

Biofuels: The 35 Years Experience of Brazil

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Markestrat Research Center

Biofuels Debate – IAMA Forum 2009 – BUDAPEST - HUNGARY



Brazilian Experience: 1979

1979 starts the sale of the 100% ethanol cars



TESTE FIAT A ÁLCOOL

Ele atinge a velocidade máxima de 142 km/hora

Como anda um carro movido apenas a álcool? Para responder a essa pergunta, **Quatro Rodas** testou com exclusividade um Fiat a álcool produzido na fábrica de Betim, Minas Gerais, e já na sua versão praticamente definitiva.

E, entre os resultados alcançados no teste, destacam-se o desempenho muito bom, superior ao dos modelos de série (apenas o esportivo Rallye tem, em alguns pontos, marcas um pouco superiores, mas, no conjunto, perde para o modelo a álcool), o consumo bem mais elevado e a ótima dirigibilidade.



Com a instalação da quinta roda, medições exatas.

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Brazil Is World's Ethanol Superpower

Seven Out Of Every 10 New Brazilian Cars Uses Alternate Fuel

SAO TOME, Brazil, March 13, 2006 by Bootie Cosgrove-Mather

Page 1 of 2

E-MAIL STORY PRINT STORY SPHERE SHARE TEXT SIZE: A A A



Tanks with ethanol are seen at Sao Tome's distillery in Brazil on Tuesday, March 7, 2006. The

Double-click any word (What's this?)

(AP) In an agroindustrial complex ringed by fields of 12-foot-high sugar cane, a giant mechanical claw dumps stalks by the tons into an even larger crushing machine. Here's where the renewable fuel used to power seven of every 10 new Brazilian cars gets its start.

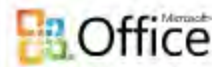
Sugary slurry flows into a row of gleaming stainless steel distilling tanks, transforming cane harvested only hours earlier by machete-wielding farm laborers into ethanol, the alternative fuel now promoted by President Bush to end what he calls America's addiction to imported oil.

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Brazil, the Ethanol Superpower

By ANDREW DOWNIE/SAO PAULO Wednesday, Mar. 07, 2007



A gas station attendant fills a car with ethanol in Sao Paulo, Brazil, March 3, 2007. Victor R. Caivano / AP

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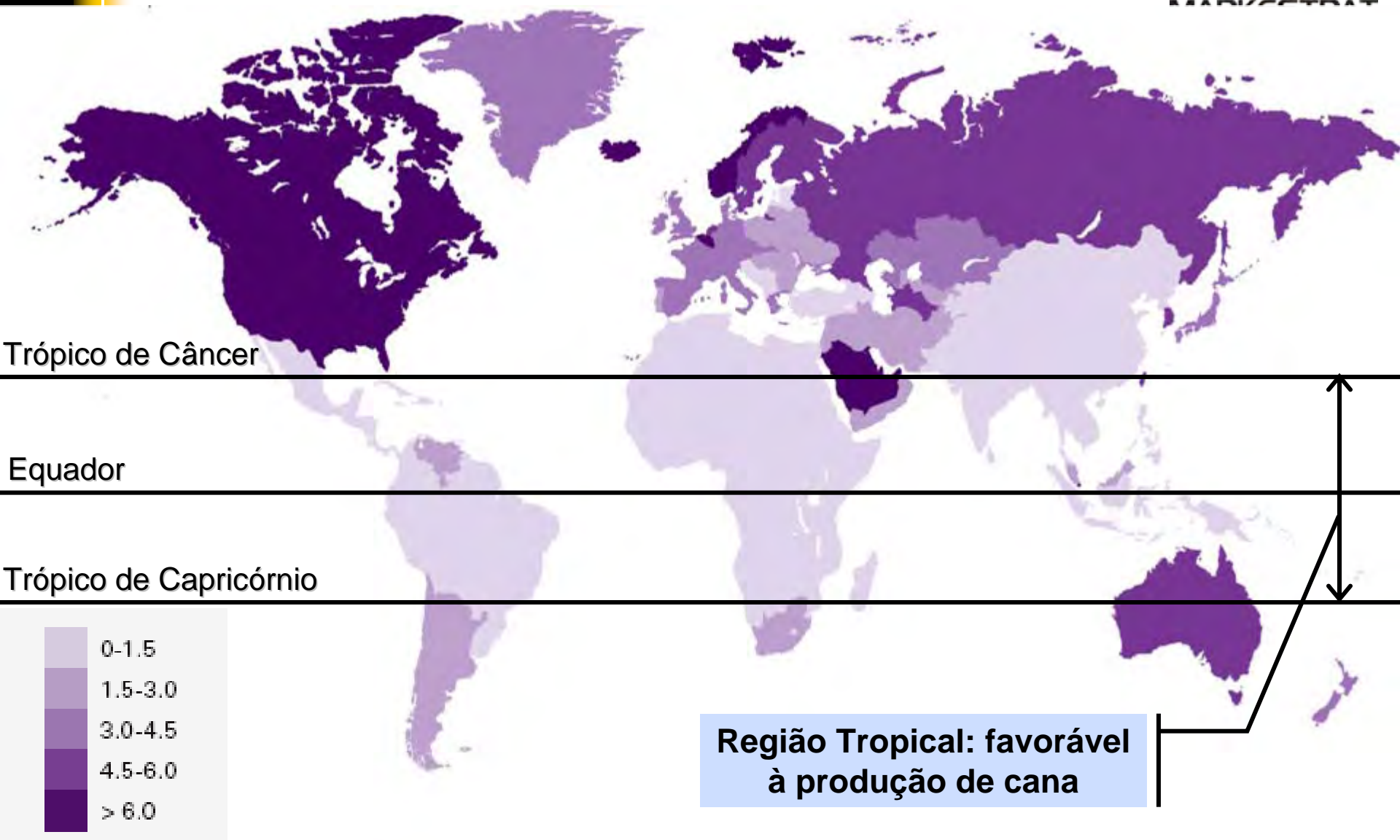
Addressing Questions

- 1 – Will the world need energy?
- 2 – The Basics of sugar cane and the Company Network
- 3 – Is it efficient?
- 4 – Is it consumer driven?
- 5 – Where will the market be?
- 6 – Does it contribute to the environment?
- 7 – Is it destroying the Amazon? Where will it grow?
- 8 – What is the strategic agenda?

Important Question

1 – Will the world need energy?

