

Microdistilleries in Southern Brazil

Field research: Cooperbio

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Outline

- 1 Introduction
- 2 Objectives
- 3 Data collection
- 4 Modelling assessment



Small scale - big opportunities?

■ Justification

Small scale bioenergy projects could, potentially, provide modern energy sources to local communities with minimum environmental and socioeconomic impacts

■ Research questions

1. Under what conditions small scale can be economically sustainable?
2. What are the main shortcomings that undermine small scale initiatives as a viable business model in developing countries?



Objectives

- Overall
Field research (data collection) as to the socioeconomic and technical aspects (agricultural and industrial) of small scale production of ethanol.
- Specific
 1. Identify active small scale ethanol projects ($<5,000$ l/d)
 2. Build a database on small scale initiatives in developing countries
 3. Explore different scenarios to assess the economic and environmental sustainability of small scale ethanol microdistilleries



Field work: Cooperbio

- Description
 - Cooperative: feedstock and biofuel production and commercialization
 - Smallholder farmers movement - MPA
 - Created in 2005
 - Members (associates): 1,600
 - Frederico Westphalen, RS



Field work: Cooperbio



Figure : Cooperbio localization. Source: Maroun & La Rovere (2014)

Field work: Cooperbio

- Historic
 - Initial motivation: Biodiesel policy PNPB (2004/05)
 - Frustrated by the failure attempt to place a Petrobras biodiesel industrial unit in the region
 - In this period ethanol emerged as an alternative to the production of biofuel and an opportunity for income generation and energy independence for smallholder farmers in the region



Field work: Cooperbio

- Historic
 - Microdistillery project: 2006-2008
 - Construction of 10 microdistilleries:
 - . 9 producers (1,000 l/d)
 - . 1 rectifier (5,000 l/d)
 - Petrobras investment: US\$ 1 million
 - Main product: ethanol (95-96%)
 - Secondary product: vinasse, bagasse



Field work: Cooperbio

- Historic
 - Microdistillery project: 2014
 - Four microdistilleries were constructed:
 - . 3 producers (1,000 l/d)
 - . 1 producer (5,000 l/d)
 - Experimental period
 - Adaptation of the industrial process
 - Main product: brown sugar, cachaça
 - Secondary product: ethanol (self-consumption: 10-30 operation days)



Field work: Cooperbio

- Historic
 - Microdistillery project 2014



Figure : Microdistillery, Eral Seco

Field work: Cooperbio

- Historic
 - Microdistillery project 2014



Figure : Microdistillery, Erval Seco

Field work: Cooperbio

- Historic
 - Microdistillery project 2014



Figure : Microdistillery, Erval Seco

Field work: Cooperbio

- Historic
 - Microdistillery project 2014



Figure : Microdistillery, Erval Seco

Field work: Cooperbio

- Historic
 - Microdistillery project 2014



Figure : Headquarters, Frederico Westphalen

Field work: Cooperbio

- Historic
 - Microdistillery project 2014



Figure : Headquarters, Frederico Westphalen

Field work: Cooperbio

■ Database

Sugarcane production

- Smallholder farms
- Main crops: tabaco, dairy, soybean
- Sugarcane area: 1 ha
- Yield levels: ≈ 60 ton/ha
- Cycle: 4-5 years



Field work: Cooperbio



Figure : Sugarcane farmer, Eral Seco

Field work: Cooperbio

■ Database

Ethanol production

- . Average yield: 45 l ethanol/ton cane
- . Critical point: milling sugar extraction



Field work: Cooperbio



Figure : Sugarcane mill, Caiçara

Scenarios

Proposed scenarios to explore to assess the sustainability of small scale biofuel production (e.g. economic)

Scenario	Industrial scale	Agricultural scale	Selling price
1	Large	Large (SP)	Regular (R\$ 0.50)
2	Micro	Smallholder (SP)	Regular (R\$ 0.50)
3	Micro	Smallholder (SP)	Station (R\$ 0.82)
4	Micro	Smallholder (RS)	Station (R\$ 1.23)

Scenarios

- Industrial systems
 - Large scale: information of an standard (≈ 1 million l ethanol/day) ethanol production plant
 - Microdistillery: production systems visited in Southern Brazil



Scenarios

- Agricultural systems
 - Large producers: production systems in SP
 - Smallholders: visited systems in RS
 - Smallholders (SP): similar to farmers in RS, yet with some adaptations (e.g., yield levels, crop management)



Scenarios

- Selling prices
 - To be verified at the National Energy Agency - ANP
- Products
 - Ethanol
 - Other products will not be considered (e.g. brown sugar, cachaça)



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