Producing food and energy for a healthier planet: the case of Brazilian sugarcane ethanol

THE SUSTAINABILITY AGENDA OF THE BRAZILIAN SUGARCANE INDUSTRY

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Executive Director
Brazilian Sugarcane Industry Association (UNICA)

Milan
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UNICA is the leading sugarcane industry association in Brazil.

Its more than 100 member companies, voluntarily engaged, represent over 60% of the sugarcane, sugar and ethanol produced in Brazil.

Its expertise covers key areas including the environment, energy, technology, international trade, corporate social responsibility, sustainability, regulation, economics and communications.

It has offices in four locations: São Paulo (headquarters), Brasília, Washington D.C, and Brussels.
I. Overview of the sugarcane industry in Brazil

II. Sustainability projects and programs
<table>
<thead>
<tr>
<th>Key Numbers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of mills</td>
<td>369</td>
</tr>
<tr>
<td>Sugarcane growers</td>
<td>70,000</td>
</tr>
<tr>
<td>Direct employment</td>
<td>1.02 million</td>
</tr>
<tr>
<td>Revenue</td>
<td>US$ 43.8 billion</td>
</tr>
<tr>
<td>Foreign revenue</td>
<td>US$ 10 billion</td>
</tr>
<tr>
<td>% energy matrix</td>
<td>16.1% (2nd source, &gt; hydro)</td>
</tr>
<tr>
<td>CO₂ emission reductions CO₂</td>
<td>&gt; 600 million t since 1975</td>
</tr>
</tbody>
</table>

28 billion liters
2nd world largest producer: 25% of production and 20% of world exports

15 million MWh
3.3% of Brazilian electricity consumption

35 million tons
Largest producer and exporter in the world: 20% of global production and 40% of exports
SUGARCANE PRODUCTS: STEP BY STEP

Current technology

Technology under development

Sugarcane

Cane stalks

Cane juice (Sucrose)

Bagasse (Cellulose)

Biopolymers (bioplastics, isoprene, etc)

Ethanol

3° generation

Sugar

Detergents & solvents

Cosmetics

Lubricants

Flavors and Fragrances

Food

Drop-in fuels (diesel, jet fuel, gasoline)

Current technology products:

- Sugar
- Biopolymers (bioplastics, isoprene, etc)

Technology under development products:

- Ethanol
- Bioelectricity

Sugarcane products:

- Cane stalks
- Bagasse (Cellulose)
- Straw (Tops and Leaves) (Cellulose)

2° generation products:

- Detergents & solvents
- Cosmetics
- Lubricants
- Flavors and Fragrances
- Food

3° generation products:

- Drop-in fuels (diesel, jet fuel, gasoline)
SUGARCAKE ETHANOL ENVIRONMENTAL PERFORMANCE

Advantages of sugarcane ethanol

<table>
<thead>
<tr>
<th>Source</th>
<th>Energy balance (units of renewable energy per unit of fossil fuel input)</th>
<th>Productivity (liters/hectare)</th>
<th>GHG reduction (from US and EU legislations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cana-de-açúcar (EUA)</td>
<td>9.3</td>
<td>7,000</td>
<td>61%-91%</td>
</tr>
<tr>
<td>Milho (EUA)</td>
<td>1.4</td>
<td>3,800</td>
<td>0%-38%</td>
</tr>
<tr>
<td>Trigo (UE)</td>
<td>2.0</td>
<td>2,500</td>
<td>16%-69%</td>
</tr>
<tr>
<td>Beterraba (UE)</td>
<td>2.0</td>
<td>5,500</td>
<td>52%</td>
</tr>
</tbody>
</table>

LAND USE IN BRAZIL

**Million Hectares**

<table>
<thead>
<tr>
<th>Total Area</th>
<th>Native Vegetation</th>
<th>Land in Actual Use</th>
<th>Other Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>851</td>
<td>554</td>
<td>258</td>
<td>38</td>
</tr>
<tr>
<td>100%</td>
<td>65%</td>
<td>30%</td>
<td>5%</td>
</tr>
</tbody>
</table>

- **Pastures**: 198 (23%) - Sugarcane: 9.5 (1%)
- **Crop Land**: 60 (7%) - Sugarcane FOR ETHANOL: 4.6 (0.5%)