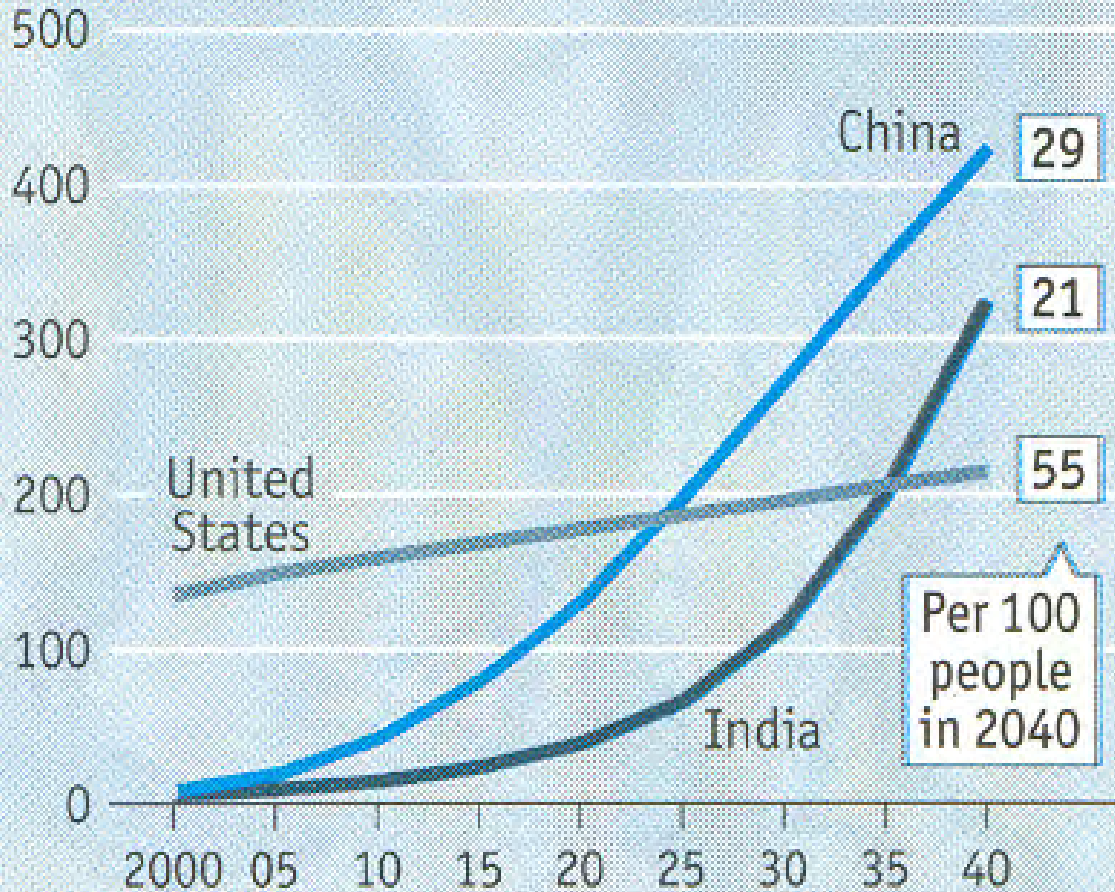
per capita consumption of energy 2006



Future traffic jams

10

Forecasts of car ownership, m

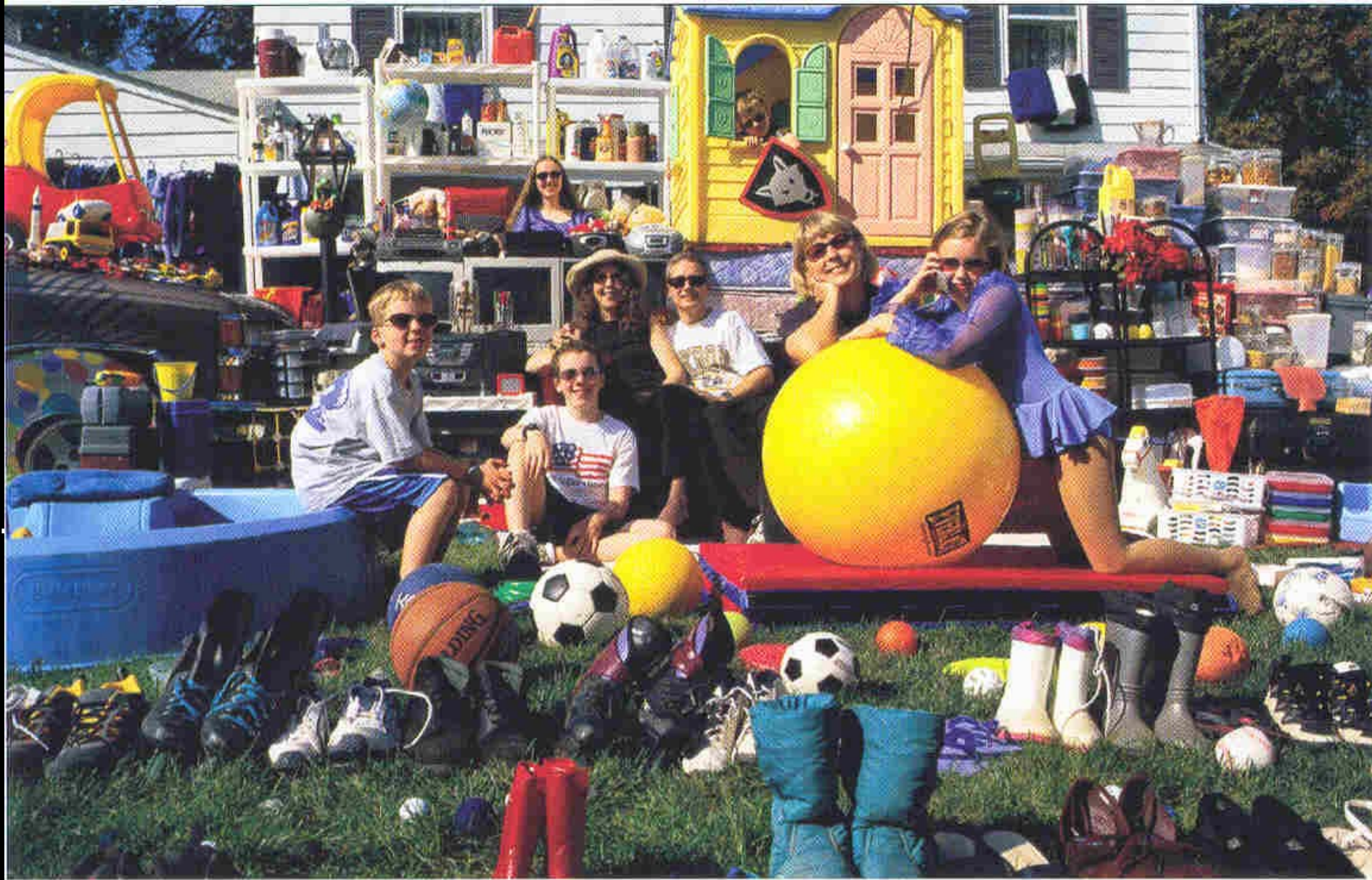


Source: Goldman Sachs



Fonte: The Economist, 16 – 22/09/2006





Oil is not only gasoline and diesel

Fonte: Caio Carvalho – Polo Nacional de Biocombustíveis

Important Question

2 - What are the basics?

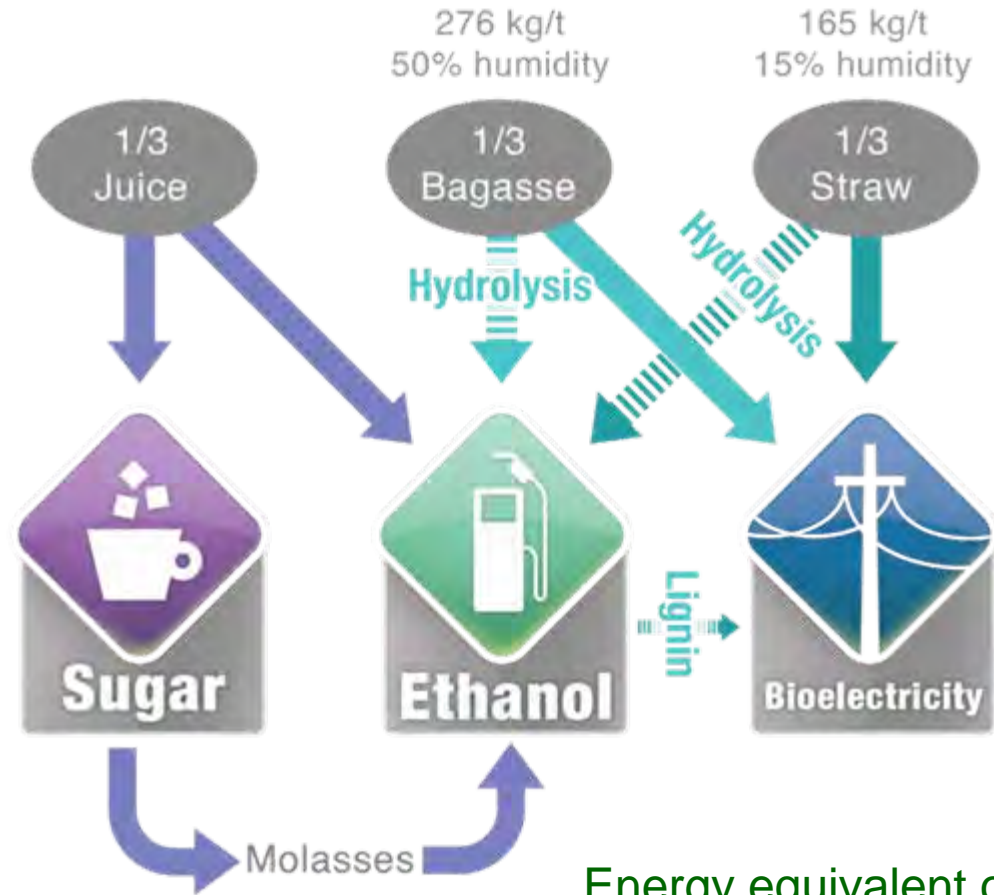


10 16:43



10 10 43

BREAKDOWN OF SUGARCANE'S ENERGY



Energy equivalent of 1
tonne of sugarcane
= 1.2 oil barrel

400 industrial units in the country



CIA. ENERGÉTICA SANTA ELISA



CIA AÇUCAREIRA VALE DO ROSÁRIO



USINA DE AÇÚCAR E ÁLCOOL MB LTDA



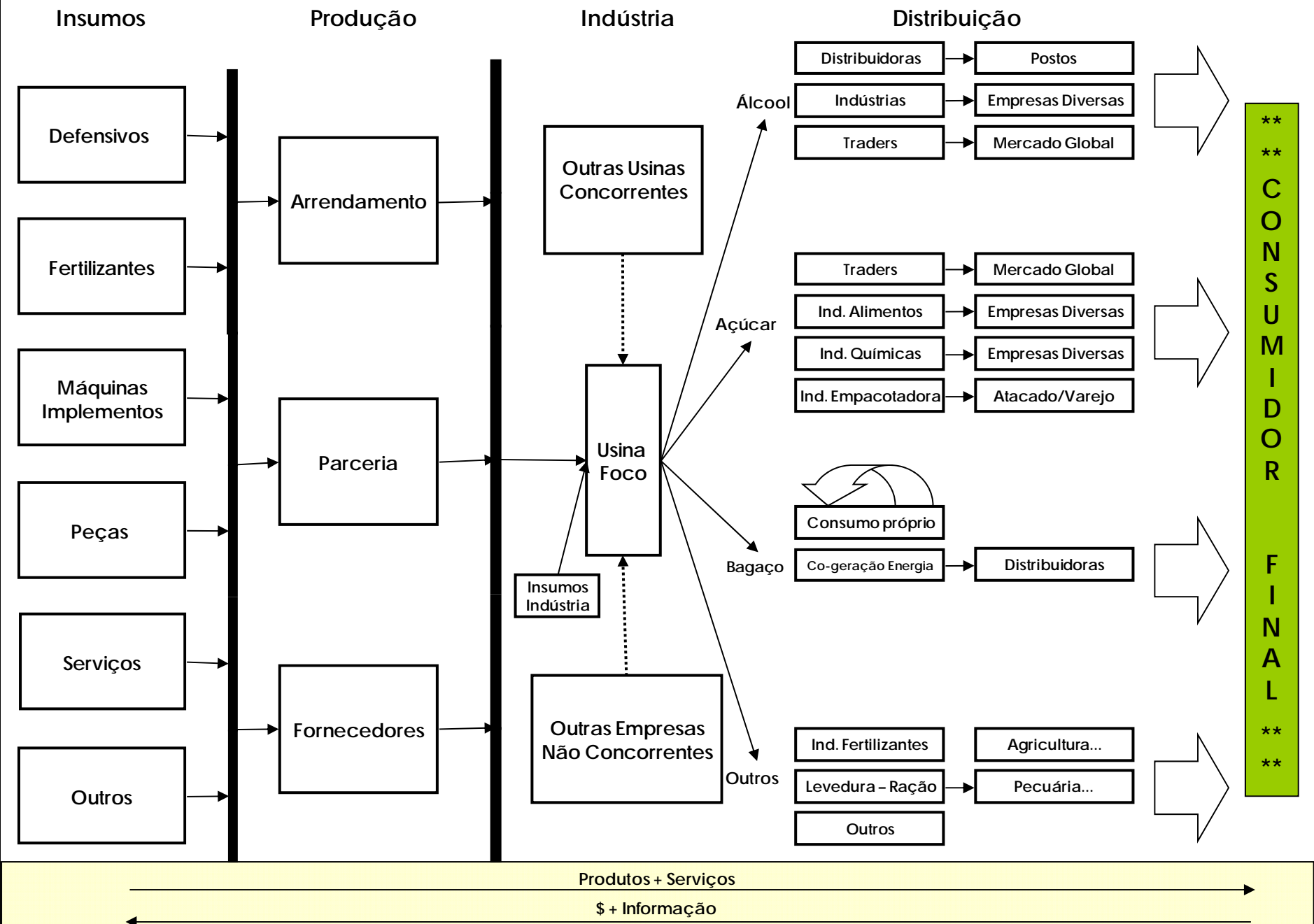
USINA MOEMA AÇÚCAR E ÁLCOOL LTDA





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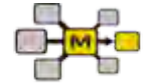
The Complex Sugar Cane Energy Network



Important Question

3 - Is it efficient in
supplying energy?

