

INTRODUCTION

Panela (raw cane sugar) production is a strategic sector for Colombia. It is the second largest producer of panela in the world after India, and panela is the second largest agroindustry after coffee in Colombia. The sector provides partial employment to 350,000 families on 70,000 farms and 22,000 panela mills that produce 1,500,000 tons of panela per year – making it the main source of employment in rural areas of Colombia.



Panela processing takes place in sugar mills that are called trapiches. The sector typically uses traditional non-environmentally friendly techniques, technologies and approaches across the supply chain. Burning firewood and (when there is firewood shortage) used tyres for heat generation leads to very inefficient combustion processes with calorific losses of between 60-70%. It is estimated that around 70% of all used car tires in Bogota are burnt in boilers for the production of panela. The use of these fuels leads to increasing deforestation and releases significant amounts of GHGs and sulphur dioxide which have adverse climate and health effects. Additionally, the panela production machinery is mainly powered with diesel which causes additional costs and air pollution. Low operating profits are the result of these inefficient equipment and production processes, which consequently limit salaries and employment opportunities, and ultimately lead to poverty and an increased emigration from rural areas.



PROJECT OBJECTIVE

Colombia's Ministries of the Environment and Agriculture (MADS and MADR), together with Fedepanela, the national association of panela producers, want to reverse the situation described above. In cooperation with Carbon Trust, they turned to ADMIRE with a project aimed to develop a National Appropriate Mitigation Action (NAMA). This entailed establishing GHG scenarios, designing an MRV system and conducting a financial analysis of the interventions, which are essential components of such a NAMA.

RESULTS & NEXT STEPS

Through extensive work with the national government, local stakeholders, and international and local consultants, the ADMIRE project developed a NAMA. It is a transformational low emission programme, where the final objective is to address market barriers and unlock financing opportunities for panela producers to take advantage of the opportunities for increasing their competitiveness, saving energy, protect their natural resources and improve their health conditions. This is amongst other things done by enabling the use of the left-over sugar cane once the juice has been pressed out, called bagasse, as fuel which replaces firewood, tires and fossil fuels. This NAMA is ready for implementation.

At present, a GEF pilot project with a total funding volume of USD 9.8 Million is being implemented by the Ministry of Environment and Sustainable Development (MADS), Ministry of Agriculture and Rural Development (MADR), National Federation of Panela Producers (Fedepanela), and the Development Bank of Latin America (CAF). The project aims for a "transformation of Colombia's Panela Subsector through the NAMA's initial implementation" and consists of the following components:

Improvement in Panaela production practices and the restoration of natural systems affected at the local and national levels;

- Integral technological transformation of the panaela production processes in Colombia;
- Capacity building of the Panaela sector for NAMA implementation;
- Monitoring, Report & Verification (MRV), and knowledge management.

Additionally, the Government of Colombia is preparing a concept note for the Green Climate Fund to access additional funds (approximately 40 million USD) for scaling up the pilot project now being implemented with the ADMIRE outputs being an essential input for the proposal.

IMPACT HIGHLIGHTS

	GHG mitigation	Investment	Actors
Currently	Unknown	USD 9.8 million	7 integral partners, 50 total actors engaged
Total potential if scaled-up and replicated	6.9 MtCO _{2e} per year	USD 105 million	7 integral partners, 50 total actors engaged

SUSTAINABLE DEVELOPMENT GOALS



Reducing of air-pollution leading to substantial health improvements.



Enabling more efficient use of bagasse removes the need for firewood, tires and fossil fuels.



Making the new technologies accessible for the rural farmers.



More efficient resource use, re-use of wastes and more suitable disposal of waste tires.

THE TECHNOLOGY - ENERGY EFFICIENT TRAPICHES

A successful implementation of the NAMA scenario in the 22,000 panaela mills would lead to cumulative national emission reductions of 96 MtCO_{2e} in 2030, or an average 6.9 MtCO_{2e}/year. The proposed technologies of the first module of the NAMA are the thermal re-circulator, the bagasse dispenser and replacement of diesel engines by electric motors.

1. Thermal Recirculation

Burners modified with thermal recirculation reduce total consumption of diesel or energy by approx. 40% by recycling waste heat lost in the chimney. The re-injection of the dissipate heat into the system effectively evaporates excess water to increase the concentration of cane juice.

2. Bagasse Management Dispensers

Before the upgrade, the usage of bagasse is cumbersome which leads to a preference of other non-sustainable fuel sources. The bagasse management dispensers enables the usage of fresh bagasse as fuel, which on one side prevents methane emissions from decomposing bagasse, and on the other side replaces the GHG heavy fuels. Under the NAMA scenario, bagasse replaces all other fuels by 2022, which eliminates the consumption of forest wood (725 kilo tons), rubber (120 kilo tons), and coal (54 kilo tons). The avoided deforestation translates to a forest area of 37,000 m².

