



Agrievolution  
2008

First World Summit  
on Agricultural  
Machinery

# AGRIBUSINESS AND MAIN IMPACTS IN BRAZIL

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**BRAZILIAN MACHINERY AND  
EQUIPMENT INDUSTRY ASSOCIATION  
ABIMAQ**

Rome 30-31 May 2008



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# DRIVEN FORCES FOR AGRICULTURE

- **Population Growth**
- **Income and Consumption Rising**
- **Accelerated Urbanization**
- **Graduation – Effect**

**Vegetal Protein Substituted by  
Animal Protein (meat, milk); fruits,  
juice, deserts, etc**

# World Population Growth in 2016: 7,2 bilhões em 2016, or, 660 million new inhabitants with higher level of consumption.

	Population			Income		
	1997-2006	2007-2016	2006 million	1997-2006	2007-2016	2006 income share
World	1.23	1.08	6 530	2.86	3.05	100
Africa	2.20	2.04	923	4.21	4.32	1.8
Latin America and Caribbean	1.40	1.17	564	2.27	3.79	5.9
North America	1.02	0.86	332	2.81	2.62	32.3
Europe	0.29	0.06	527	2.20	2.13	27.6
Asia	1.15	0.98	4 150	3.55	4.02	30.3
Oceania	1.36	1.08	33	3.33	2.72	2.0

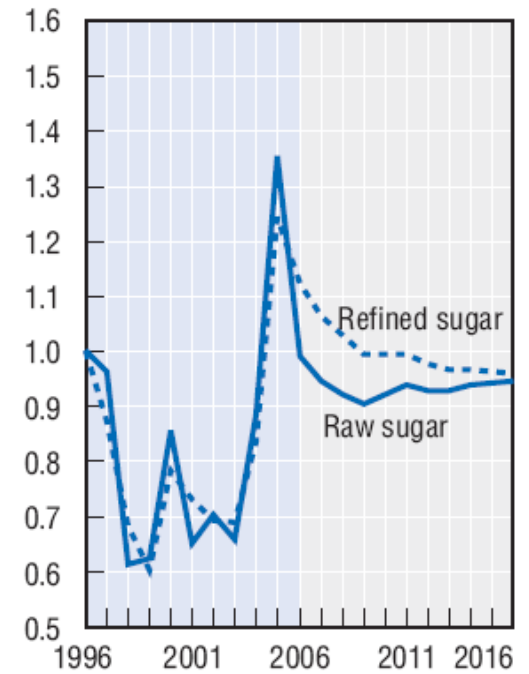
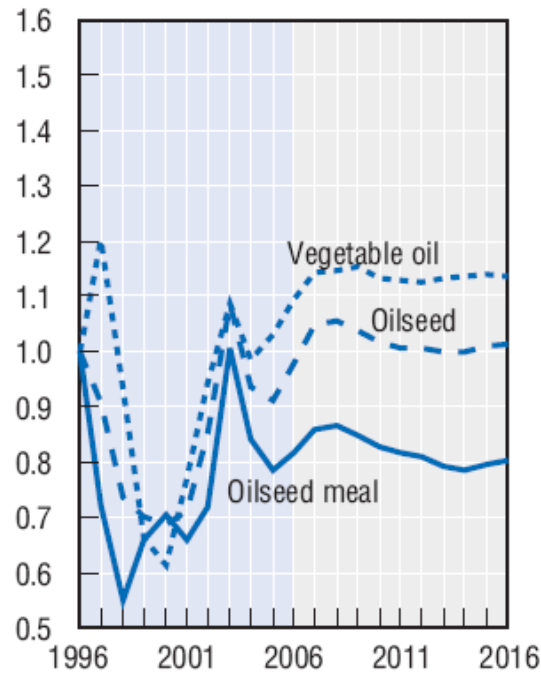
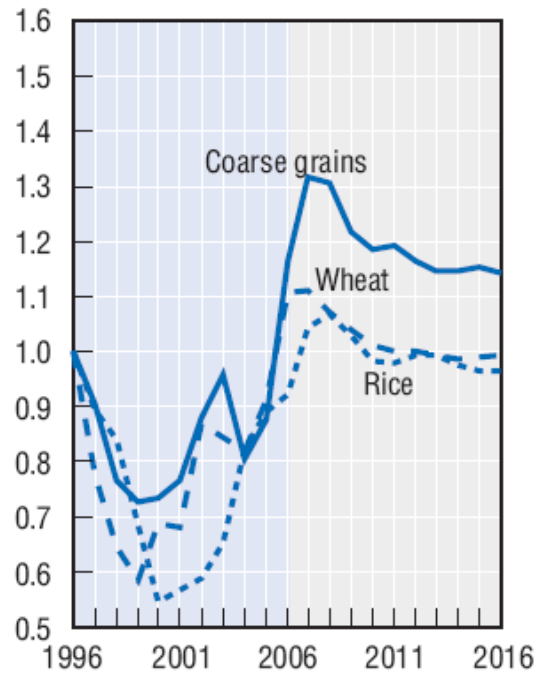
Note: Income is measured by GDP at USD 2000 market prices. Average annual growth is the least-squares growth rate (see glossary).

Source: UN World Population Prospects (2004 Revision), World Bank Global Economic Prospects 2007 (November 2006).