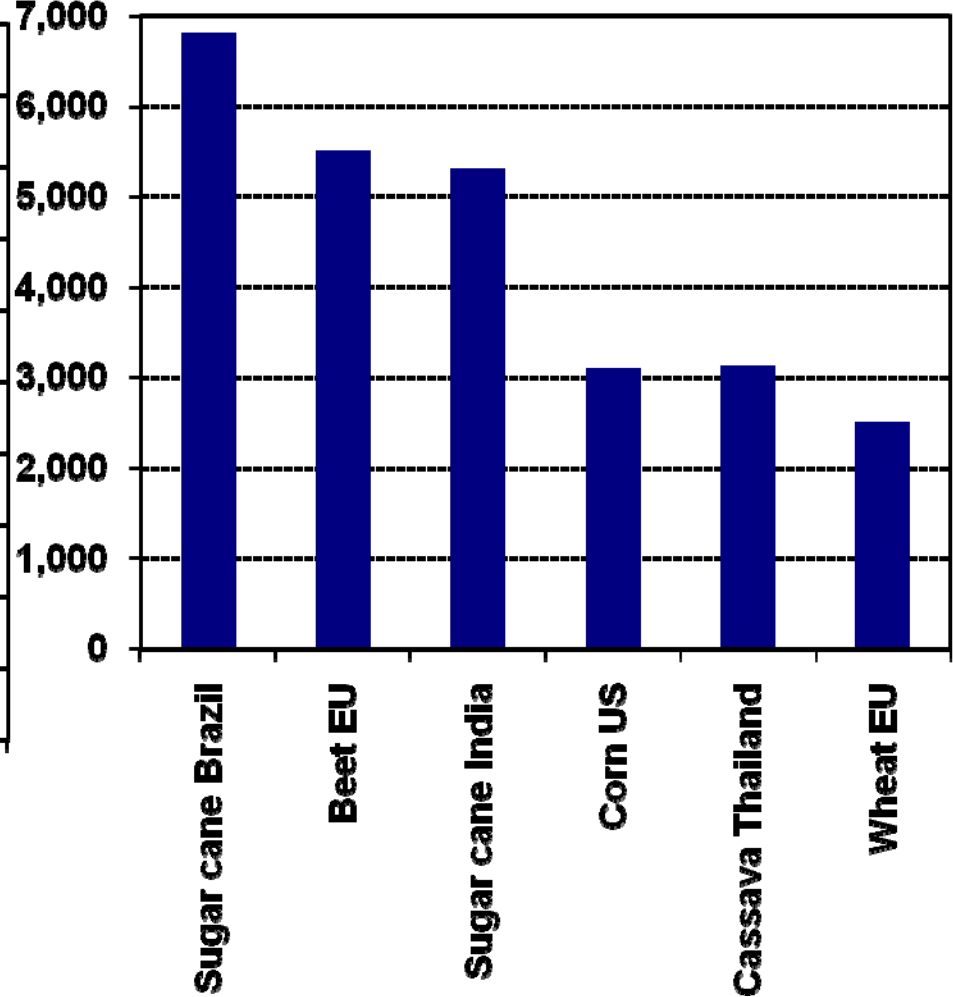
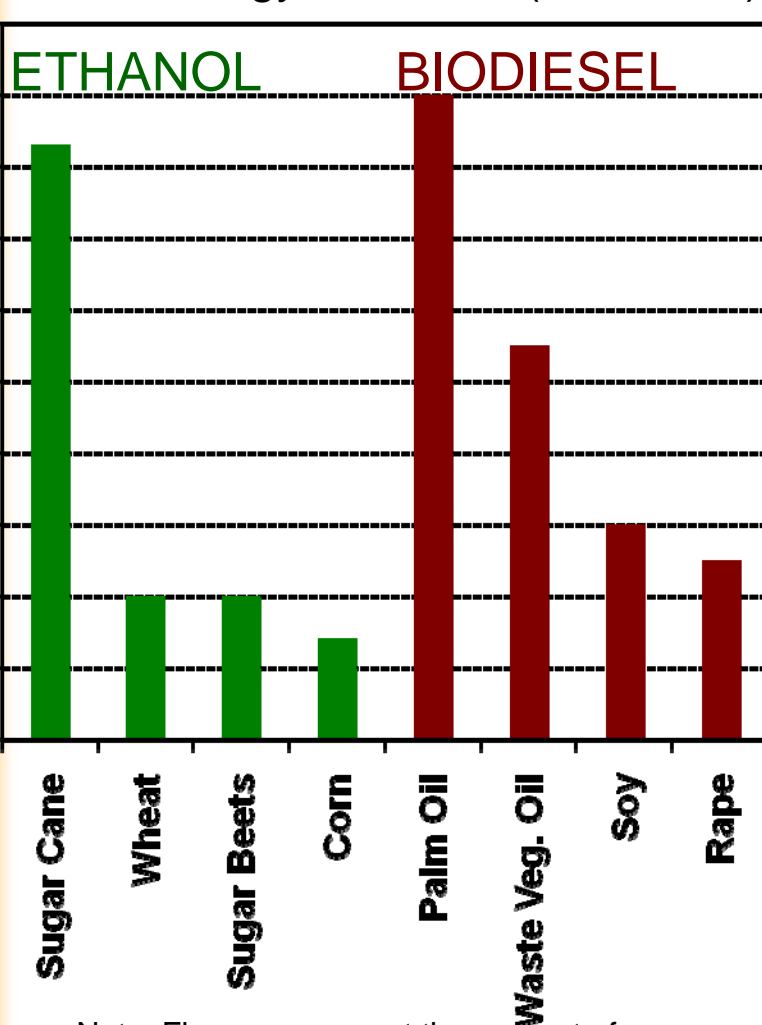
Efficiency of Biofuels Feedstocks



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Fossil Energy Balances (estimates)

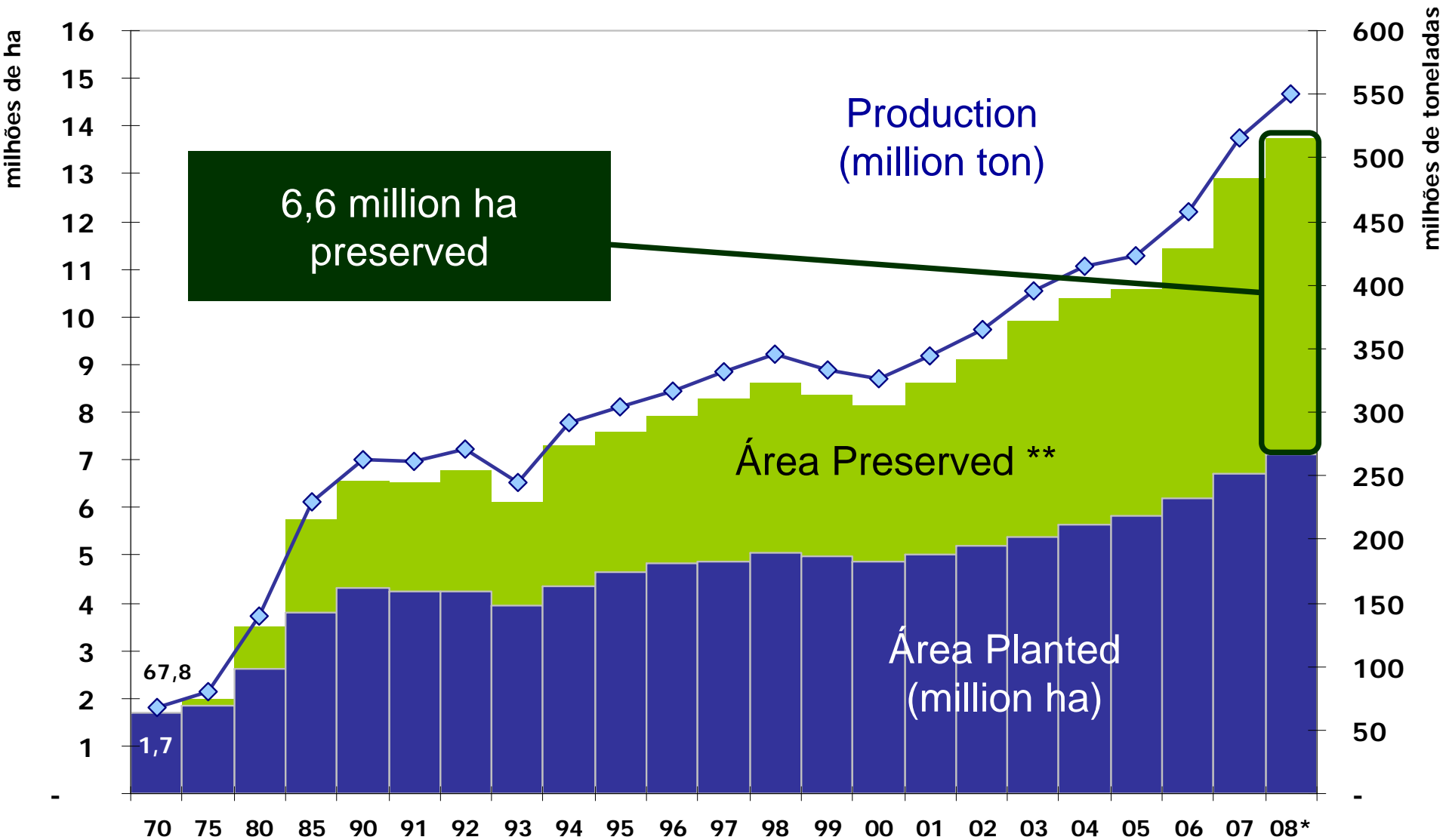
Ethanol Yields (liters per hectare)



Note: Figures represent the amount of energy contained in the listed fuel per unit of fossil fuel input.