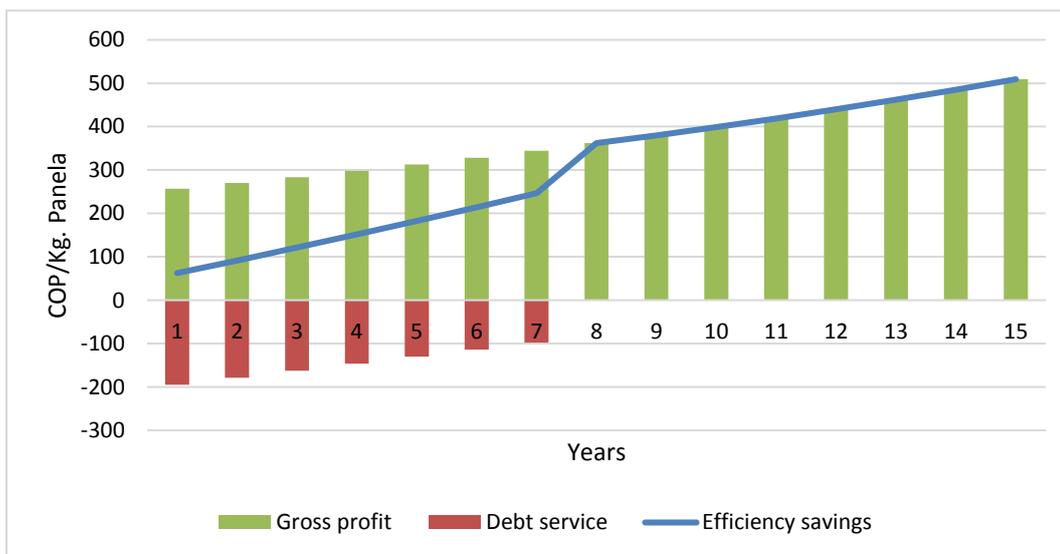


3. Replacing internal combustion engines with electric motors

Currently over 90 % of trapiches operate with diesel engine. Under the NAMA scenario, diesel consumption is reduced by over 60% from 22.6 million liters (BAU, 2010-2016) to 8.6 million liters in 2030. The switch from diesel to electricity increases energy consumption by only 15% as the electric motors are significantly more efficient.

