Sustainable bioenergy in Brazil

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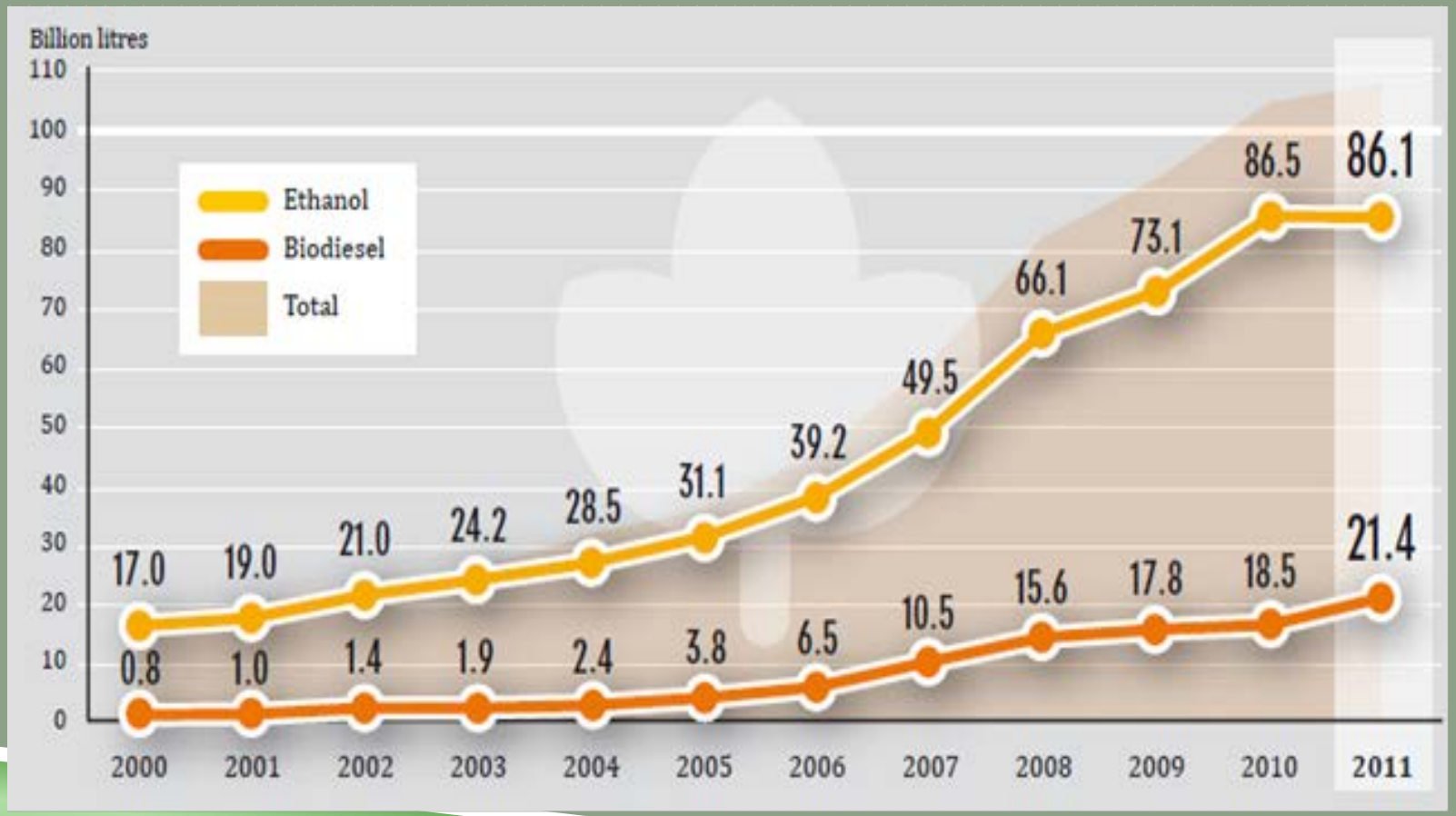
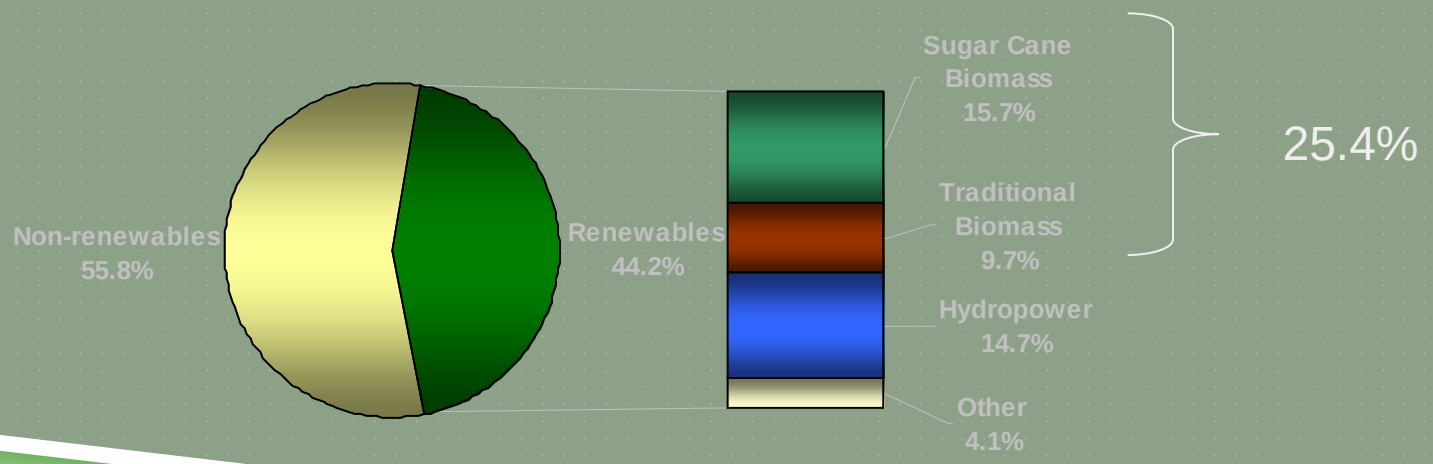
Biofuels in the World



