 12 departments on page 11.

#### Component 2

1) Please confirm that the GEF resources will be used in the energy efficiency investments listed in Outcome 2.1 to cover the incremental cost and whether panela producers will contribute to these investments.

2) Please elaborate on the business plan for the implementation of these investments for these producers and consider adding an outcome for the development of a financing scheme or mechanism to support the uptake of these technologies and practices beyond the pilots selected.

3) Please elaborate how Output 2.2.1 will lead to climate change mitigation. If it does not result in GHG benefits it is ineligible for GEF resources and it must be financed by co-financing.

4) Please elaborate on the baseline for the residual bagasse that Outcome 2.3 is focusing on - how much waste is produced, what is usually done with it, what impact does it have on GHG emissions - and the alternative uses that are being considered.

#### Component 3

1) Please change the type of financing to TA in Table B as this component will support capacity building only.

2) Please elaborate how this component will work with the relevant ministries to develop the appropriate supporting regulatory frameworks, financing mechanisms and/or incentive programs to ensure the replication of the project and transformation of the sub-sector, and incorporate in Table B.

#### GEBS

1) Since the project is utilizing climate change resources only, we advise to fill out Table F only for tons of CO<sub>2</sub>e mitigated, as the project targets for rows 1 and 2 must be monitored and reported on with the relevant BD and LD Tracking Tools.

2) Please provide the assumptions and methodology for calculating the 234,550 tCO<sub>2</sub>e expected to be mitigated by this project and clarify which technologies it covers (thermal re-circulation, bagasse dosing, replacement of ICEs, elimination of firewood and diesel use, etc). The estimate should also include any direct GHG benefits from Component

1 and indirect GHG benefits from the project.

Please be advised that the Agency Fee for both the PPG and the Project Grant should be 9% of the total. Please correct and submit a revised Letter of Endorsement and PIF with the correct figures.

#### CAF Response:

After required consultations with the Government of Colombia and CAF, the following re-phrased project objective was agreed: "Contribute to the implementation of the NAMA through the productive and technological transformation of the Panella sub- sector".

Additional co-financing will be leveraged through Fedepanela, and sourced specifically from projects to be implemented by Fedepanela in support of its Strategic Plan, but which will also be in support of the National GHG Mitigation Strategy. Support will be in kind, and will be further articulated in the PRODOC and in the Co-financing Confirmation Letters. Additional co-financing has been secured from FINAGRO in the amount of US\$104,727,321 for period 2018-2020, and represents one of 2 credit lines as financial mechanisms in support of technological transformations and enhancements in panela production practices, consistent with the objectives and anticipated outcomes of Components 1 & 2 of the project. This can be appreciated in paragraph 72 of the CAF Project Document and in Section A1 of this CEO Endorsement Request, as well as in the relevant co-financing confirmation letter.

In addition to co-financing committed by CAF, a funding line will be created as a financial mechanism, aimed at the value chain of the Panela in Colombia with a budget of USD \$ 2 million, and will also include capacity building opportunities for the sector. This credit line is confirmed and will be made available to replicate technological transformations anticipated by the project, and also to support capacity building, consistent with the proposed objectives and outcomes of Component 3 of the project. This can be appreciated in paragraph 58 of the CAF Project Document and in Section A1 of this CEO Endorsement Request.

The logic for 45 units is tied to the available budget and to those producers best poised to embrace the transformation, and the premise that this project is the 'initiation' of the transformation in the panela sub-sector, with a clear intention to maximize opportunities for replication and upscaling beyond the life of the GEF resources. Page 11 has been corrected. Please note that, as a consequence of the prioritization presented in the Low Emission Development Strategy for the Panela Production Chain in Colombia - developed by ONF-Andina in 2018 and funded by CAF, and adopted by MADS, proposed project interventions will now focus on 40 production units in 6 departments of the country. This is consistent throughout the CAF Project Document and this CEO Endorsement Request.

Yes, GEF resources will be used to cover the incremental cost in achieving energy efficiency.

The total cost of the national NAMA's implementation is close to US\$167 million, and through the ADMIRE Project from UNEP DTU, Business Plan is currently being developed to determine total NAMA implementation costs, including financial scenarios, financial model and financial mechanisms for NAMA implementation. This plan will be used to initiate national mobilization of economic resources in support of implementation. Please note that a GHG Measurement and Reduction Framework has been developed in late 2017 to determine total NAMA implementation costs, including financial scenarios, financial model for NAMA implementation, as well as a GHG Baseline Calculation Tool. This framework will be used to initiate national mobilization of economic resources in support of NAMA implementation at the national level. (This can be appreciated in paragraph 72 of the CAF Project Document and in Section A1 of this CEO Endorsement Request, as well as in the relevant co-financing confirmation letter). This framework provides baseline data on emissions from panela production at the national level, and thus offers a good basis upon which the project may determine CO<sub>2</sub> emissions and removals in the 40 production units and 6 departments targeted by the project. Training in the use and application of the framework will be crucial for project staff, those of the Ministry of Environment and Sustainable Development, the Ministry of Agriculture and Rural Development, and Fedepanela staff.