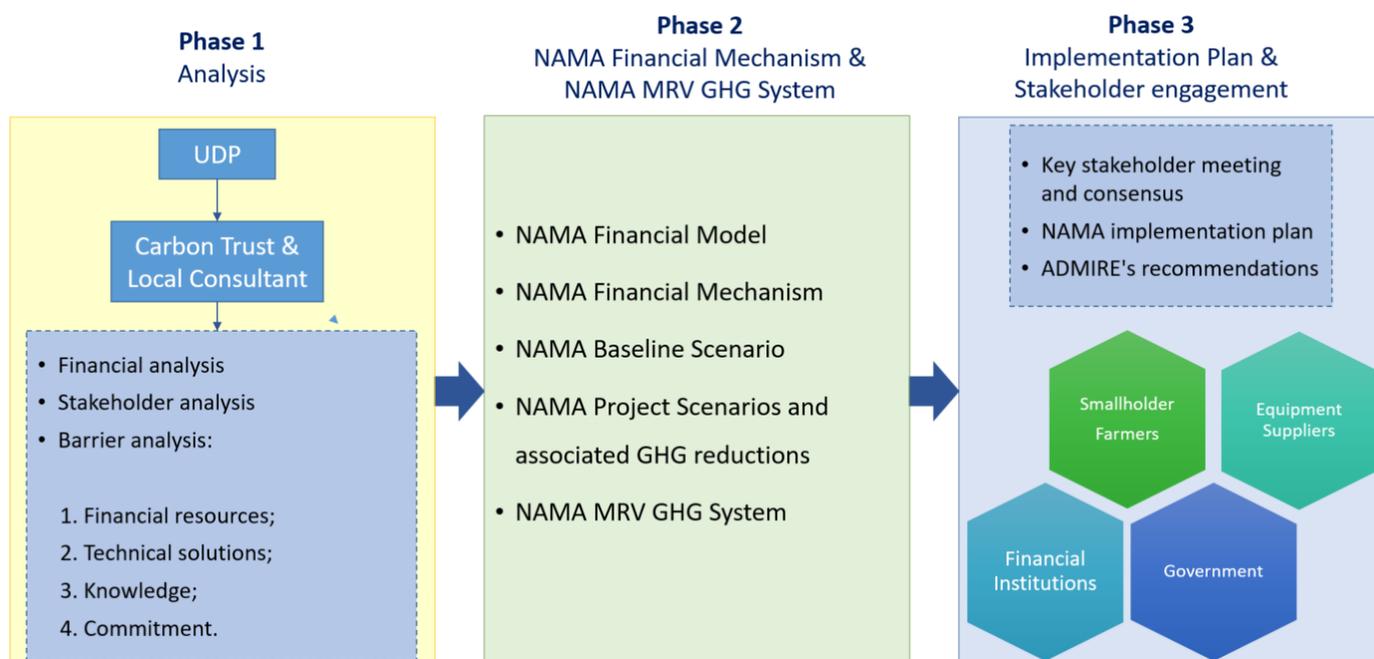
THE BUSINESS CASE FOR CLIMATE ACTION

The efficiency measures described in the previous section translate to reduced production costs. Medium size producers reduce production costs by 18%, while small informal producers reduce costs by 15%. With these energy and fuel savings, the capital investment of USD 13,000 per trapiche can be recovered within 7 years. The figure below shows the savings per kg of Panela for a medium size producer which turn into gross profit after the loan repayment from year 8 onwards. The savings are sufficient to cover all debt costs from year 1.



Extrapolating the impact of individual trapiche to a national operation of 8,000 trapiches, there is an investment opportunity of over USD 105 Million. This investment amount is envisaged to be provided by development banks providing the liquidity to commercial local banks for distribution and backing up the loans with a guarantee fund.

PROJECT INTERVENTION



Phase I constituted an analysis phase where a financial as well as a stakeholder analysis was carried out in order to identify key gaps and barriers and opportunities in improvements of trapiches. This analysis revealed inadequate access to finance by farmers, and the lack of technical solutions, knowledge and awareness, as well as interest and commitment of farmers to improve their operations, as the most dominant barriers. As a response to this, the ADMIRE outputs were developed during phase II & III of the project. The project was concluded with a meeting between all key stakeholders engaged in the project to define further actions and the responsible entities, which are listed in the table 1 below. ADMIRE's recommendation details these further actions and can be found in the resources section of this project brief.

Table 1 - Addressing identified barriers through the ADMIRE project and further actions to be conducted.

Phase I - Barriers	Phase II & III - ADMIRE outputs	Further actions - ADMIRE's recommendations	Responsible entities
Access to finance 	All project phases, through identification of financial situation and needs, financial analysis and mechanism development for FIs and implementation plan for implementation.	<ul style="list-style-type: none"> Credit lines Concessional loans Grants Guarantees Consolidation of trapiches Incentivize the use of bank accounts by small producers 	<ul style="list-style-type: none"> Bancolombia, Davivienda, Procredit, Itau, Finagro, FAG, and development banks
Technical solutions 	Project phase 1 and 2, through analysing and verifying the feasibility of the technology in technical and financial terms.	<ul style="list-style-type: none"> Accreditation of suppliers, installers and technologies More technology providers Training to financial entities in evaluation of projects 	<ul style="list-style-type: none"> Icontec, CCEE, ONAC, UPME, CPL, CAEM, Carbon Trust Asoc. de Ingenieros Agrícolas, SAIS, IGIS, Induluz, Altec

<p>Knowledge & awareness</p> 	<p>Project phases 2 and 3, through verifying the technical and financial feasibility and presenting the results to key stakeholders.</p>	<ul style="list-style-type: none"> • Workshops and events • Project demonstration • Marketing companies • Centralized information centers • GIS trapiches productive units 	<ul style="list-style-type: none"> • Fedepanela. Corpoica, SENA • GEF • SAC, Fedepanela
<p>Commitment</p> 	<p>Project phase 3, through stakeholder engagement and the preparation of the implementation plan and ADMIRE's recommendations.</p>	<ul style="list-style-type: none"> • NAMA governance 	<ul style="list-style-type: none"> • Public private partnership scheme

RESOURCES

Report - NAMA Summary Report
 Report - NAMA Financial Model
 Report - Baseline and NAMA Scenario
 Report - NAMA MRV System
 Report - NAMA Financing Mechanism
 NAMA Implementation Plan

TEAM

Name	Title, Organisation	Position, Email
Giovanni Andrés Pabón Restrepo	Ministry of the Environment	Coordinator of the Mitigation Group at Climate Change Division
Daniel Perdomo-Rodriguez	Carbon Trust	Senior Manager
Marco C. Schletz	UNEP DTU Partnership	Project Officer; macsc (at) dtu (dot) dk
Alma Lucia Garcia Hernandez	UNEP DTU Partnership	PhD Student

Read more about the other ADMIRE projects at www.admireproject.org

Implemented By



Supported By