Sugar Cane Productivity Evolution



Fonte: IBGE (Censo Agropecuário: 1970-1975-1980-1985; PAM (1990 até 2006); e LSPA (2007 e 2008)

Elaboração: GV Agro

Nota: * Estimativa

**Área calculada a partir da produtividade média de 1970

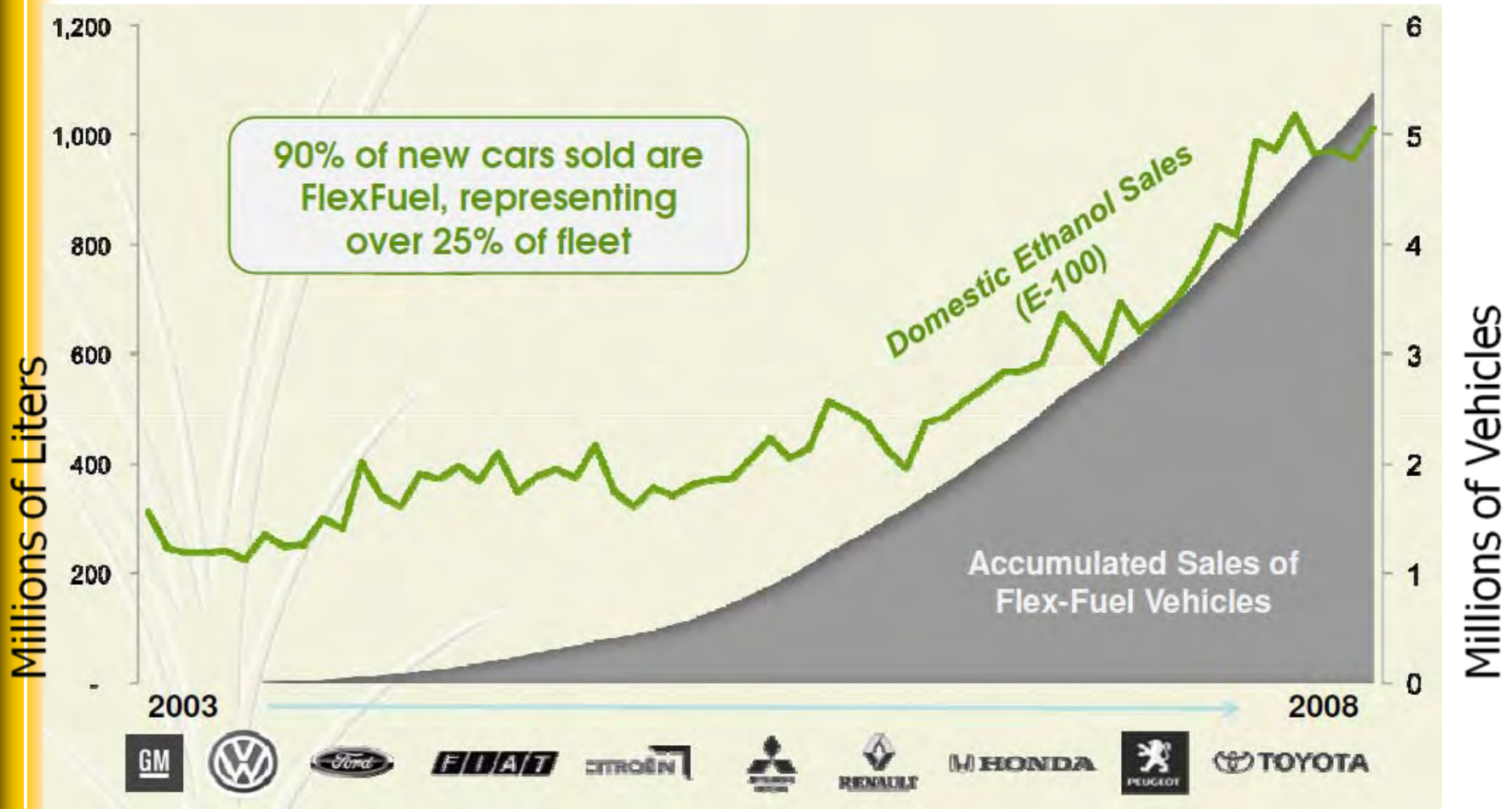
Important Question

4 - What was our major technological breakthrough?

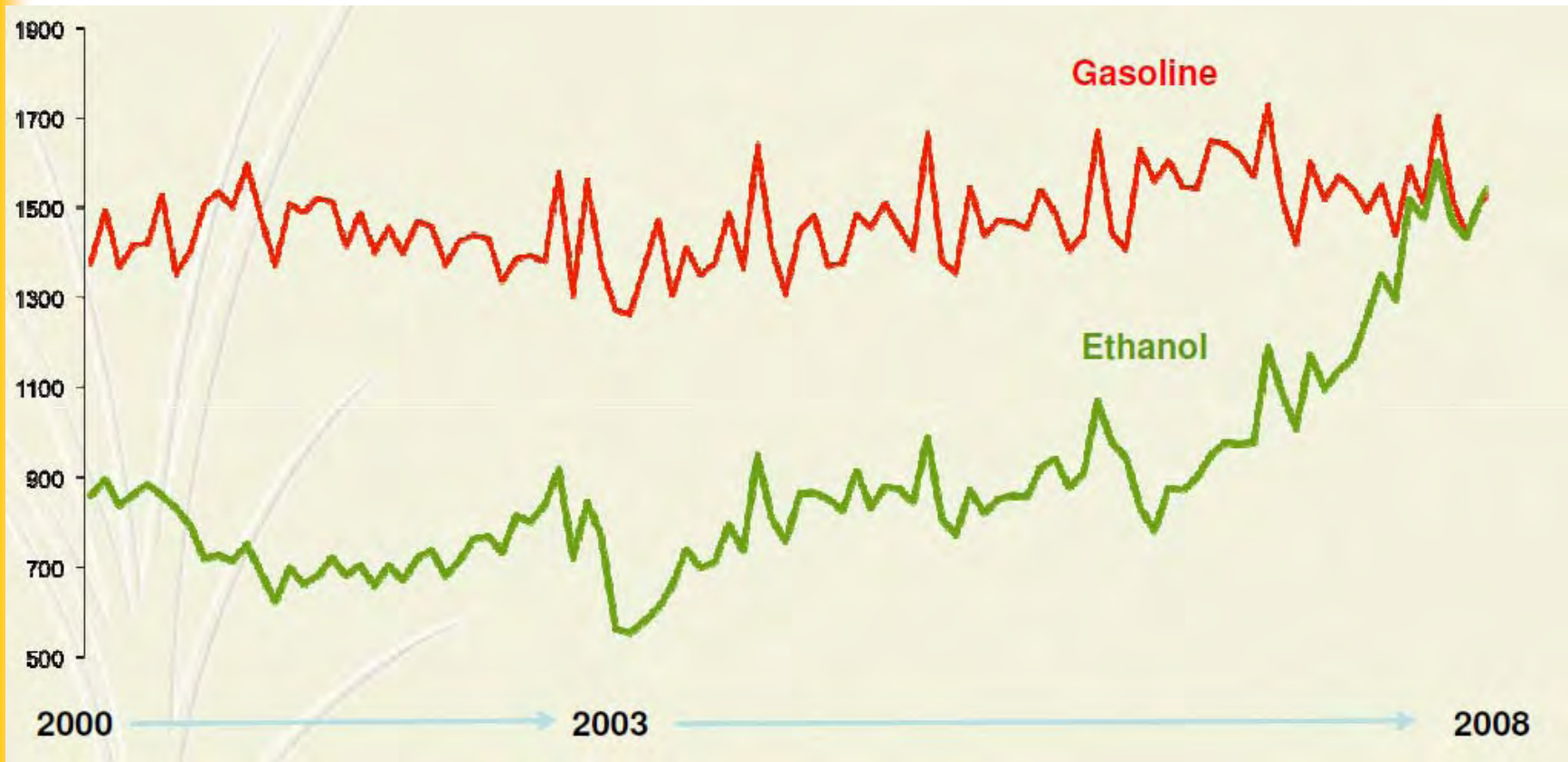
We gave the power to the consumer!

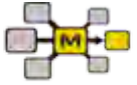


Demand is Driven by Consumer Choice



Gasoline is Now the Alternative Fuel!