**Ethanol Productivity**

Source: ICONE, IBGE (PAM 2010 and Censo Agropecuário), MMA, INPE (TerraClass), Agricultural Land Use and Expansion Model Brazil Ag-LUE-BR (Gerd Sparovek, ESALQ/USP). Elaboration: UNICA and Cosan. Note: ILs = Indigenous Lands. Other Native Vegetation include Legal Reserves (RLs).
I. Overview of the sugarcane industry in Brazil

II. Sustainability projects and programs
ENHANCING THE SUSTAINABILITY

➢ Government Initiatives
1. It excludes sugarcane expansion in the most sensitive biomes – e.g. Amazonia and Pantanal

2. It excludes sugarcane expansion on any type of native vegetation (Cerrados, Campos, etc.)

3. Authorized areas for sugarcane expansion: 64.7 ml hectares, equivalent to 7.5% of the Brazilian territory (currently 1% of the area is used for sugarcane)

It guides licensing decisions of the Brazilian environmental agencies. Public funding for sugarcane mills is subject to its compliance.

Source: Brazilian Ministry of Agriculture, Livestock and Food Supply (2009)
ENHANCING THE SUSTAINABILITY

- Public-Private Partnerships
Voluntary agreement reached between São Paulo state government, the sugarcane industry (UNICA) and the cane suppliers (ORPLANA)

It anticipates the deadline for ending sugarcane burning: from 2021 to 2014 in areas that can be mechanized and from 2031 to 2017 in other areas.

It also includes other conservation measures, such as the protection of river side woods, the recovering of those near water springs and the reduction of water use.

144 mills and 26 association of sugarcane suppliers joined the initiative, representing 93,5% of the state ethanol production and 45,5% of Brazilian production
“Trilateral” agreement - Government, Private Sector and Labor Unions - which sets around 30 better work practices that go beyond legislation demand.

It is a voluntary agreement where participating units are verified by independent auditing companies. 180 sugarcane production units are currently in compliance with the Commitment.
Voluntary agreement reached between São Paulo State Government, the sugarcane industry (UNICA) and the cane suppliers (ORPLANA).

It anticipated the deadline for ending sugarcane burning: from 2021 to 2014 in areas that can be mechanized and from 2031 to 2017 in other areas.

It also includes other conservation measures, such as the protection of river side woods, the recovering of those near water springs and the reduction of water use.

173 mills and 29 association of sugarcane suppliers joined the initiative, representing 90% of the state production and 50% of Brazilian production.
Mechanization in the state exceeded ~ 90% of all cane fields

Water resources management by the sugarcane mills

Source: INPE and the São Paulo State Secretariat for the Environment.
ENHANCING THE SUSTAINABILITY

➢ *Private Partnerships*
Retraining Program for Sugarcane Rural Workers

- Response to the process of mechanizing the sugarcane harvest to eliminate burning;

- It aims at providing specialized training for sugarcane rural workers in the state of São Paulo;

- Partnership among UNICA and FERAESP (Federation of Rural Workers of the State of São Paulo), IADB, mills, companies from the supply chain and international NGOs (Solidariedad)

- Along 4.5 years of Project, RenovAção re-qualified more than 6,000 people among current and former rural workers (cane cutters), and members of the communities affected by the crop mechanization process, through 78 courses offered by distinguished schools in 194 different classes
The Program **encouraged similar actions inside the mills**, multiplying the number of trained workers (more than 22,000 trained in the last 4 years)

*RenovAção’s* initiatives were the base for the public initiative to begin launching new projects with very similar features, such as the *Pronatec, a Federal Public Program*, coordinated by the Ministry of Education, that aims to train and requalify around 12,000 people from the sugarcane sector, just in the state of Sao Paulo.

International recognition by FAO as an “example” among the initiatives that combined renewable energies production with social inclusion.
First welder graduate class

Mechanical tractor course

Electrician tractor course

Mechanical of harvester course
UNICA was the first agribusiness association in the world to publish a sustainability report following the Global Reporting Initiative Framework.

In its last version (2010/11) it achieved an “A+ Grade”. Dissemination of the practice within the Sugarcane sector: more than 100 mills have now their own GRI Sustainability Report!
A bilateral private sector arrangement between sugar/ethanol industry and sugarcane growers that establishes a dynamic and transparent model to define the price paid by ton of cane.