Bioenergy in Brazil

- Biomass is one of the main alternatives for renewable energy generation in Brazil
- Sugarcane bioelectricity represents 2% of the Brazilian electricity matrix.
- Complementarities: cane harvest occurs during the dry season, when hydroelectric reservoirs are low and marginal sources of electricity are needed.

Brazilian Energy Mix (2011)



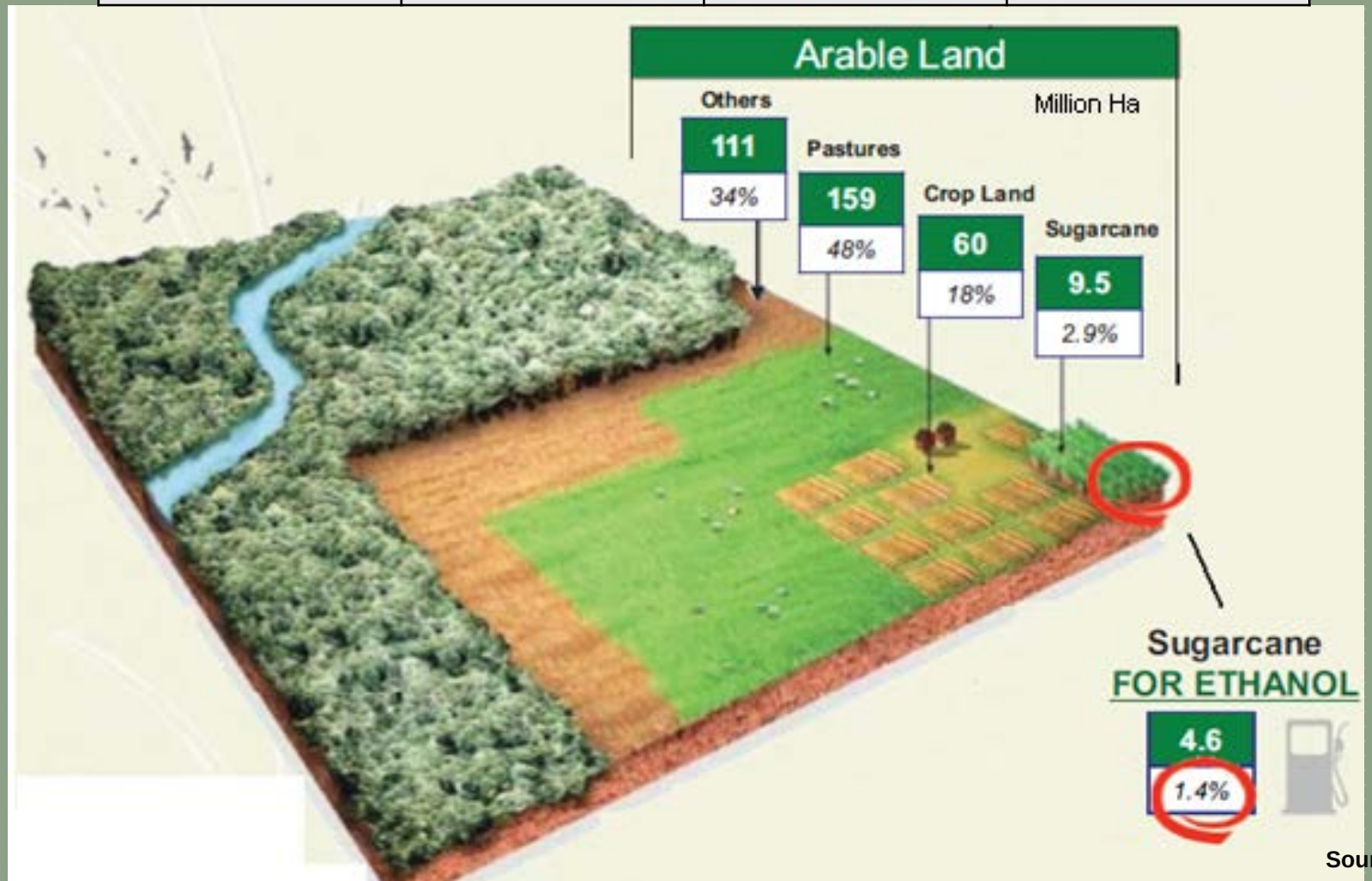
Sustainability Indicators

Economic	Environmental	Social
• 430 mills • US$ 48 billion in annual revenue (2% of the GDP) • US$ 15 billion in exports • Cogeneration of electricity	• 61 to 91% CO_2 reduction (compared to gasoline) • Expansion over abandoned pastures • Increased harvesting mechanization	• 70,000 sugarcane growers • 1.2 million jobs • Rural development • Social inclusion

- **Ethanol** consumption between 1975 and 2011 **replaced 330 billion liters of gasoline;**
- **No competition between biofuels and food production:** 50% of gasoline consumption was replaced by ethanol produced on 1.4% of the Brazilian arable land, while food production has doubled in the last decade;
- Ethanol use in Brazil **prevented 850 million tons of CO_2 emissions** over the last 30 years.