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Brazilian sugarcane ethanol

1% of arable land delivers

50% of Brazil's petrol needs



You can help fight climate change by supporting a mandatory 10% target for renewables in transport by 2020

The successful Brazilian experience shows that the EU's ambition to achieve 10% of renewable fuels in transport by 2020 is feasible. Brazil has replaced half its petrol needs with ethanol made from sugarcane, grown on only 1% of its arable land. Sugarcane expands primarily on degraded pastures and does not compete with food production or cause deforestation of the Amazon. In fact, 90% of the sugarcane harvest happens in South-Central Brazil and the remainder is in the Northeast. Both regions are more than 2,500 km from the Rainforest, or roughly the distance between Paris and Moscow. While sugarcane production has increased steadily in recent years, Brazil has doubled its grain production in the last decade and become the top global exporter of several key commodities. The Brazilian experience proves that food, fuel, feed and fiber can be produced simultaneously and sustainably.

More information:
www.unica.com.br/en

unica

SUGAR CANE INDUSTRY ASSOCIATION
C/URB. - SAU - 05071 - 14012

USTP

Recent Numbers on Ethanol

2 million new flex fuel cars entering on the market in 2009...

April retail costs:

Gallon of gasoline: US\$ 4.0/gallon

Gallon of ethanol (E100): US\$ 1.9/gallon

Ethanol production cost: US\$ 0.98/gallon

Prices of ethanol/gasoline: 50-65%

Economic benefit till 70-75%

Environment and employment benefit?

Important Question

5 - Where will the market
of ethanol be?

NEW USES FOR ETHANOL IN THE FUTURE



Bus powered by ethanol in São Paulo. Released on 23 october.



Motorcicle powered by ethanol



Bio-Plastics (polyethylene produced from bioethylene, PVC produced from bioethylene)



100% ethanol airplane, used for spraying plantations

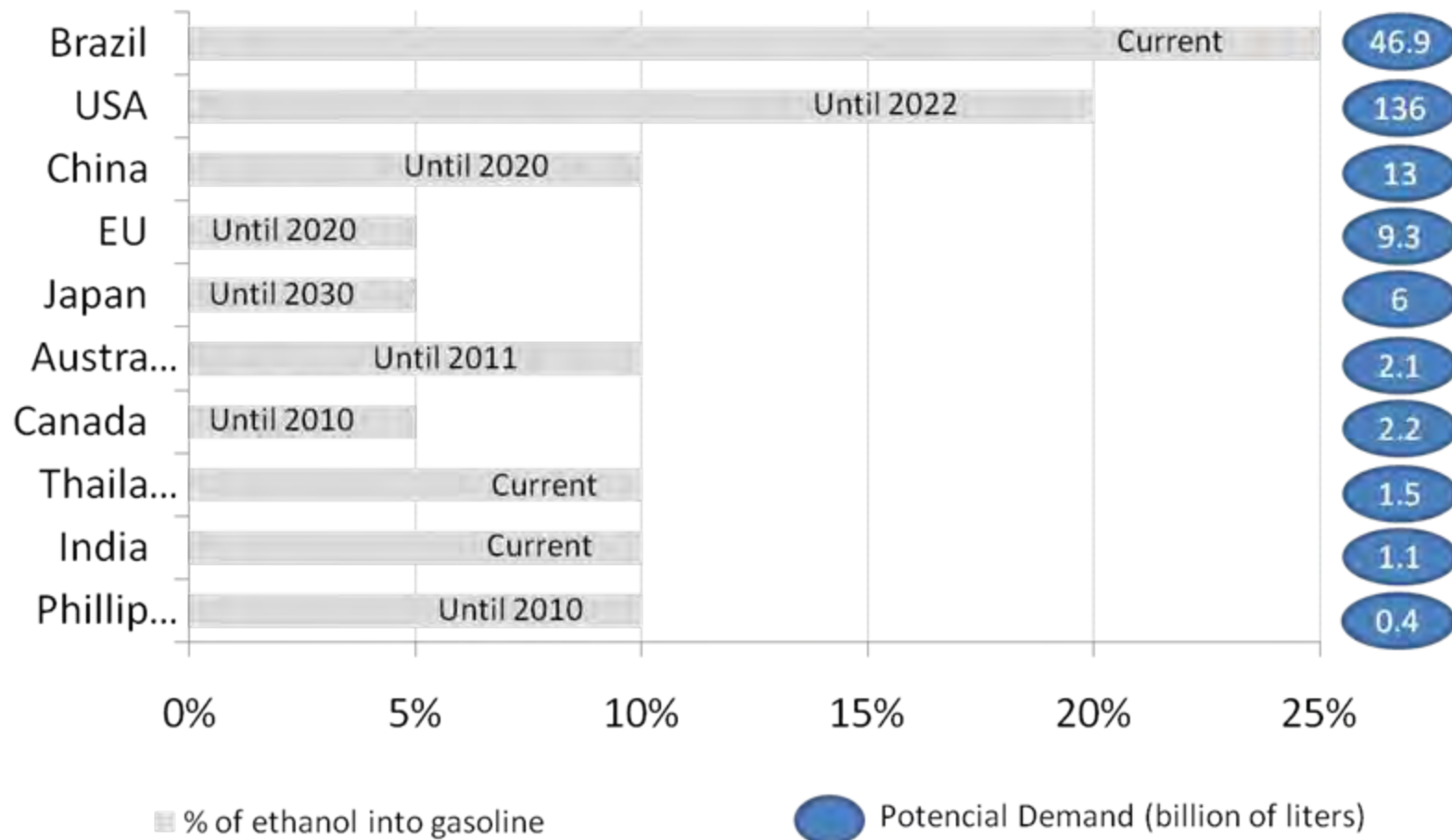


Ethanol used on transesterification of biodiesel.



Ethanol and fuel cells

Biofuels Mandatory Blending Targets



Important Question

6 - Does it contribute to the environment?



Legenda

	Aceiro 3M
	Carreador 6M
	Recuo de 1,50M para início da linha de Plantio de Árvores
	Área Reservada para Plantio de Árvores
	Área Úmida
	Curso d'água

Mata Ciliar

- 30 ou 50 metros
- Carreador de 6 metros (sem vegetação)
- Aceiro de 3 metros (corta cana crua ou inclina a cana no sentido do canavial)





Represa/lagoa
Espelho d'água



Remanescente
florestal



Mata ciliar
Recém plantada

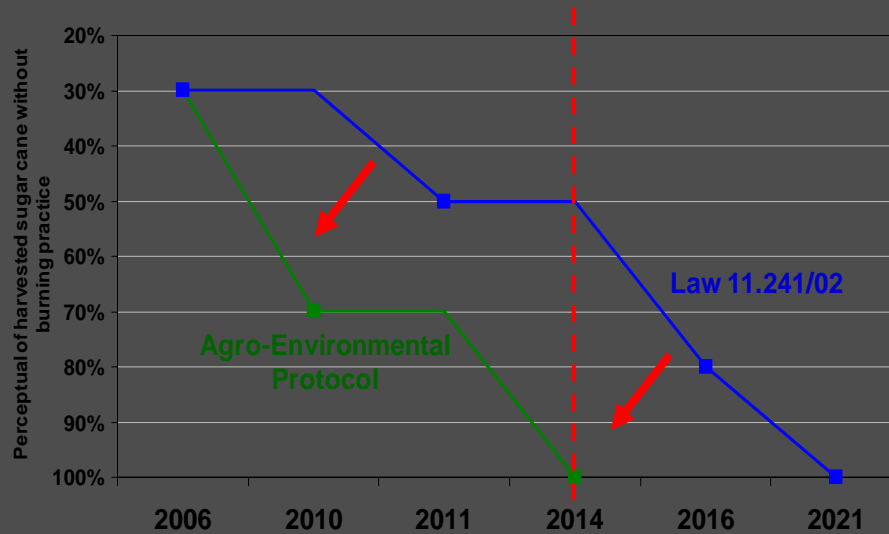


Área de
nascente/várzea



The “Green Protocol” in São Paulo State

Elimination of the of sugarcane straw burning
State of São Paulo – mechanized areas

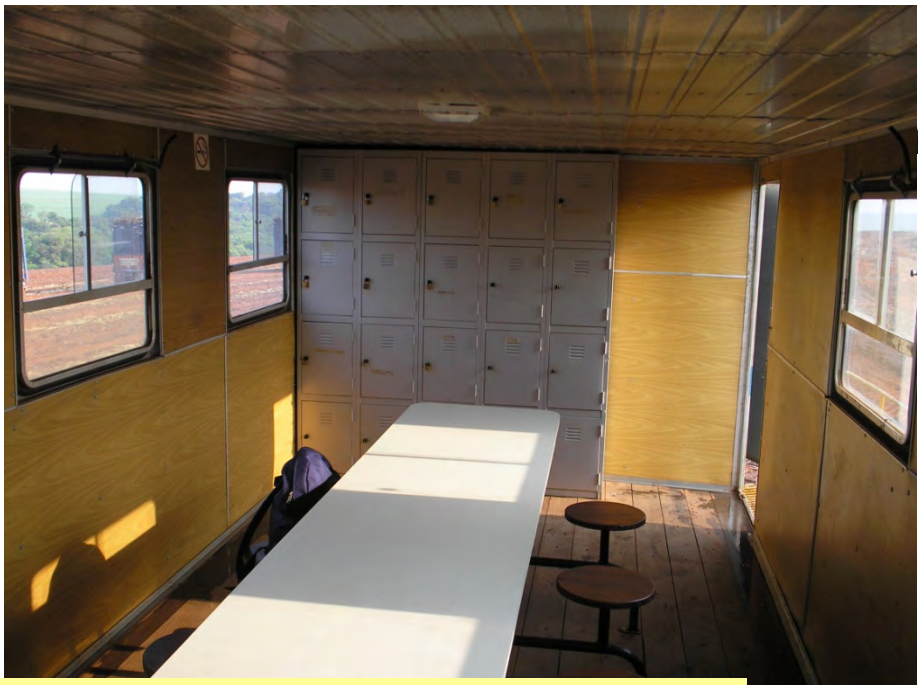


Note: the highlighted dots in the graphic lines show the specific years cited by the Law or in the Protocol. Prepared by: UNICA.