# High Prices Are Expected.....

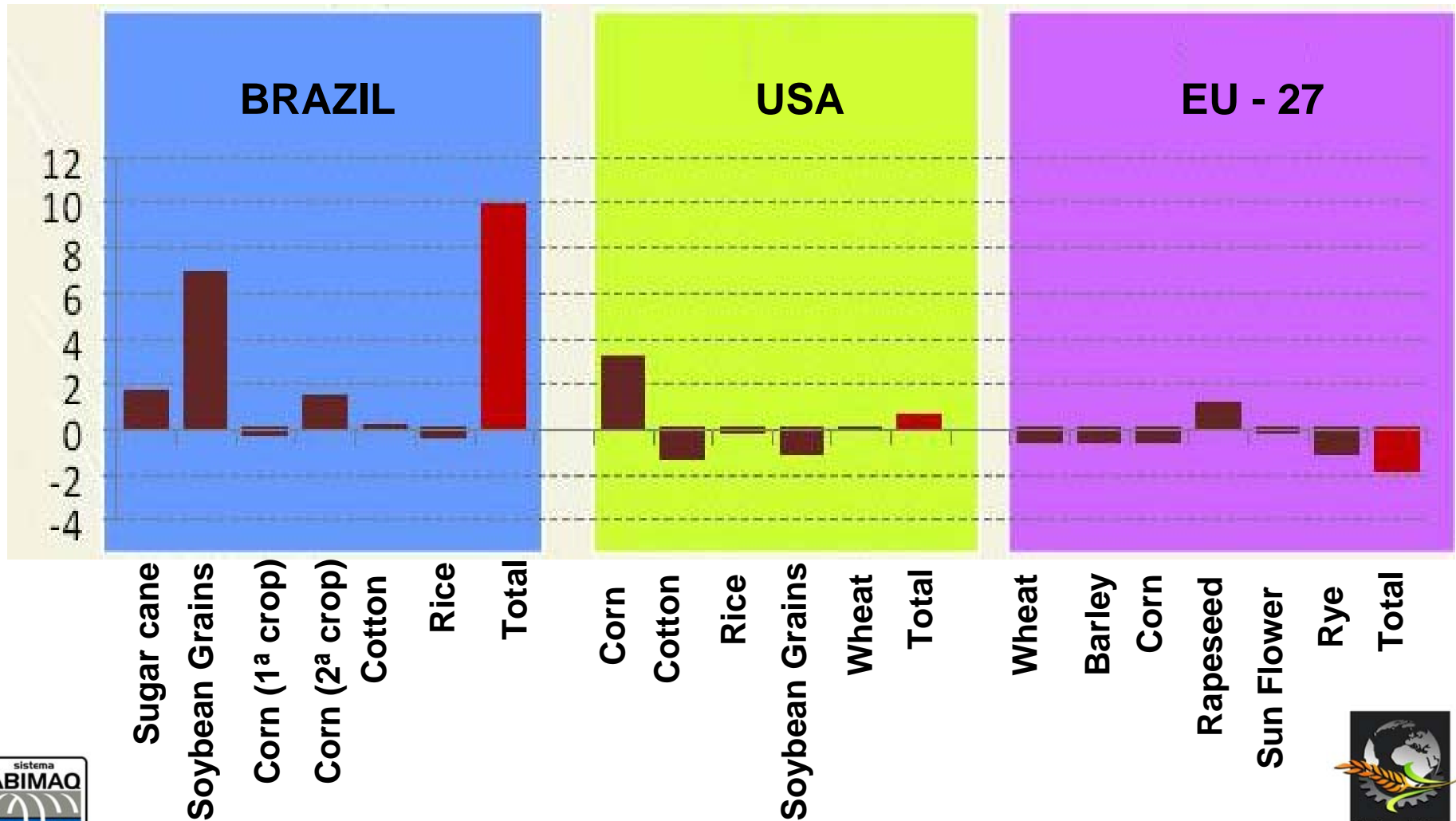
## Outlook for world crop prices to 2016

Index of nominal prices, 1996 = 1



Source: OECD and FAO Secretariats.

# PLANTED AREA OF SELECTED CULTURES: ABSOLUT VARIATION OF 2000/2002 TO 2006/08 (million of hectares)



Source: IBGE; CONAB; USDA. Elaboration: ICONE.

# AVAILABILITY OF ARABLE LAND IN BRAZIL

Million Hectares (2007)

<b>Brazil</b>	<b>850</b>		
<b>Total preserved areas and other uses*</b>	<b>510 (60%)</b>		
<b>Total arable land</b>	<b>340 (40%)</b>	<b>% total land</b>	<b>% arable land</b>
<b>1 Cultivated Land: All Crops</b>	<b>63.1</b>	<b>7.4%</b>	<b>18.6%</b>
<b>Soybeans</b>	<b>20.6</b>	<b>2.4%</b>	<b>6.1%</b>
<b>Corn</b>	<b>14.0</b>	<b>1.6%</b>	<b>4.1%</b>
<b>Sugarcane**</b>	<b>7.8</b>	<b>0.9%</b>	<b>2.3%</b>
<b>Sugarcane for ethanol***</b>	<b>3.4</b>	<b>0.4%</b>	<b>1.0%</b>
<b>Oranges</b>	<b>0.9</b>	<b>0.1%</b>	<b>0.3%</b>
<b>2 Pastures</b>	<b>200</b>	<b>23.5%</b>	<b>58.8%</b>
<b>3 Available land (ag, livestock)</b>	<b>77</b>	<b>9.1%</b>	<b>22.6%</b>

**Notes:** Estimated data; \* These areas include Amazon Rain Forest, protected areas, conservation areas and reforestation, cities and towns, roads, lakes and rivers;

\*\* cultivated area for sugar and ethanol production;

\*\*\* harvested area for ethanol production



Source: IBGE, CONAB and UNICA. Data compiled by Icone and Unica.