Land use in Brasil

Total Area (Million Ha)	Protected Areas	Arable Land	Others
851	496	330	25
100%	58%	39%	3%

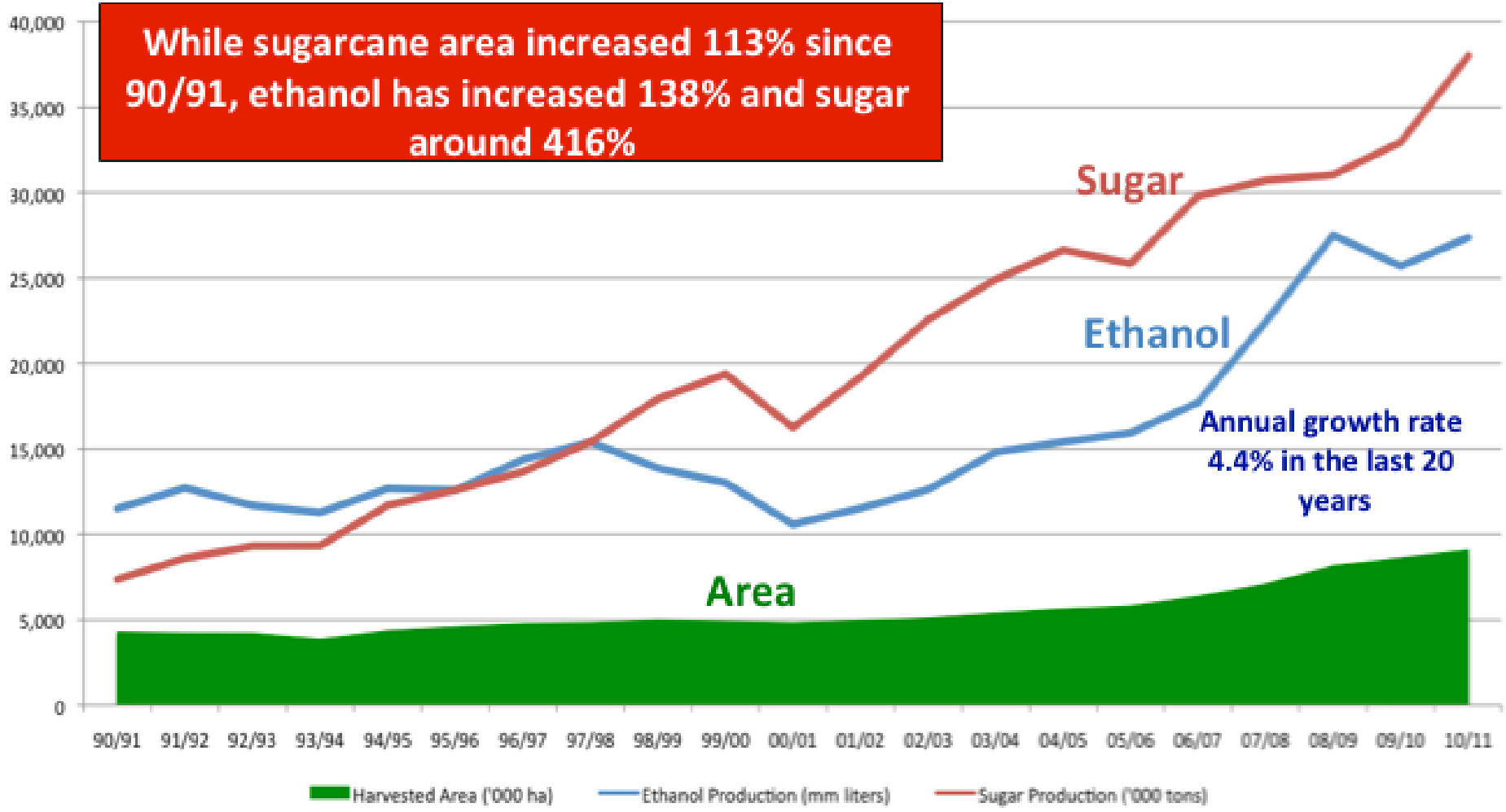


Source: UNICA.