**PROTOCOLO
AGROAMBIENTAL DA
CANA-DE-AÇÚCAR**

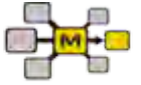
**COLHEITA MECANIZADA,
SEM QUEIMA, JÁ REPRESENTA
QUASE METADE DA ÁREA
DE CANA DO ESTADO**





ABRIGO/REFEITÓRIO/SANITÁRIO: FR. CARREGAMENTO





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General Motors S 10



Emissão de gases (viagem de 100km percorrida pelo mesmo veículo)

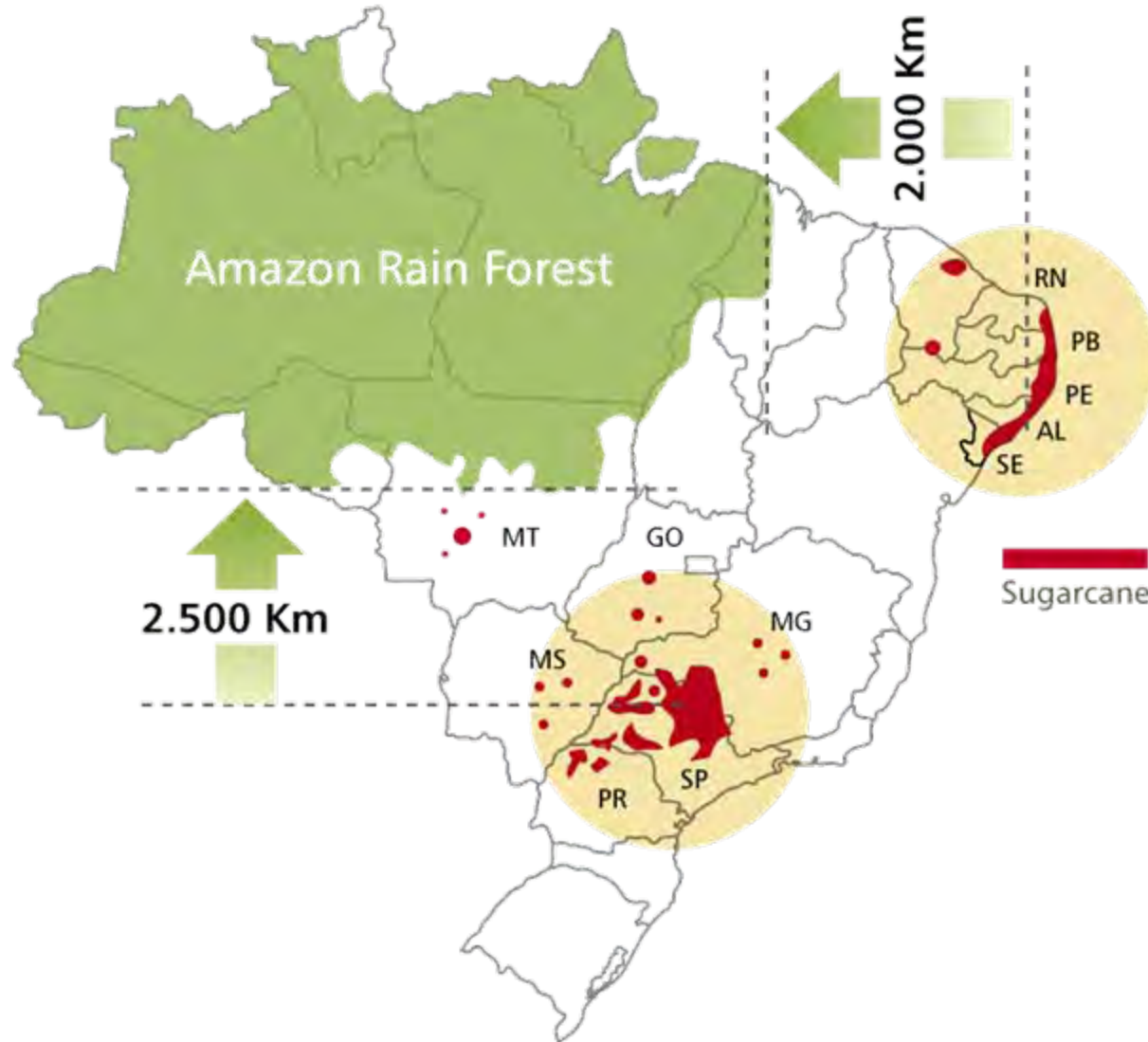
Modelo	S 10 cabine simples	S 10 cabine simples	S 10 cabine simples
Motor	2.8 turbo	2,4 flexpower	2,4 flexpower
Combustível	Diesel	Gasolina pura	Álcool
Rendimento	13,5 km/litro	10,4 km/litro	7,2 km/litro
Potência máxima	140cv	141cv	147cv
Emissão de GEE* (Kg CO2)	29,69	35,1	9,44
Quantidade de litros gastos	7,41	9,62	13,89

Elaborado por: Markestrat
Fonte: Embrapa *Gases de efeito estufa

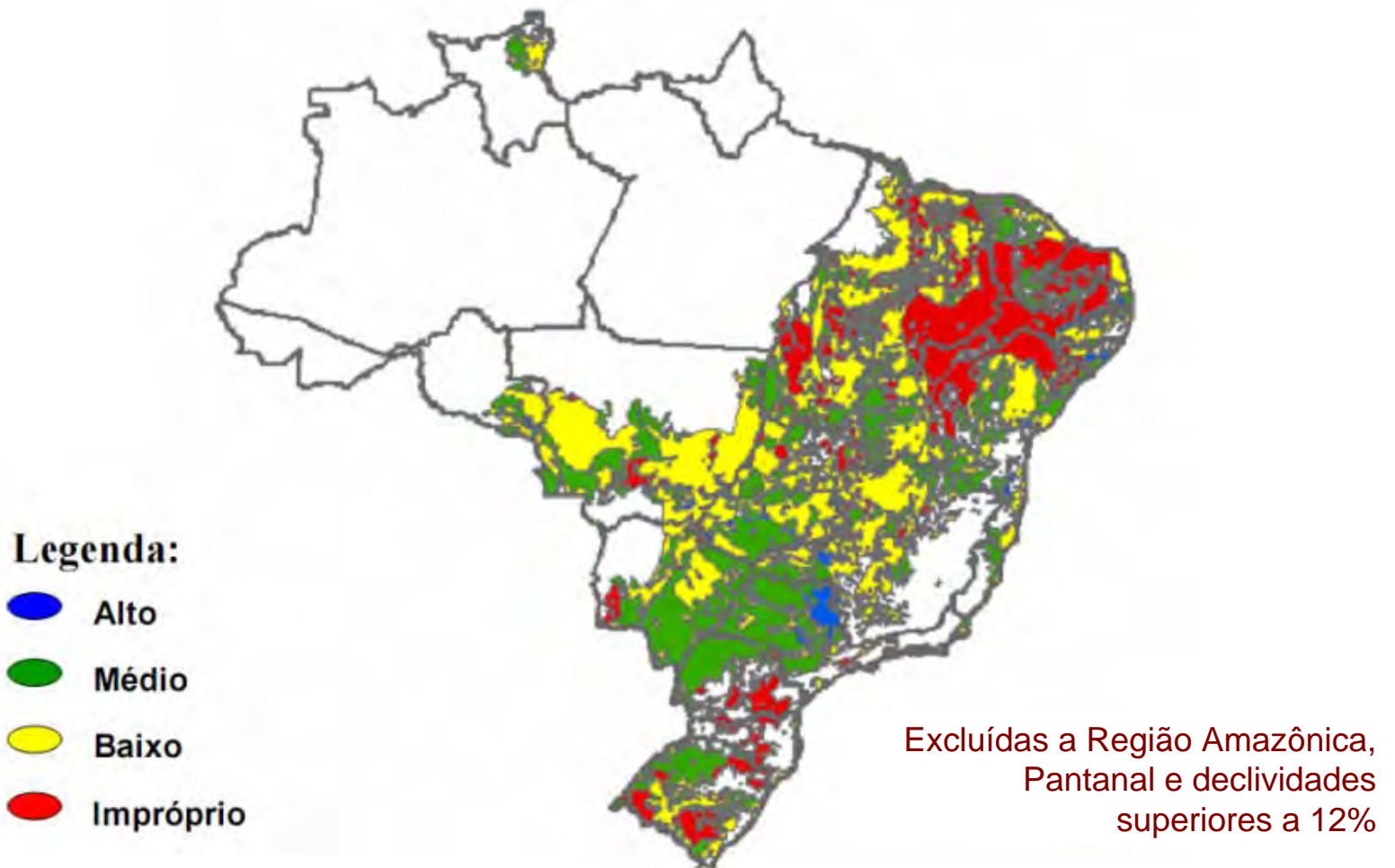
Important Question

7 - Is it destroying the
Amazon?
And where will it grow?