# BRAZIL: GRAINS

## PRODUCTION (thousand ton)

# BRAZIL: PLANTED AREA

## (thousand ha)

Product	1990/91	2007/08	% per Year
Cotton	1.357	2.437	3,50
Rice	9.997	11.955	1,06
Bean (total)	2.808	3.437	1,20
Corn (total)	24.096	56.233	5,11
Soybean	15.395	59.989	8,33
Wheat	3.078	3.824	1,28
Other	1.169	2.899	5,49
<b>Brazil</b>	<b>57.899</b>	<b>140.774</b>	<b>5,37</b>

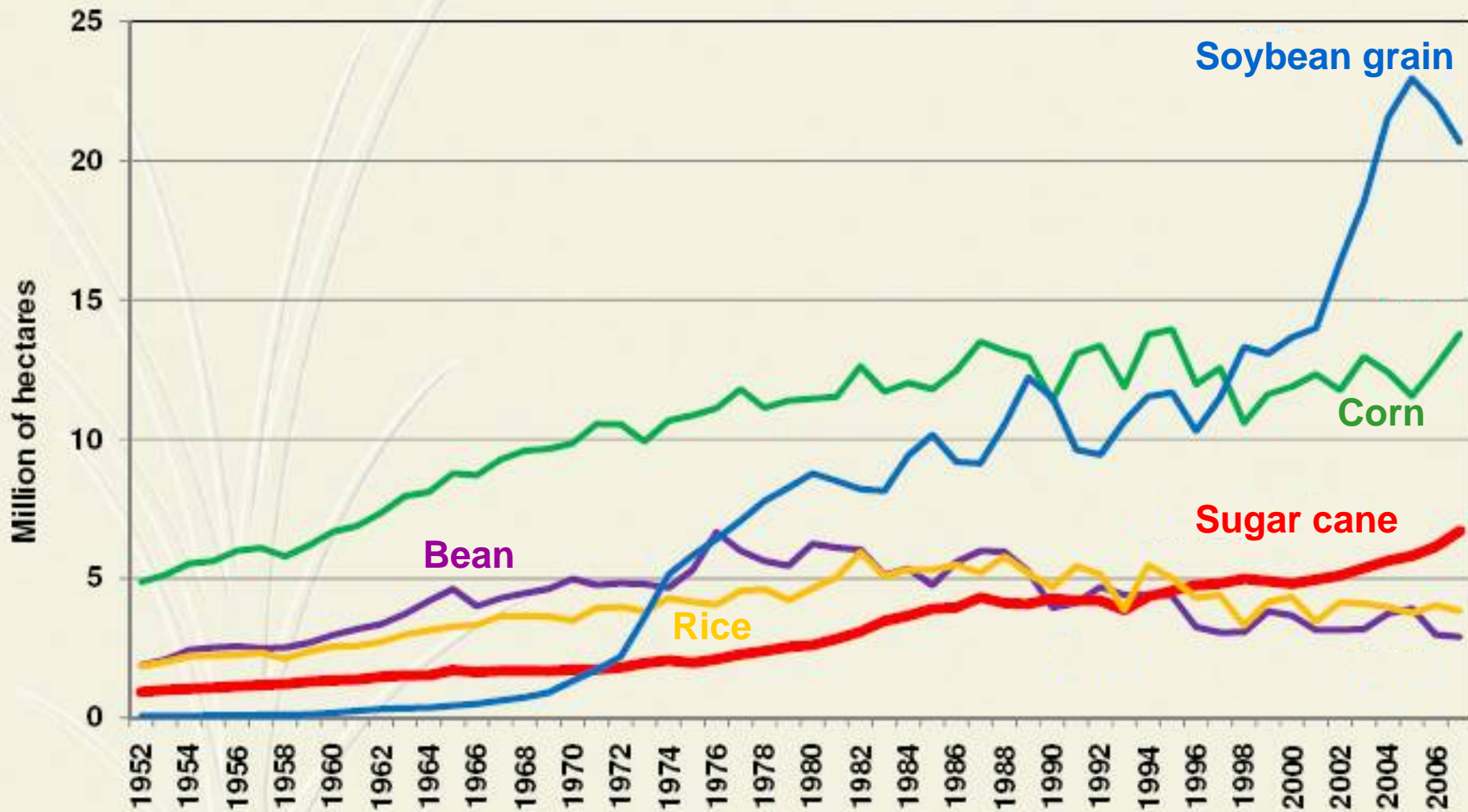
Product	1990/91	2007/08	% per Year
Cotton	1.939	1.095	-3,31
Rice	4.233	2.928	-2,14
Bean (total)	5.504	3.831	-2,11
Corn (total)	13.451	14.470	0,43
Soybean	9.743	21.158	4,70
Wheat	2.146	1.819	-0,97
Other	878	1.400	2,78
<b>Brazil</b>	<b>37.894</b>	<b>46.701</b>	<b>1,24</b>