Sugarcane Agroecological Zoning

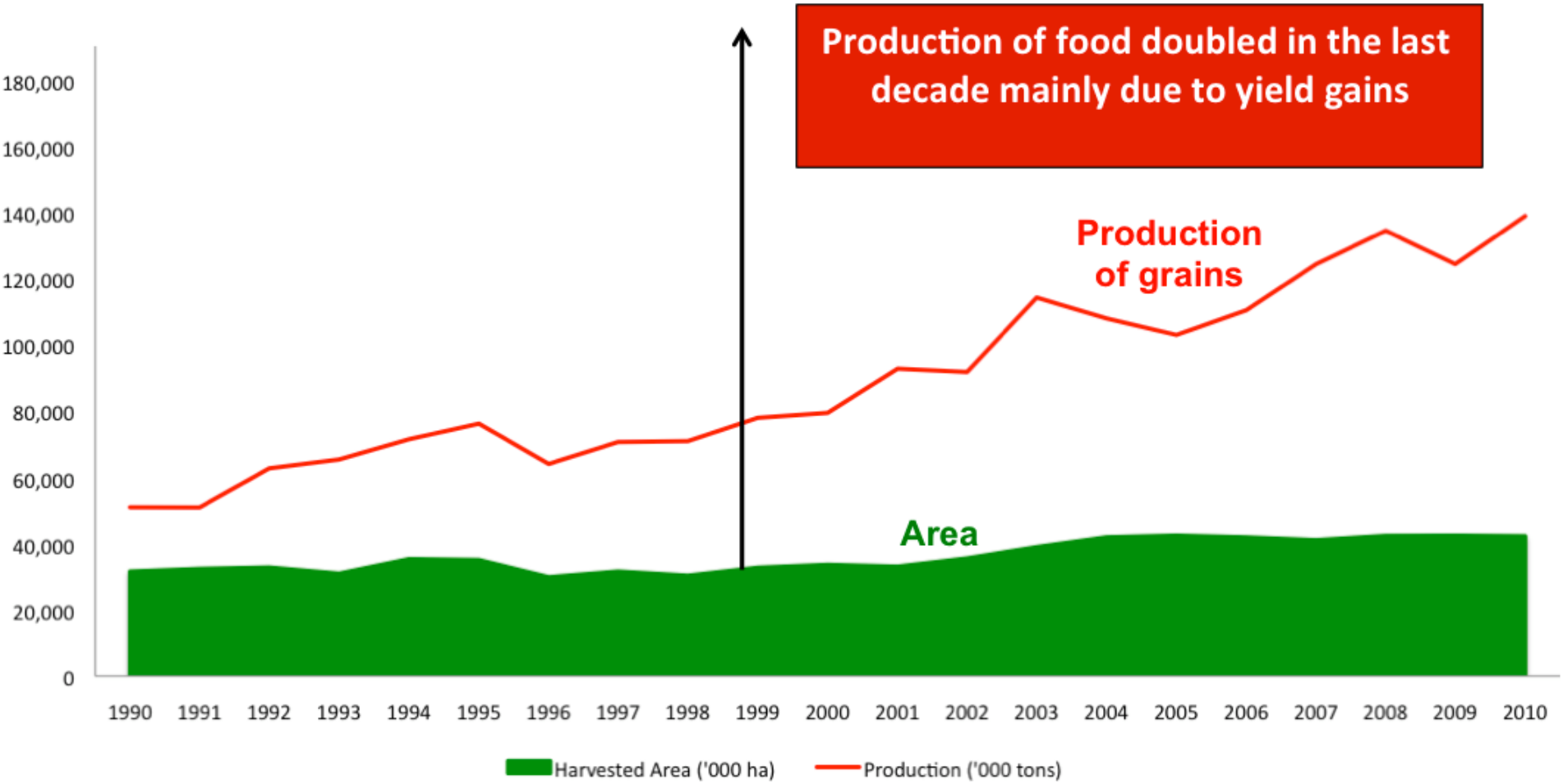
- Excludes sugarcane production in the most sensitive biomes, such as Amazonia and Pantanal.
- Excludes the clearing of native vegetation for sugarcane expansion
- Authorized areas for sugarcane expansion: 7.5% of the Brazilian territory (64.7 m hectares).