Sugarcane producing regions in Brazil



Soil and climate possibilities for sugar cane



Still a lot of Land to be Used in a Sustainable Way

Availability of arable land in Brazil

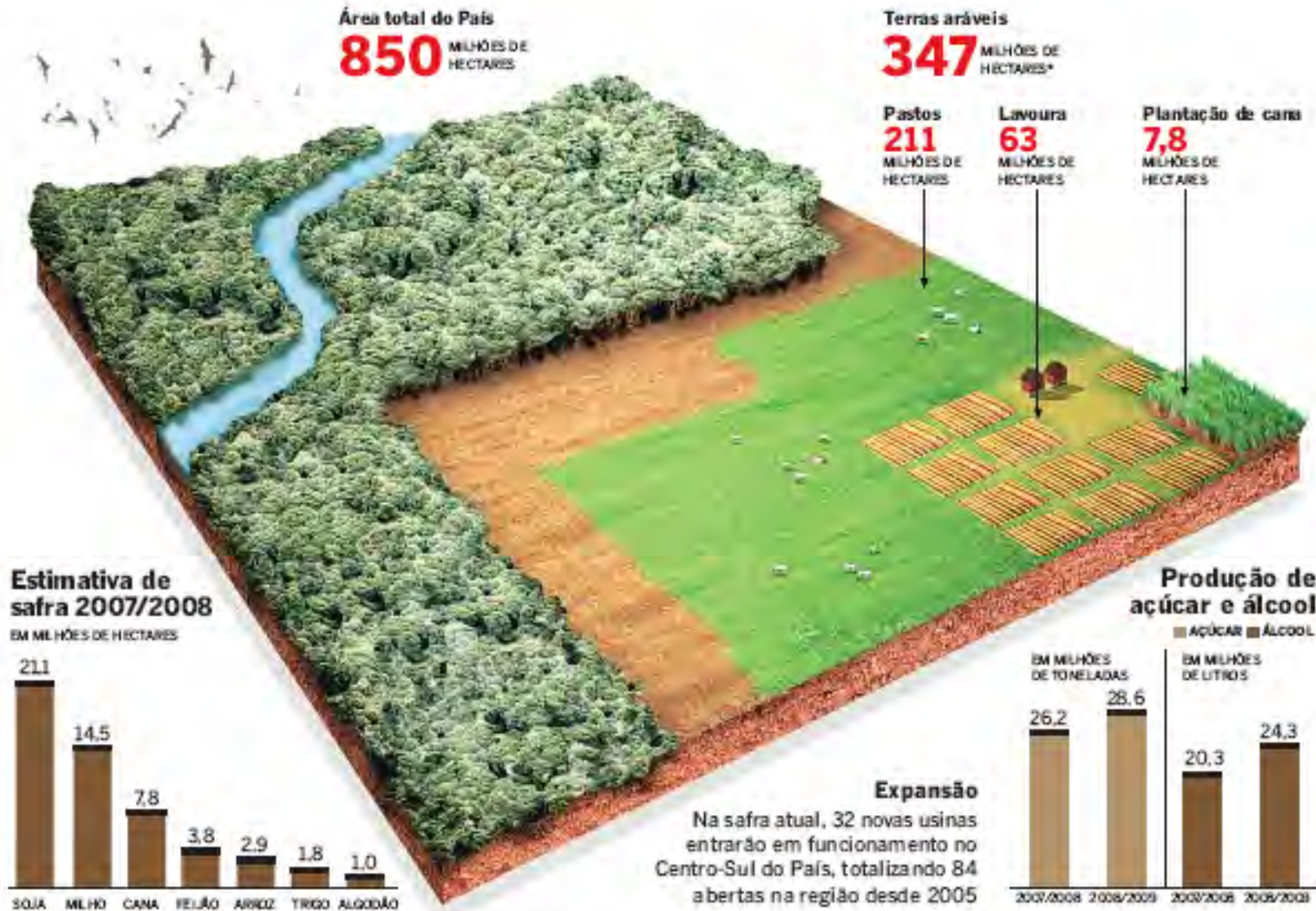
Million Acres and Million Hectares (2007)				
Brazil	2100	850		
Total preserved areas and other uses *	1260	510 (60%)		
Total Arable Land	840	340 (40%)	% of total land	% arable land
1 Cultivated Land: All crops	155	63.1	7.4%	18.6%
Soybeans	49	20.6	2.4%	6.1%
Corn	35	14.0	1.6%	4.1%
Sugar cane **	17	7.8	0.9%	2.3%
Sugar cane for ethanol ***	8	3.4	0.4%	1.0%
Oranges	2	0.9	0.1%	0.3%
2 Pastures	494	200	23.5%	58.8%
3 Available land (ag, livestock)	190	77	9.1%	22.6%

*Notes: e = estimated data; * These areas include Amazon Rain Forest, protected areas, conservation areas and reforestation, cities and towns, roads, lakes and rivers; ** cultivated area; *** harvested area for ethanol production.*

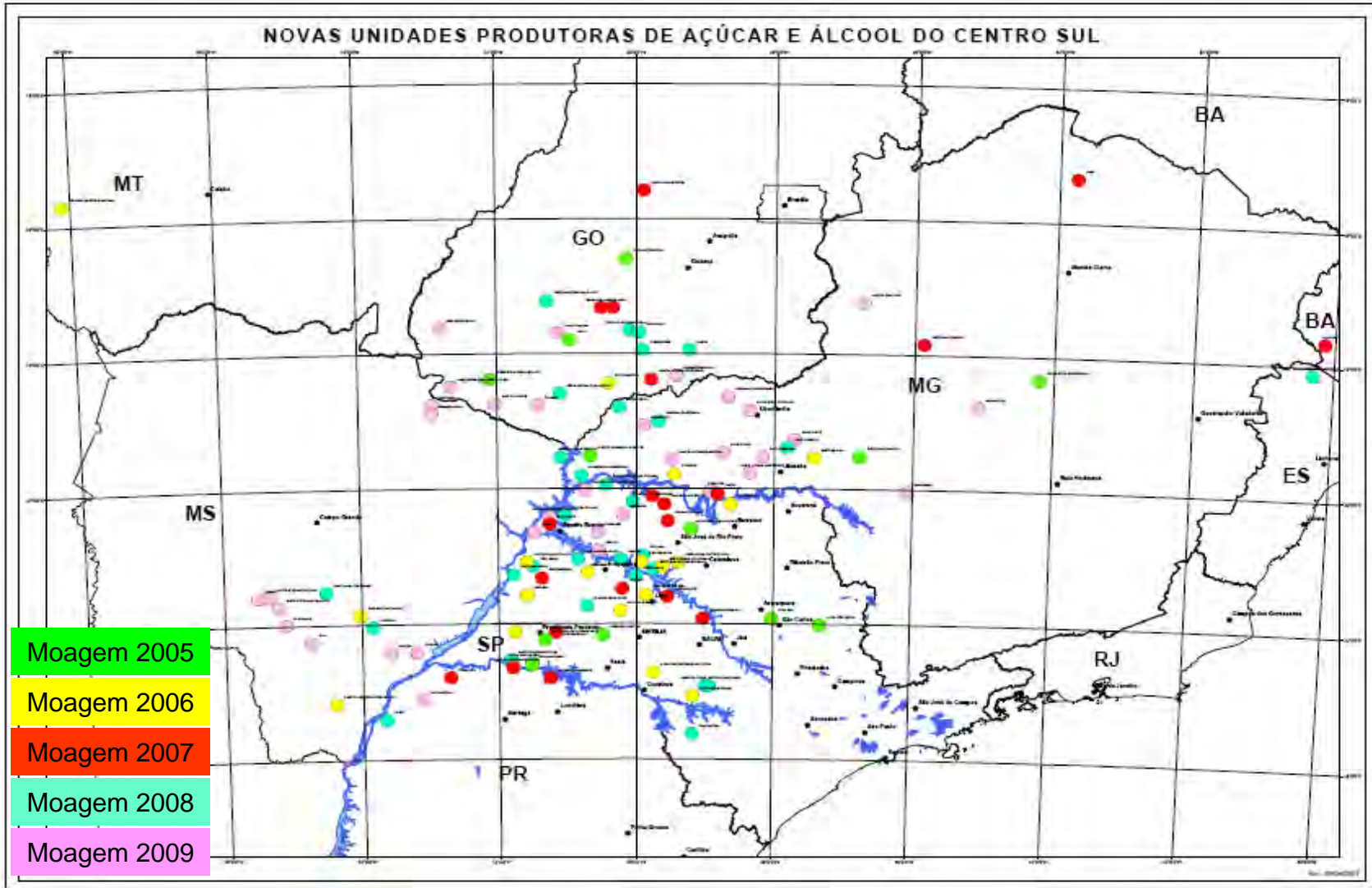
Sources: IBGE, Conab and Unica Data compiled by Icone and Unica.

247 million acres to be developed for agriculture

Land Use in Brazil



EXPANSION OF PRODUCTION IN SÃO PAULO



RESULT ANALYSIS (Sugar Cane)

