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Sustainability for small trapiches

(Colombia)

Colophon

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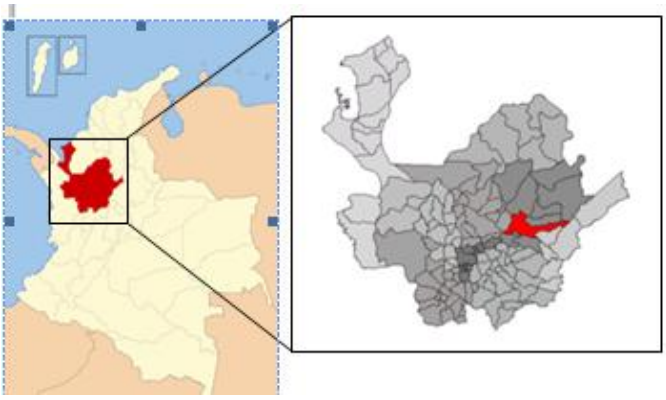
CONTEXT AND REASONS TO START THE PROJECT

Trapiches ('Presses') are production facilities for 'panela'. At the trapiches, the sugarcane is milled in a press, producing sugarcane juice which is boiled at high temperatures obtaining solidified sugars and minerals after controlled evaporation of the water contents by constant manual stirring and passing through a sequential set of boiling pans.

Most of the trapiches are very small production facilities, but still Colombia is the second largest producer of panela. Colombia produces about 1.4 million tons of panela per year, in about 15.000 trapiches in the country, being an important income source for tens of thousands of Colombian (poor) peasant families.

The environmental impact of the panela production at the trapiches is substantial and therefore improvements are needed such as avoiding energy waste, the sustainability of the biomass chain (harvest residues and bagasse utilization), CO2 and other emissions into the air due to the fuels used when the bagasse is not dry enough for fuelling the furnace. Quite often tires scrap is used, causing enormous amounts of harmful emissions like tar, dioxines, CO, SO2, and N2O.The working conditions at the trapiches are usually harsh due to dirty smoke, high temperatures, humidity and materials handling.

The envisaged project was carried out at the 'Empresa Comunitaria La Avención', located in the municipality of Yolombó, Antioquia, Colombia (see map below).



Location	Latitude: 6° 35' N Longitude: 75° 0' O
Area	941 km²
Altitude	1450 msnm
Temperature	21°C
Distance	94 km NE of Medellín
Foundation	1560
Population	Total (2002): 16.157 inhal Density: 17 hab./km²

La Avención is a good functioning trapiche that still had considerable improvement potential with regards to environment, working circumstances and energy efficiency. This trapiche is the result of a cooperation effort of 8 former trapiches. Fundación Suramericana (one of the project members) has been accompanying the Cooperativa Trapiche La Avención for some time already, not only with capital to improve the production facilities but also with resources to contribute to e.g. the building of a community school. Therefore, there was already a lot of useful information available and an existing cooperation model which could be very useful for La Avención serving as a pilot production facility for further improvement and benchmarking purposes in the design of a roadmap for the panela sector in Antioquia, Colombia and other countries.

Trapiche La Avención is the result of the co operation of 8 former trapiches and employs over 20 persons (of which 4 women), benefitting more than 95 families.

Not all of the farmers' families work at the trapiche, one of the obvious reasons being the size and the existing bottlenecks in the production process due to the continuity in the supply of cane, the processing of the cane and the availability of fuel for the furnace. Many of these constraints have been solved with the adaptations carried out within the scope of the project, permitting thus to improve the conditions, create more employment and economic activities with an extra income source due to biomass surplus (bagasse briquettes).

OBJECTIVES OF THE PROJECT

The pilot project was basically aimed at improving the energy efficiency of the production process and hence obtaining surplus bagasse for the production of bagasse briquettes to replace firewood and other polluting fuels usually used. Besides, the project aimed at improving the working and operational conditions in order to comply with resolution number 779 of 2006, which sets the technical sanitary requirements for the production of panela.

More specifically, the project aimed at improving of the energy efficiency and working conditions at production facilities, raise the production yield of the sugarcane juice, the production capacity and the energy efficiency, drying (and briquetting) of bagasse, CDM potential assessment, trapiche sector sustainability assessment and the definition of a replica programme.

Gains for the whole panela industry being a much better understanding of the potential benefits when adaptations in the production process and cooperation activities as achieved at 'La Avención' are applied.

ACTIVITIES UNDERTAKEN IN THE PROJECT

The whole project consisted of two (parallel) parts:
P1) a pilot project where technical adaptations and analyses were be carried out and
P2) a programme definition in which a follow up scheme is presented.

The first part was meant to prove that by applying existing techniques in a panela production facility the earlier described effects could be obtained. For this part the scope was the trapiche La Avención.

The second part served to complete the picture in terms of PPP consequences, as well as the definition of a comprehensive follow-up programme, the primary scope being the (small trapiche) panela-industry in Antioquia which can be scalable to the rest of Colombia and other countries.