Sugarcane in Brazil: Harvested Area, Ethanol & Sugar Production



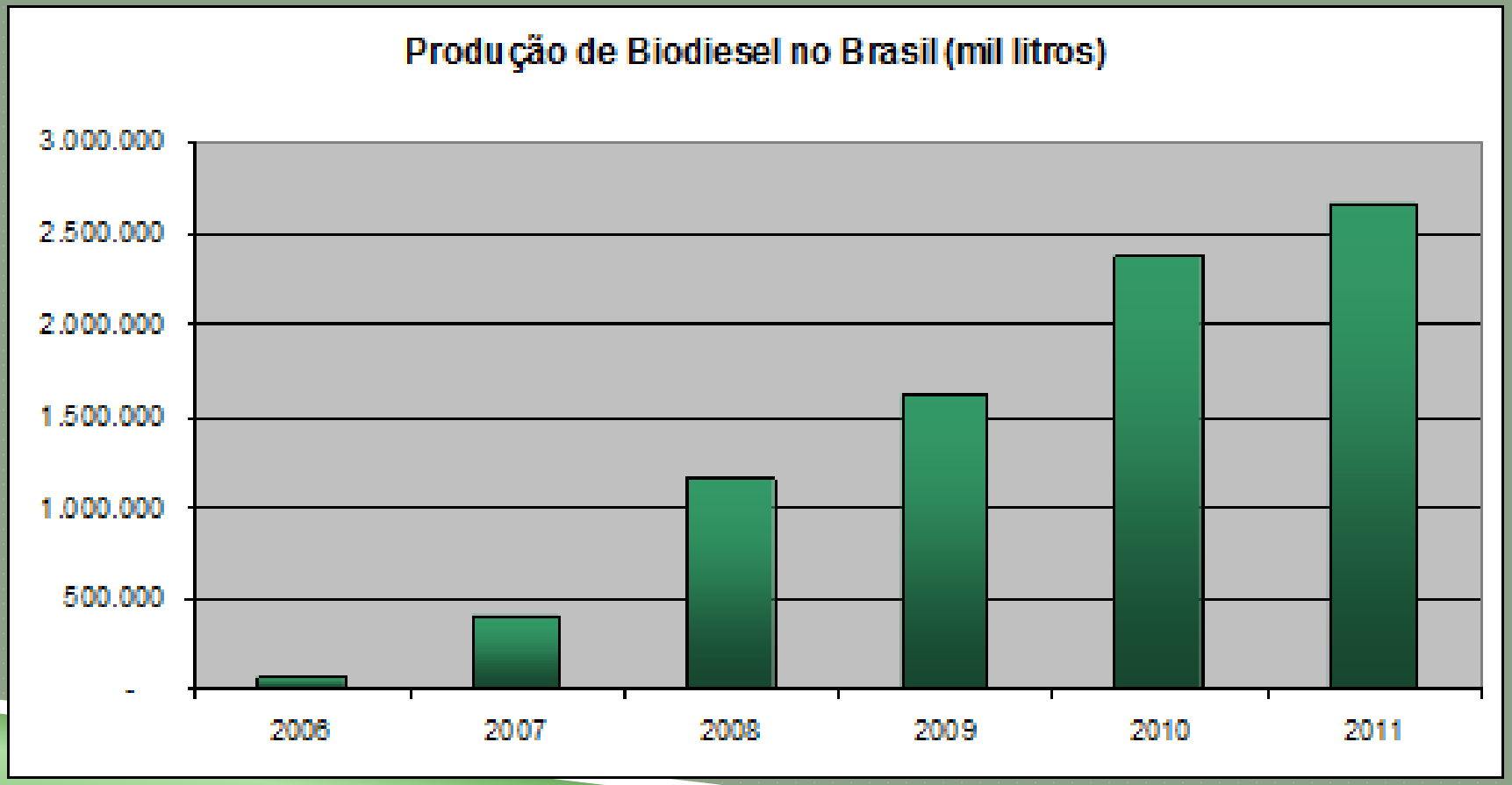
Sources: IBGE (2010) and UNICA. Prepared by UNICA.
Note: * estimated