Waste water from the production process is usually disposed to soils or directly to river catchments without any previous treatment. The high level of organic matter in the water emits methane when decomposed, particularly if it does not receive the adequate treatment; hence, in-situ waste water treatment is proposed in the Panela NAMA, identifying a significant co-benefit which is to dispose treated water into the crops.

According to FEDEPANELA figures, every 1.6 Ton of Panela produced in the country generate 5.7 tons of residual bagasse, meaning that the 1'500,000 Tons of panela produced in a year in Colombia, produce approx. 5'343,750 tons of residual bagasse. The residual bagasse is disposed outdoors for 30 days so it can lose humidity and then use in the mill burner, releasing a considerable amount of methane to the atmosphere during this time. This is further developed in the updated PIF. These assumptions and calculations were also consulted in the development of the GHG Measurement and Reduction Framework produced by the ADMIRE Project in 2017, and released in 2018. Please note that these figures have been updated based on more robust calculations that were not available during the PIF stage. Calculation Tool is being submitted along with Tracking Tool at CEO Endorsement.

Type of financing changed in Table B of PIF.

The key ministries will form part of the project's oversight and governance structures, they are already key partners of the NAMA, and will be partners in the mobilization of resources once the Business Plan is developed under the ADMIRE project (Note: this is now actually represented as the GHG Measurement and Reduction Framework developed by the ADMIRE project in late 2017 and released in 2018, inclusive of financial scenarios, models, and baseline calculation tools; project staff and key agency staff must be trained in the use and application of this framework).

Table F has been adjusted in updated PIF.

Assumptions for calculating CO<sub>2</sub>e are provided in Footnotes 9 & 10 in PIF. Technologies to be covered include thermal re-circulation, recycling of bagasse, elimination of firewood and car tires and diesel. Please note that in the final CAF Project Document, this has been corrected to reduction in the use of firewood, as opposed to elimination. This can be appreciated in Annex 1 of the CAF Project Document and in component descriptions in Section A1 of this CEO Endorsement Request.

Updated PIF has revised figures.

Secretariat Comment of October 3rd 2016:

- 1) Additional co-financing from CAF through a funding line or from another source is a critical element for this project to be successful beyond demonstration. Please clarify if this credit line will be added as co-financing by CEO Endorsement. Also, please review the type of co-financing in Table C and confirm if it is all really cash, as in previous submission some of it was listed as in-kind.
- 2) By CEO Endorsement, we expect a more robust calculation of the GHG emissions reduced by the project as well as an estimate for indirect emissions reduced by replication.
- 3) By CEO Endorsement, we expect some articulation of the business model for the energy efficiency investments for the producers and how the replication of these investments will be promoted and incentivized.
- 4) Please address remaining comments in Box 5.
- 5) please resubmit PIF after fixing the following: 1) Agency Fee in 'Part I: Project Information' should be \$236,691 - the fee for the GEF Grant only; 2) The total in Table B adds up to \$2,629,901, meaning it's \$1 above the amount endorsed. Please take \$1 out of any of the four components or the PMC, so the total matches what is in Table A, \$2,629,900; 3) All of the co-financing in Table C is now listed as cash. Please confirm which source of co-financing is actually in-kind vs. cash; 4) The Agency Fee in Table D should be \$236,691 - the fee for the GEF Grant only.

CAF Response:

Remaining comments in Box 5 have been addressed.  
Agency Fee has been corrected in PIF.  
Total in Table B has been fixed to match total in Table A in PIF.  
Type of co-financing in Table C has been corrected.  
The agency Fee in Table D has been corrected in PIF.

RESPONSES TO COMMENTS FROM STAP AT PIF

(Not Applicable)

## **ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS.**

**A. Provide detailed funding amount of the PPG activities financing status in the table below:**

PPG Grant Approved at PIF:			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
Consultancy	46.896,89	43.184,20	300,00
Tickets and per diem	3.103,11	1.103,11	0
<b>Total</b>	50.000,00	44.287,31	300,00

Please refer to CEO Endorsement Request - ANNEX C. See in Roadmap document

**ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used)**

**Provide a calendar of expected reflows to the GEF/LDCF/SCCF/CBIT Trust Funds or to your Agency (and/or revolving fund that will be set up)**

Not applicable

**ANNEX E: GEF 7 Core Indicator Worksheet**

Use this Worksheet to compute those indicator values as required in Part I, Table G to the extent applicable to your proposed project. Progress in programming against these targets for the program will be aggregated and reported at any time during the replenishment period. There is no need to complete this table for climate adaptation projects financed solely through LDCF and SCCF.

**ANNEX F: Project Taxonomy Worksheet**

Use this Worksheet to list down the taxonomic information required under Part1 by ticking the most relevant keywords/topics//themes that best describes the project

**ANNEX G: Project Budget Table**

**Please attach a project budget table.**

Please refer to the Project Budget Table presented in Annex E. Please, see Roadmap document