## BRAZIL: GRAINS PRODUCTIVITY (kg/ha)

Product	1990/91	2007/08	% per Year
Cotton	1.056	2.225	4,48
Rice	2.362	4.083	3,27
Bean (total)	510	897	3,38
Corn (total)	1.791	3.886	4,66
Soybean	1.580	2.835	3,50
Wheat	1.434	2.102	2,28
<b>Brazil</b>	<b>8.733</b>	<b>16.028</b>	<b>3,64</b>

Source: CONAB, April 2008

# BRAZIL: PLANTED AREA OF MAIN CULTURES



Source: IBGE (2007)

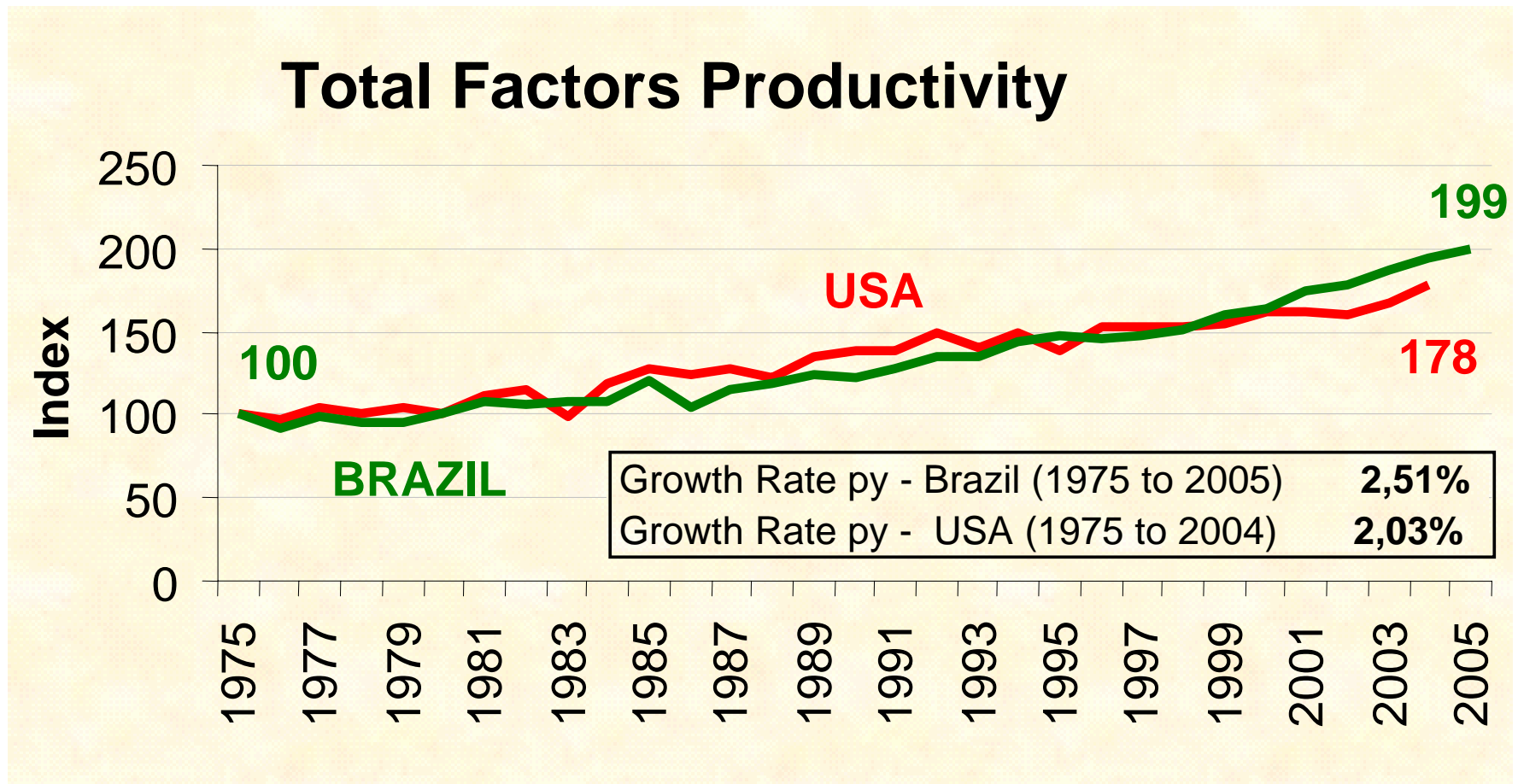


# BRAZIL - AGRICULTURE: ANNUAL GROWTH RATE (%)

## TOTAL FACTORS PRODUCTIVE

	1990-1999	2000-2005
<b>Product Growth</b>	<b>3,01</b>	<b>5,99</b>
<b>Sources of Product Growth</b>		
<b>Modern Inputs</b>	<b>0,35</b>	<b>2,03</b>
Working Productivity	3,11	5,81
Capital Productivity	3,14	4,67
Land Productivity	2,06	3,26
<b>Total Factors Productivity</b>	<b>2,65</b>	<b>3,87</b>