Grains* in Brazil: Harvested Area & Production

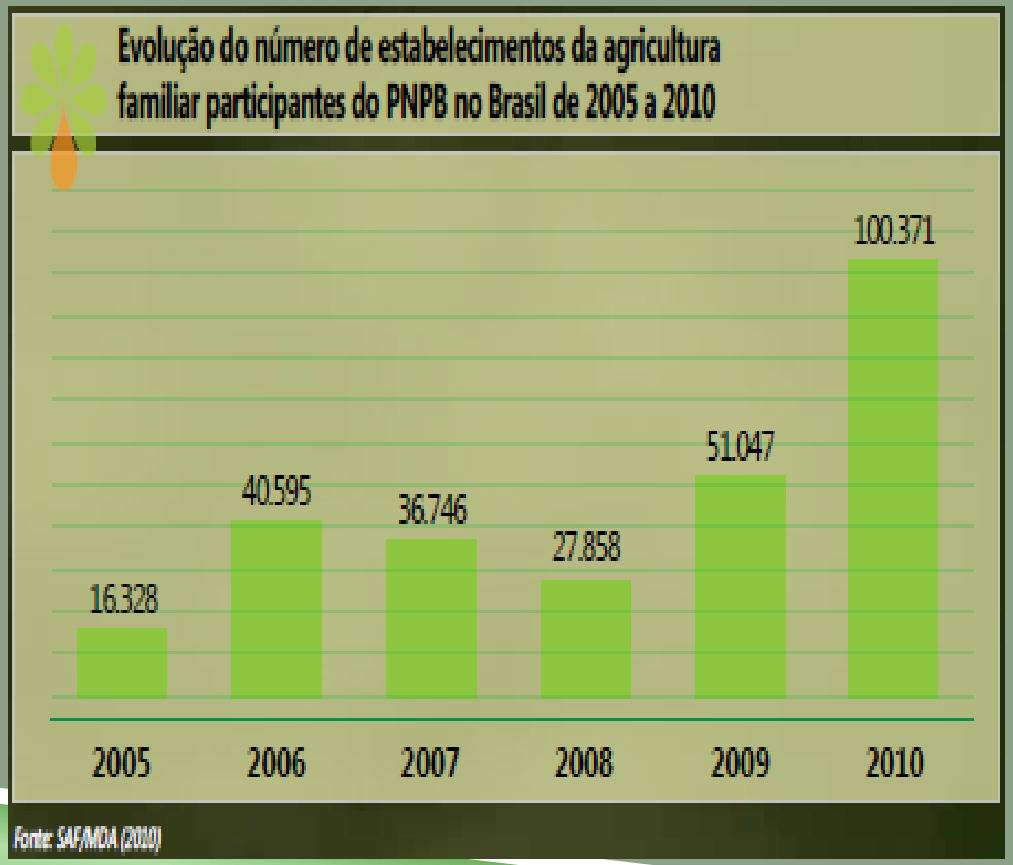


Source: IBGE (2010)
Notes: 2010: estimated data.*Grains include rice, corn, wheat, soybeans and beans.

Brazilian Biodiesel Production ('000 liters)



Biodiesel – participation of small farmers



US and EU markets

- Brazilian sugarcane ethanol granted "advanced biofuel" status by EPA – 61% to 91% CO2 emissions reduction;
  - 98 mills certified to export to the US
- EU RED number for sugarcane ethanol: 71% CO2 emissions reduction (without ILUC);
  - 12 mills certified with BONSUCRO (Better Sugarcane Initiative).

New developments/trends

- Revamp of ethanol production in 2013;
- Cellulosic ethanol: first commercial plant in the NE
  - Funds from the National Development Bank (PAISS Program): US$ 500 million.
  - GraalBio plant in Alagoas - 82 million litters/year.; US$ 150 million investment.
- Aviation biofuels (R&D);
- Increase in biodiesel production;
- New products (bioplastics, biochemistry)

  Braskem: bioolymers (Green Polyethylene)

Thank you

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