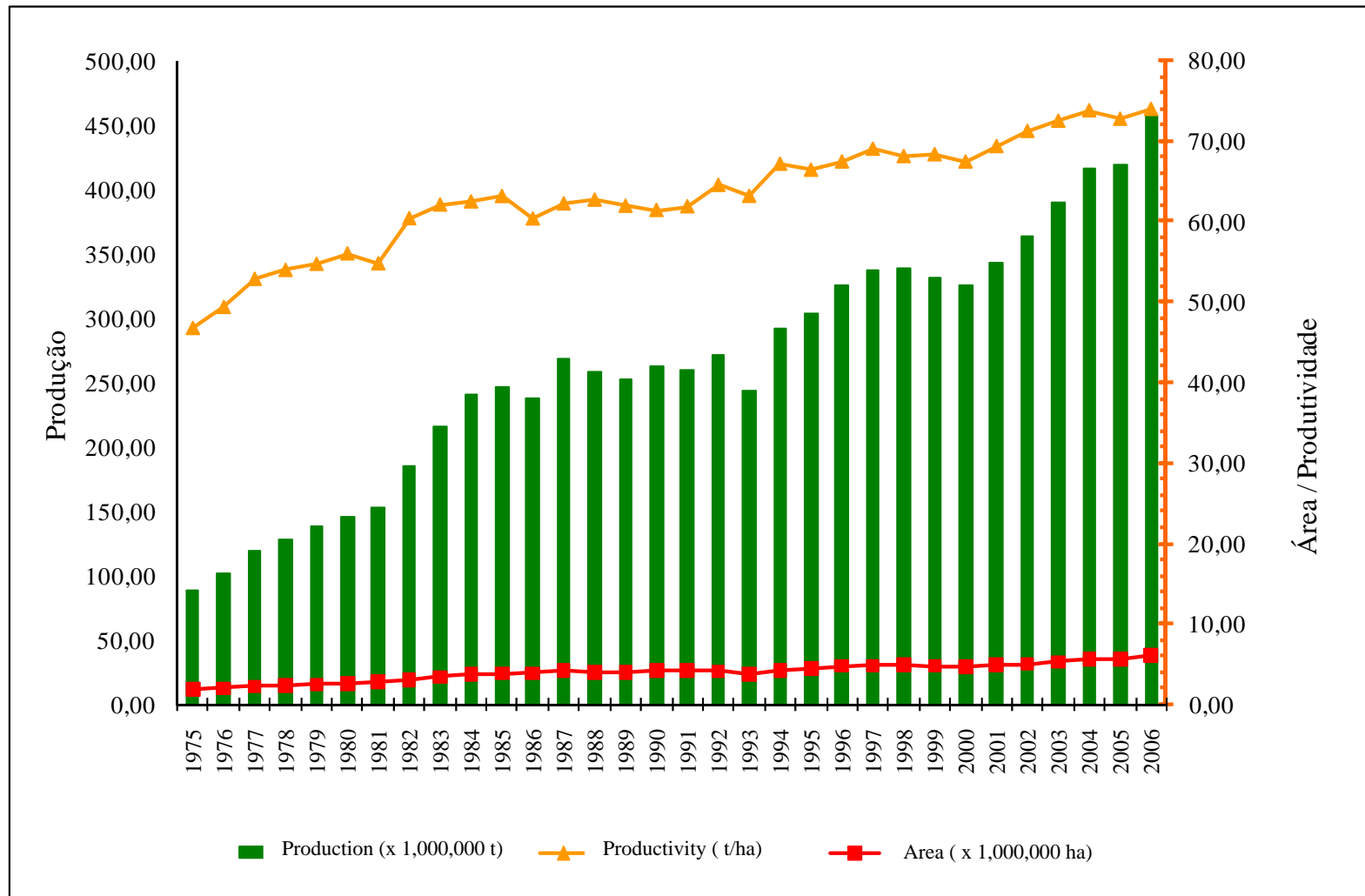


Figure 2: Production, Productivity and total area of Brazilian sugar cane from 1975 to 2006.
Source: Prepared by the authors based on UDOP.

RESULT ANALYSIS (Corn - SP)

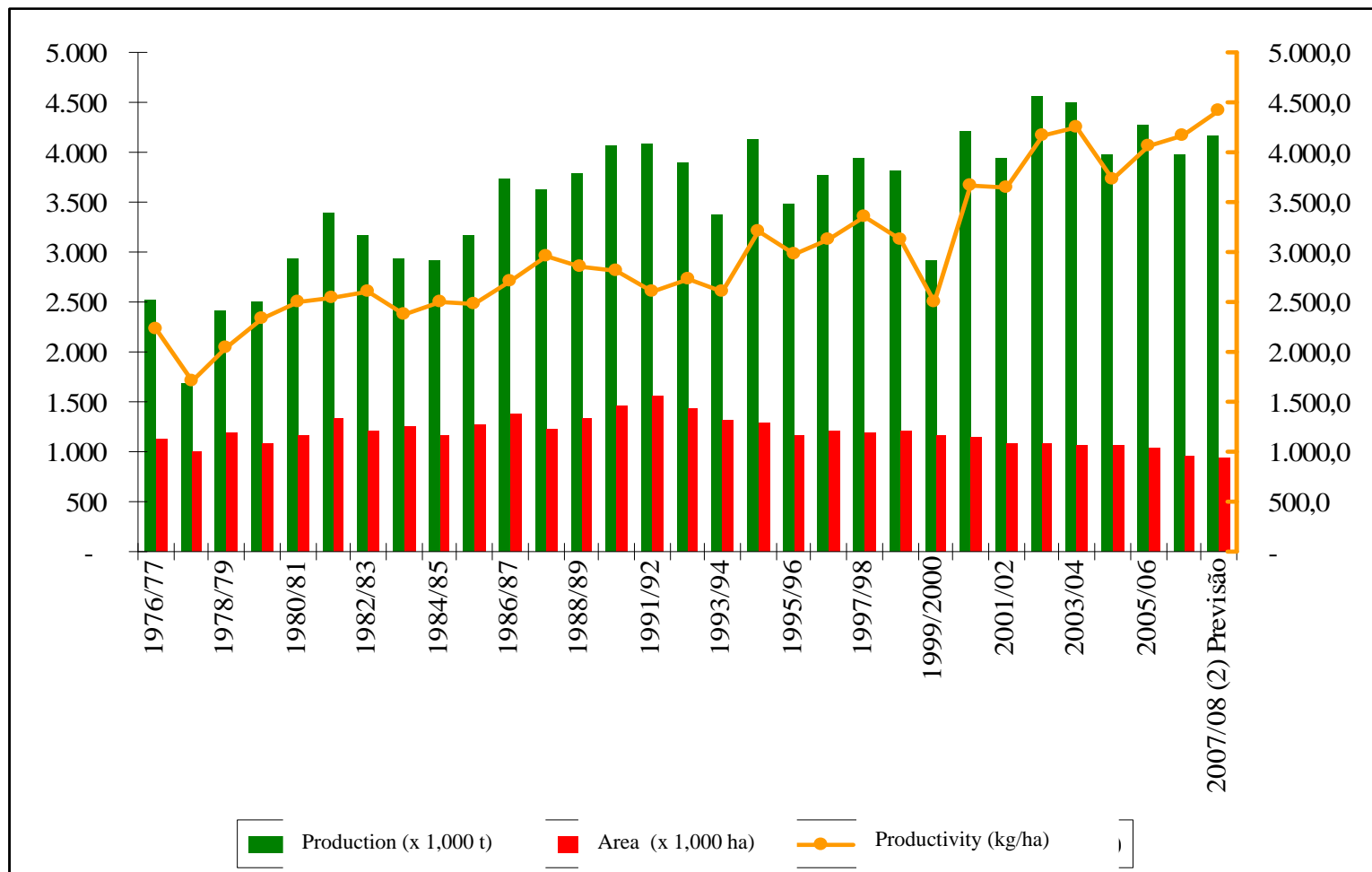


Figure 3: Production and Productivity of corn in the state of São Paulo between 1976 and 2008*.
Source: Prepared by the authors based on data from (CONAB, 2008).

* Estimate.

Important Question

8 - What is the strategic agenda?

My Views of US **Ethanol**: Win Win Strategy

BENEFITS

- ✓ **Environment** (contribution to climate and others)
- ✓ **Employment** (a lot of jobs generated)
- ✓ **Empowerment** (money moving to inlands)
- ✓ **Energy** (another source + diversified)
- ✓ **Exports** (trade balance)
- ✓ **Economy** (distribution of income)

RECENT EVIDENCE

- ✓ Mandates of 15-20%
- ✓ Corn ethanol as additive to gasoline
- ✓ Flex Fuel Cars using E85 when oil prices climb
- ✓ Second generation ethanol being developed for 2015-2020, more blending and more use as E85
- ✓ Possible imports from Brazil to supply blending needs towards coast states (California, Florida and Texas). Makes sense in logistic terms.

NEW ERA

- ✓ Ethanol can bring a reconfiguration of the relationships of the USA with Central and South America

CONGRESS NEEDS TO ELIMINATE THE TARIFF ON SUGARCANE ETHANOL TO LOWER GAS PRICES.
[FIND OUT MORE →](#)



ARE WE THERE YET? When it comes to cheaper gas, the answer is no. Gas prices are at record highs and they keep increasing. Congress has the ability to eliminate the tariff on imported ethanol, which would lead to lower prices at the gas pump. Unfortunately, Congress has not yet lifted the tariff - and American drivers continue to hit a Congressional roadblock when it comes to finding cheap gas.

About Sugarcane Ethanol
Facts: What you don't know still hurts you at the pump.

About The Tariff

See Our Ads

Ethanol Strategic Agenda

Internally

- Taxes reduced to 12% (ICMS) in all states.
- From E 20/25%, to E 18/28%.
- Flex Fuel Vehicles Incentives.
- Directs sales of ethanol from industry to gas stations.
- *Motorcycles flex and larger engines flex* (diesel).
- *joint-ventures* to enter on the market of wholesaling and retailing.
- The Concept of Green Gas Stations.
- City buses moved by ethanol.
- Petrobras exporting gasoline blended with ethanol.
- Continuous communication plan

Externally

- Fight against protectionism
- Stimulate overall production (Africa and Asia)
- Stimulate and follow mandates of percentages of added ethanol to gasoline
- Work on ethanol myths: Amazon, Land shortage, slaves and others.
- Certification and global patterns
- Image: differentiation of cane ethanol based on superior energy balance and future potential
- global adoption of flex-fuel cars and ethanol retailing system
- Joint-ventures with oil companies (BP, Petrobras e Shell).



Mozambique's sugar cane to be used in making ethanol

Wednesday, 15 April 2009

Foreign companies have invested about \$710 million in Mozambique to produce an annual 440 million litres of ethanol a from sugar cane.

Roberto Albino, director of Mozambique's Centre for Agricultural Promotion (Cepagri), said that 48,000 hectares has been set aside for the production of sugar cane across six provinces.

"The money is coming from three foreign companies, ProCana, Principle Energy and Groun Resources," he said.

ProCana has an investment agreement with Mozambique's government ethanol plant.

Principle Energy is a renewables energy company in which London-listed fund manager Principle Capital has a significant undisclosed stake.

The projects could generate as many as 7 000 and 10 000 jobs

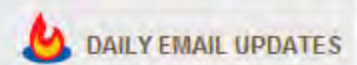


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