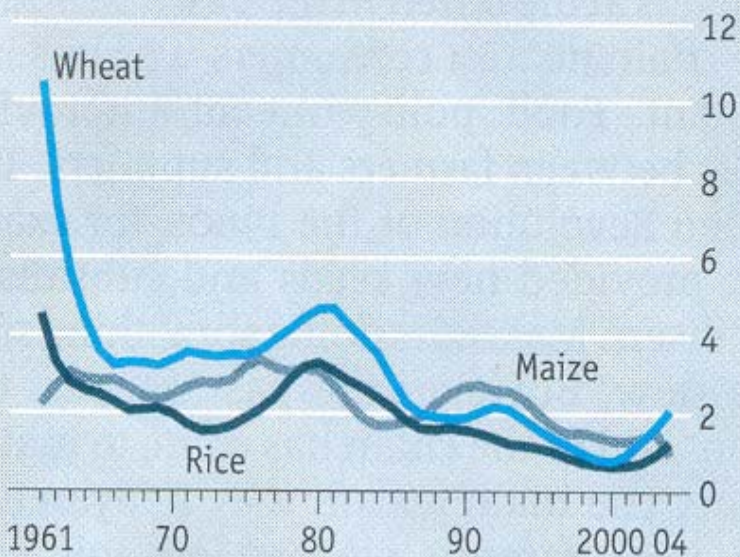
# TFP COMPARISONS – BRAZIL AND USA



## THE AGRICULTURE'S DILLEMA

### Diminishing returns

Crop yields in developing countries  
Annual average growth rate, %

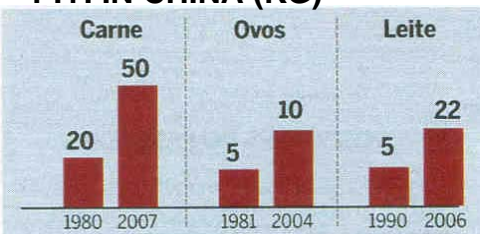


Source: World Bank

Source: The Economist, 19-25/04/2008



### PER CAPITA CONSUMPTION P.Y. IN CHINA (KG)



### PRICES VARIATION FROM MARCH 07 TO MARCH 08



Fontes: BBC, FAO, Jackson Son & Co., Bloomberg e Ministério da Agricultura da China

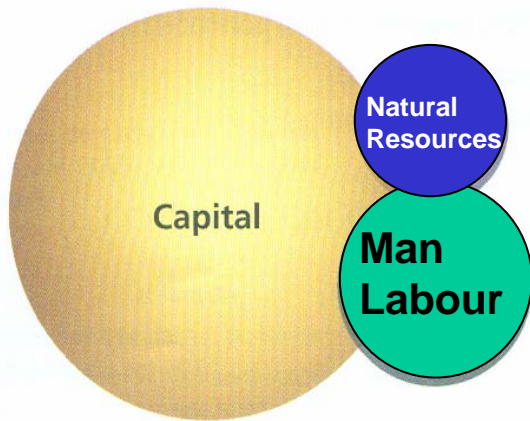
Sources: BBC, FAO, AGRICULTURE MINISTRY OF CHINA



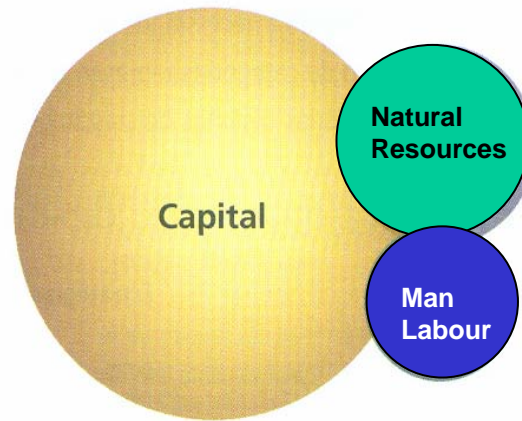
# The silent tsunami

The food crisis and how to solve it

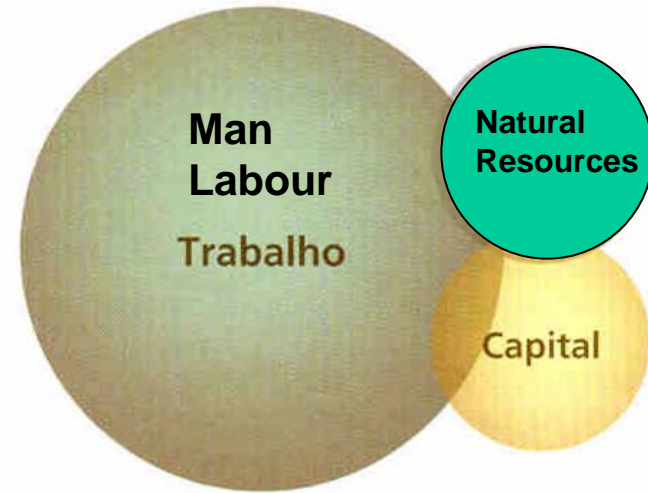
# EX: REGIONS AND DEVELOPMENT STRATEGIES