Activities carried out under P1:
Between 2010 and 2012 the trapiche underwent several infrastructure and operational modifications: furnace overhaul, installation of a steam extraction system, replacement of extraction mill and motor, conversion of the conventional bagasse storage into a greenhouse for bagasse drying, introduction of a bagasse chipper, design and implementation of a bagasse briquetting machine, access road improvement, and other infrastructure to the interior of the trapiche in order to comply with existing regulation (Res. 779).

As to P2 activities:
Between 2011 and 2012 several studies were carried out, mainly Sanitary data investigation, Economic data investigation, Social data investigation, Environmental data investigation, Stakeholders identification and Financial resources identification serving as the basis for the Sustainability assessment and ultimately the Replica programme design.

The project was carried out by a consortium consisting of Colombian and Dutch entities lead by the Centro Nacional de Producción Más Limpia y Tecnologías Ambientales (CNPMLTA, Col). The other project participants were the Empresa Comunitaria La Avención (Col), Fundación Suramericana (Col), TO&MMA (NL) and GMSP (NL).

RESULTS OF THE PROJECT[1]

The project had a very positive impact in the improvement of the production capacity and sustainability of the operation. The Trapiche is now fuel self-sufficient and all of the required fuel is bagasse. Improvements made to the mill have also increased the efficiency of the milling process leading to higher yields of juice per unit sugarcane processed, thus higher overall yield of panela per unit harvested sugar cane.
Surplus bagasse can now be processed to make briquettes that may be used to replace coal or firewood in local (cooking) stoves and/or kilns.

Furthermore the project made it possible to:
- Eliminate forest clearings previously needed for firewood to operate the kiln
- Reduce consumption of fossil fuels by switching to an electrical motor for cane milling
- Have shorter operation times (the same amount of panela is produced in about one half of the time) by increased furnace and milling efficiency
- Comply with resolution number 779
- Improve the working environment.

Furthermore, two sustainability analyses of the trapiche management and the availability of surplus biomass were carried out.

The sustainability analysis for the trapiche was made following the criteria of the Global Reporting Initiative (GRI) on economic, social, working, human rights and environmental aspects.

The sustainability analysis of the biomass was performed according to the NTA 8080 criteria. Given that the generated biomass is a residue from the production process with marginal value compared to the sugarcane itself, the main applicable sustainability criterion is the greenhouse gas emissions balance, which is positive for the operation activities. Some actions have been taken also that should improve in theory the greenhouse balance outside of the production process although this is not quantifiable. The use of the bagasse is considered sustainable and doesn't generate additional (negative) impacts compared to the baseline situation.

[1] *For further reading see also 'Reporte de Sostenibilidad' and 'Documento de Réplica'.*

LESSONS LEARNED

Working with a highly motivated farmers' community yielded many valuable lessons for the project participants. However we highlight the following:

- Complex technical solutions may turn out hard (and too costly) to implement in rural areas, alongside the possible risk of introducing ways of working that will not be adopted by (nor make sense to) the local workforce.

- A close monitoring of deliverables from (third party) providers in these kind of pilot projects (especially in rural areas) is essential for the fulfilment of the objectives and the timing of the work plan.

- The strategy of the project cannot be followed too rigidly and has to be flexible enough in order to be capable of incorporating required adaptations; not only in technical issues but also in the way of working of the project team members individually and in their interaction with different organisations, farmers and (third party) suppliers.

- Planned interventions should take into account the 'normal' day to day operation of the involved production facility (as to limit delays and non-operating days).

- When assessing rural enterprises (with a rural subsistence economy as basis) using frameworks as e.g. GRI or NTA 8080, it is important to bear in mind that the indicators reflect the informality of management practices. Hence a need is evidenced for constant assistance from public and private entities for their further development over time.

FOLLOW UP OF THE PROJECT

The positive effects of the project on the production and therefore the economic growth are aspects the local community recognizes and value. Hence, many more trapiches in the region are willing and eager to follow a similar path in terms of associating and organizing into better structured co-operation and improved production facilities.

The panela producers association FEDEPANELA (Federación Nacional de Productores de Panela), local government (Yolombo Municipality) and The Department of Antioquia were linked to this Project: All them supported the execution of the Project and welcome replication.

In general it is considered that there is great potential for replication of the project in Colombia, given that most trapiches operate at small scales. Improvements in efficiency and productivity can be achieved via association. One of the main barriers for the implementation of the needed measures is financing, thus the intervention of government and association entities is needed to promote the competitiveness of the sector and channel the necessary resources.

One of the project deliverables is a 'Replication document', which describes the requirements and recommendations for the replication of this Project in other trapiches. The replication document specifies in detail all of the works, equipment specifications, costs, and detailed implementation activities that can be applicable to similar trapiches in the country.

Besides the replication document, a sustainability guide[2] (falling outside of the project scope) has been commissioned separately by NL Agency with third parties. This document is intended to complete the picture for key stakeholders of other trapiches, on how improved bagasse management and fuel use can be implemented, based on the experiences in the pilot project.

Furthermore the project has also accepted NL Agency's offer for assistance to look further into the financial viability of replication of the project.

[2] *This guide is expected to become available in March 2013.*