Brazilian Sugarcane

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High-Value Products from Sugarcane

PLANT SUGARS → INDUSTRIAL SYNTHETIC BIOLOGY PLATFORM → CHEMICALS & FUELS

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Brazil is #1 in Sugarcane

- Brazil is the **world’s largest cane producer**, twice #2 India
- Brazil's **South-Central region accounts for 90%** of country’s cane harvest
- Brazil’s sugarcane sugar **yields have grown at 3% CAGR** since late 1970s

Source: University of Minnesota Institute on the Environment; Brazilian Sugarcane Industry Association (UNICA), Food and Agricultural Organization (FAO)
Sugarcane Industry in Context

Sugarcane occupies 2.5% of Brazil’s arable land to produce over 600 million tons per crop year.

### Millions of Hectares (2012)

<table>
<thead>
<tr>
<th>Category</th>
<th>Hectares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil Land</td>
<td>850</td>
</tr>
<tr>
<td>Arable Land</td>
<td>330</td>
</tr>
<tr>
<td>Crop Land</td>
<td>70</td>
</tr>
<tr>
<td>Soybean</td>
<td>27</td>
</tr>
<tr>
<td>Corn</td>
<td>15</td>
</tr>
<tr>
<td><strong>Sugarcane</strong></td>
<td><strong>8.5</strong></td>
</tr>
<tr>
<td>Cattle Pasture</td>
<td>198</td>
</tr>
</tbody>
</table>

1 Hectare = 2.5 acres

Source: UNICA, CONAB, IBGE
### Land Uses in Brazil

<table>
<thead>
<tr>
<th>Total Area</th>
<th>Native Vegetation</th>
<th>Land in Use</th>
<th>Other Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>850 Million Hectares</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>

- **Native Vegetation**
  - Pasture: 198, 23% (24%)
  - Crop Land: 60, 7% (16%)
  - Sugarcane: 8.5, ~1% (25%)

- **Conservation Units and ILs**
  - 204, 24%

- **Protected Areas**
  - 135, 16%

- **Other Native Vegetation**
  - 215, 25%

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). Developed by: UNICA and Cosan. Note: ILs = Indigenous Lands. Other Native Vegetation include Legal Reserves (RLs).
Brazilian Industry Output

**SUGAR CANE**
- +500 Million Tons
- % of World Crop

**RAW SUGAR**
- 37 Million Tons
- ¼ of World Demand

**ETHANOL**
- 6 Billion Gallons
- ½ of U.S. Production

**ELECTRICITY**
- 1,500 MW
- ~3% of Brazil Demand

Source: UNICA and MAPA. Note: Data is estimate.
Historical Production

Source: UNICA and MAPA. Note: 12/13 data is estimate.
Agricultural Challenge

CROP SIZE
Metric Tons

PRODUCTIVITY
Tons per Hectare

While pump prices remained stable, the net price paid to refineries increased by 34% through reduced taxation in the period.
SUGAR: To meet domestic demand and retain current share (50%) of global sugar market, annual sugar production will have to increase by 13.7 million tons by 2020.

ETHANOL: Projected production to meet 50% (vs 36% currently) of estimated ethanol market in Brazil plus about export demand of about 13 billion liters (4 BGY).

OTHERS: Other uses of sugarcane could account for upwards of 5 billion liters ethanol-equivalent.

Source: UNICA. Note: Estimated values of the harvest 2011/12.