**EUROPE**



**USA**



**ASIA**



**BRAZIL AND RUSSIA**

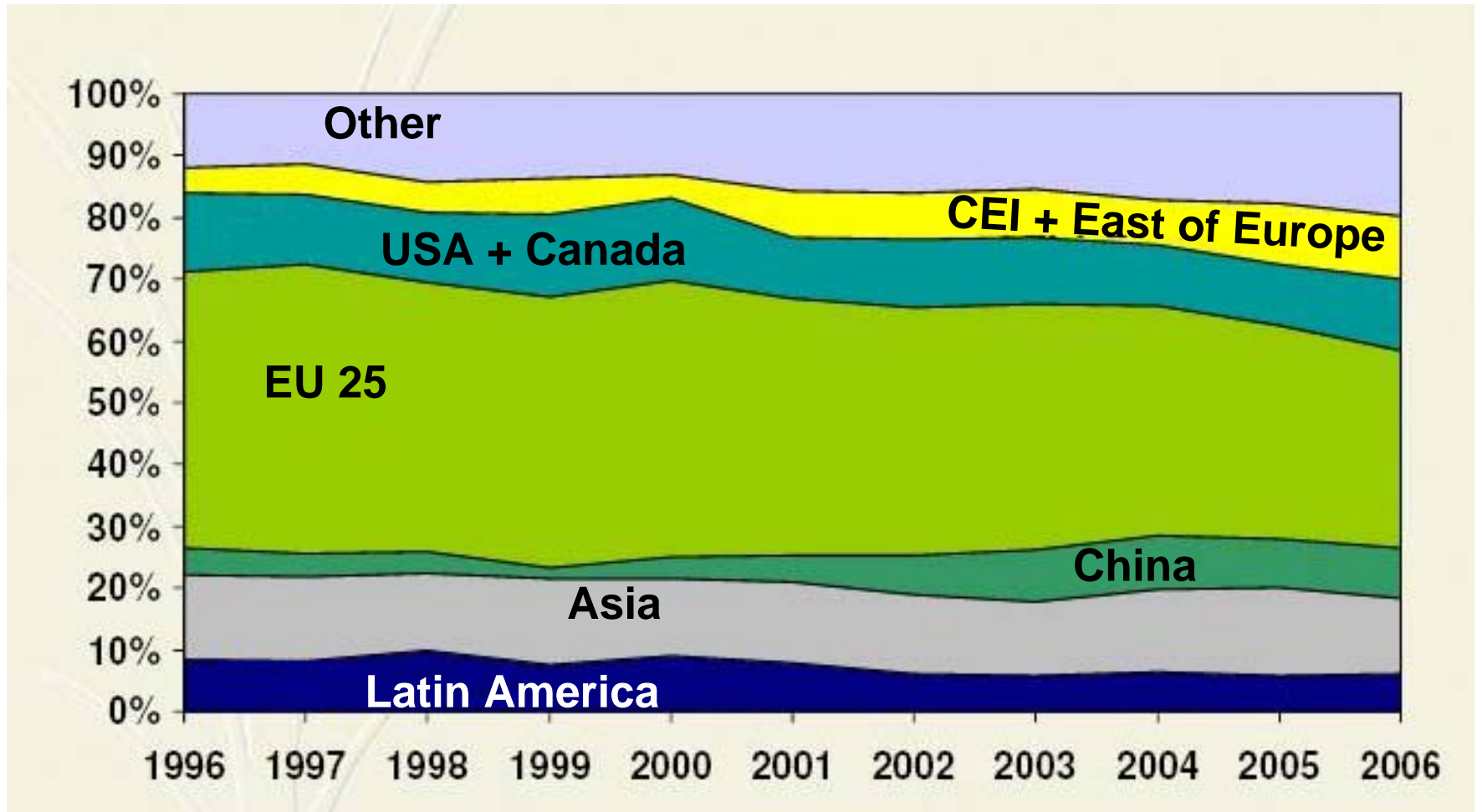
# AGRIBUSINESS

## BRAZIL AND PRODUCTIVITY EFFECT:

CROPS	YIELD <sup>(1)</sup> Grains	YIELD <sup>(2)</sup> Cane
<b>1976/77</b>	<b>1,3 t/ha</b>	<b>4,2 m<sup>3</sup> ethanol/ha</b>
<b>2006/07</b>	<b>-58,3 million ha (efficiency gains)</b>	<b>-1,3 million ha (efficiency gains)</b>
<p><b>(1) Geraldo B. Martha Jr. Embrapa Cerrados, maio/07</b></p> <p><b>(2) Canaplan</b></p>		

BRAZILIAN AGRIBUSINESS EXPORTS	Exports 2007 US\$ MM	Brazil / World (2005)		Annual Tax Growth (1996 – 2007)		
		Share	Ranking	Value	Volume	Price
Soybean Complex	11,386	38%	2	9%	10%	1%
Sugar / Ethanol	6,770	29%	1	13%	14%	0%
Chicken	4,626	29%	1	19%	19%	-1%
Cattle	4,232	20%	1	28%	25%	-2%
Coffee	3,887	29%	1	6%	2%	-3%
Tobacco	2,262	23%	1	6%	3%	-3%
Orange Juice	2,252	82%	1	5%	3%	-2%
Corn	1,943	2%	8	54%	42%	-8%
Pork	1,209	16%	4	27%	26%	-1%
Fruit	717	-	-	17%	19%	1%
Cotton	507	5%	4	91%	88%	-2%
Powdered Milk	225	1%	14	47%	44%	-2%
Other	7.061	-	-	-	-	-
<b>Total Agribusiness</b>	<b>47,078</b>	<b>4%</b>	<b>3</b>	<b>8%</b>	<b>13%</b>	<b>- 4%</b>