Created in 1999, it aims at sharing risks between agents and comprises two private entities:
- UNICA, representing sugar and ethanol producers
- ORPLANA, representing sugarcane growers

Main principles:
- Balanced forum between growers and the industry
- Voluntary engagement
- Dynamic model, subject to revisions of its parameters and improvement of its rules on a regular basis (general revisions conducted every 5 years)
- Revenue of the sugarcane grower is proportional to the industrial revenue
  - On average, sugarcane production accounts for 60% of total sugar and ethanol production costs. Therefore, the sugarcane grower receives on average 60% of the agroindustrial revenue.
SUGAR CANE CRUSH IN THE STATE OF SÃO PAULO

Cane from growers: 33%

Cane from growers: 46%

Sugarcane from the mills

Source: UNICA
Since 2011

- 40 Brazilian mills certified out of 46 in the world
- 9% of all cane area in Brazil
- 28% of EU consumption targets for 2020

An international multi-stakeholder certification of best sustainability practices

Some of the 60+ Bonsucro members

Coca-Cola, Tate & Lyle, Rabobank, World Wildlife Fund, IFC, Jabil, Cargill, COPERSUCAR, Syngenta, Bunge, Greenpeace, Unica, Elevance Renewable Sciences, BACARDI, bp, Guarani Sugar, Ethical-Sugar, Solidaridad, Shell, ETH, USJ S. João, Unilever
<table>
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<th><strong>Public policies</strong></th>
<th>Examples</th>
<th>Instruments</th>
<th>Scope</th>
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<td>National and State Agroecological Zonings</td>
<td>Regulatory</td>
<td><img src="https://example.com/brazil.png" alt="Brazil" /></td>
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<td>New Forest Code</td>
<td>Regulatory</td>
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<th><strong>Public-private partnerships</strong></th>
<th>Examples</th>
<th>Instruments</th>
<th>Scope</th>
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<td>The Green Protocol, The National Commitment to improve labor conditions</td>
<td>Self-regulatory</td>
<td><img src="https://example.com/brazil.png" alt="Brazil" /></td>
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<td>BONSUCRO certification</td>
<td>Self-regulatory</td>
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<tr>
<td>Renovação Project</td>
<td>Self-regulatory/market-based incentives</td>
<td><img src="https://example.com/brazil.png" alt="Brazil" /></td>
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</tr>
<tr>
<td>CONSECANA</td>
<td>Self-regulatory/market-based incentives</td>
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<th><strong>Individual initiatives</strong></th>
<th>Examples</th>
<th>Instruments</th>
<th>Scope</th>
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<td>Eg: local partnerships, support to schools or hospitals, etc</td>
<td>CSR / Differentiation</td>
<td><img src="https://example.com/brazil.png" alt="Brazil" /></td>
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Source: UNICA. Note: CSR – Corporate Social Responsibility
THE SUSTAINABILITY PORTFOLIO: DIFFERENT TOOLS FOR DIFFERENT OBJECTIVES

INTERNATIONAL

NATIONAL

PRIVATE

Environmental

Social

Economic

scorecard

Sugarcane Agroecological Zoning

New Forest Code

renov
Ação

consecana

International

National
CONCLUSIONS

- There is **no silver bullet** for the sustainability challenge. We need the **right tools for each objective**. There is no one-fits-all.

- To consider different **regional characteristics** is essential...

- ... but to consider the characteristics of the **different production-to-consumption chains** are as important.

- Clear regulatory framework is the first priority (ex: land tenure, labor rights, energy policy, etc...)

- **Innovative models are also needed**: self regulatory commitments, third party certification, transparency tools, multi-stakeholder partnerships

- Each model has **different potentials** but also **different limitations**.

- We need a holistic strategic thinking: **strive for the maximization of the outcomes for each sustainability program**.
The sugarcane sector has been more and more involved in activities aiming to promote best social, environmental and economic practices in the industry.

There are several types of initiatives (e.g. governmental, private, public-private partnerships), with different scopes (e.g. national, sectoral, individual) and application instruments (e.g. command and control, market-based incentives).

UNICA, as an institutional representation, follows those initiatives aiming to create incentives for its member companies and enable their engagement.

Partnerships with the government and other institutions, as well as NGOs, are positive in the sense that they increase the impact and credibility of these programs and projects.
Thank you!

www.sugarcane.org
www.unica.com.br