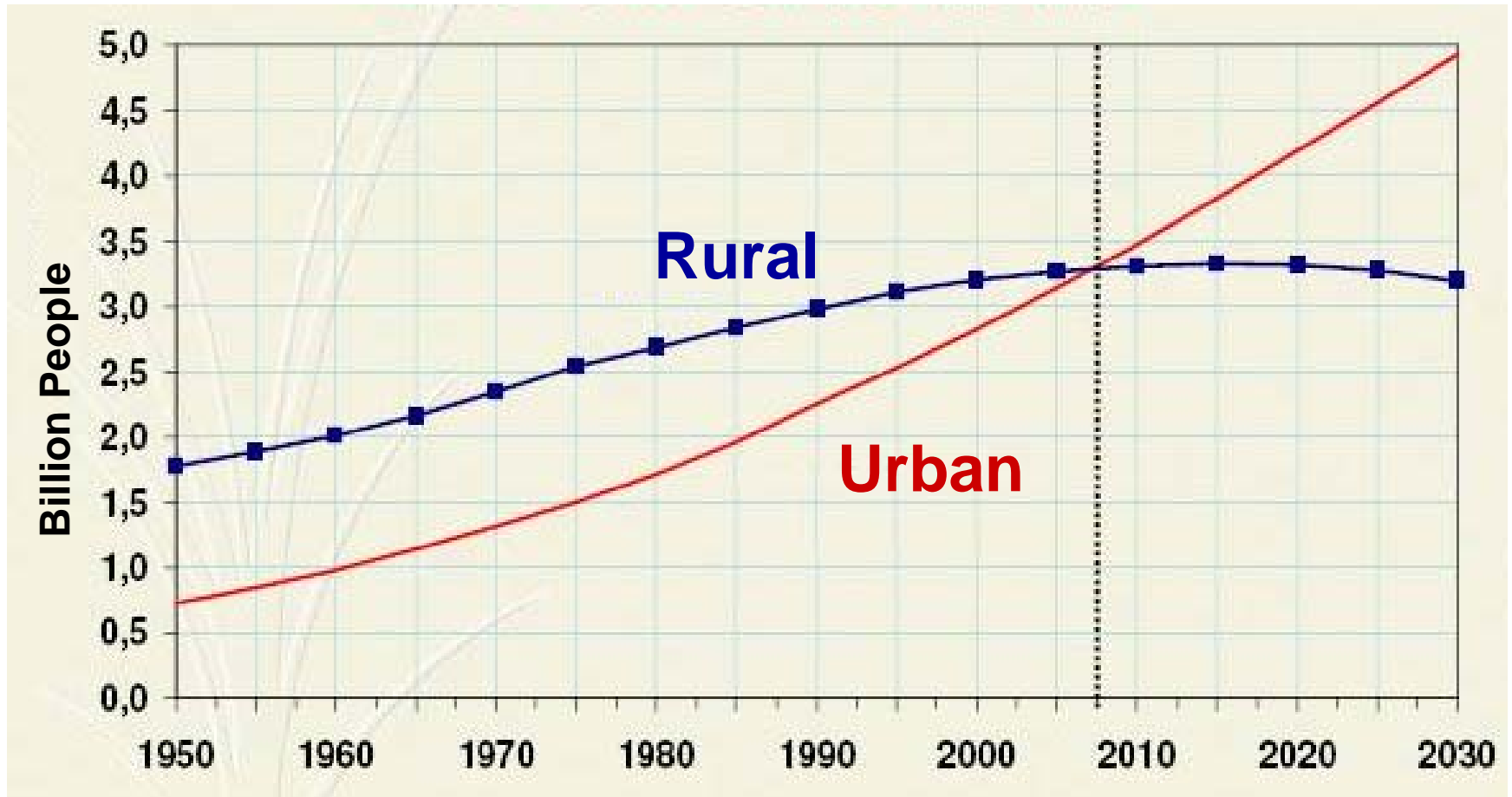
# AGRIBUSINESS EXPORTS FROM BRAZIL





# POPULATION EVOLUTION IN THE WORLD

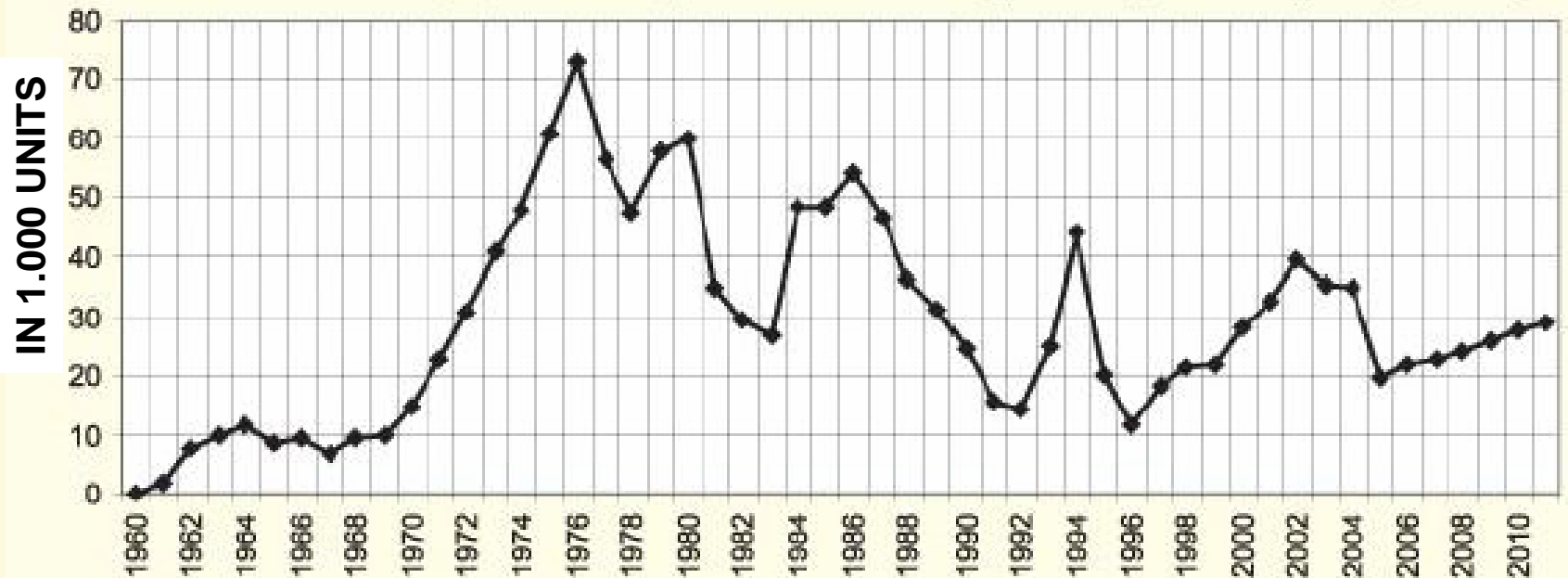
## IMPORTANT IMPACT FOR MECHANIZATION



# AGRICULTURE MACHINERY EVOLUTION BRAZIL IN DIFFERENT MOMENTS

1960 / 2011 - TRACTOR'S SELLS FOR THE INTERNAL MARKET

<b>AVERAGES</b>	13.114	57.584	34.228	23.770	29.833	25.338	25.967
	60 / 73	74 / 80	81 / 92	93 / 97	98 / 03	04/06	07 / 11



Fonte: Anfavea / 2006

# BRAZIL IN DIFFERENT MOMENTS

## TRACTOR'S FLEET PROFILE BY CATEGORY(%)

TYPE	1992	2006	2011
HEAVY	26,5	40,23	41,16
MEDIUM	64,4	56,60	55,20
LIGHT	9,1	3,08	3,64

# BRAZIL – HARVESTERS - INTERNAL SALES EVOLUTION

## 2000 / 2008 -

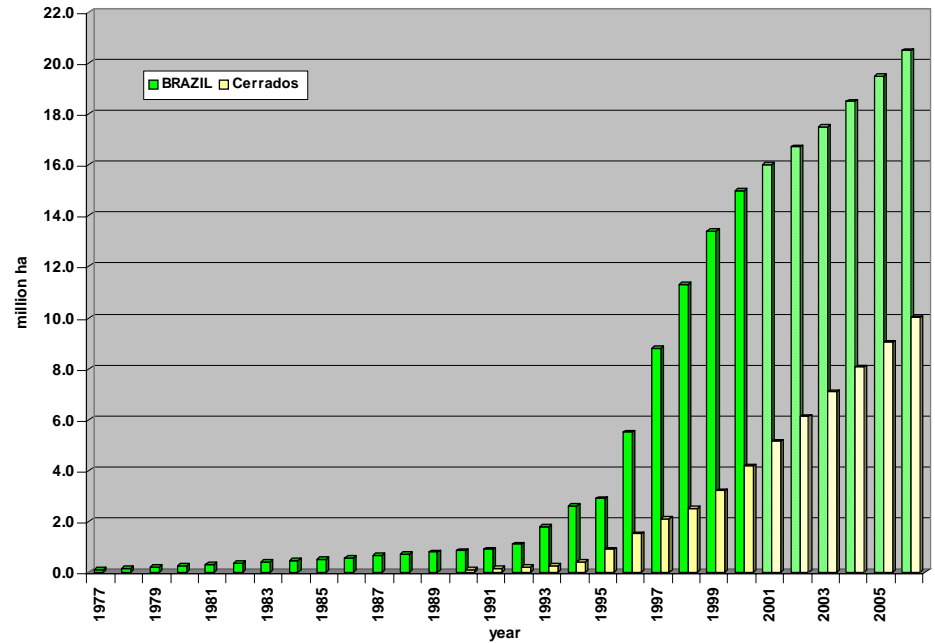
<b>Year</b>	<b>Units</b>
<b>2000</b>	<b>3.780</b>
<b>2001</b>	<b>4.098</b>
<b>2002</b>	<b>5.648</b>
<b>2003</b>	<b>5.440</b>
<b>2004</b>	<b>5.605</b>
<b>2005</b>	<b>1.534</b>
<b>2006</b>	<b>1.030</b>
<b>2007</b>	<b>2.377</b>
<b>2008(*)</b>	<b>1.338</b>
<b>Note: (*) 2008: January to March</b>	

# MECHANIZATION

**FULL  
MECHANIZED  
SOYBEAN  
PRODUCTION**



**PLANTING  
AND HARVESTING  
AT THE SAME  
TIME**



# MODERN PLANTERS

**DIRECT PLANTING (NO OTHER OPERATION)**



# Sugarcane Cultivation

3 operations

Fertilizing

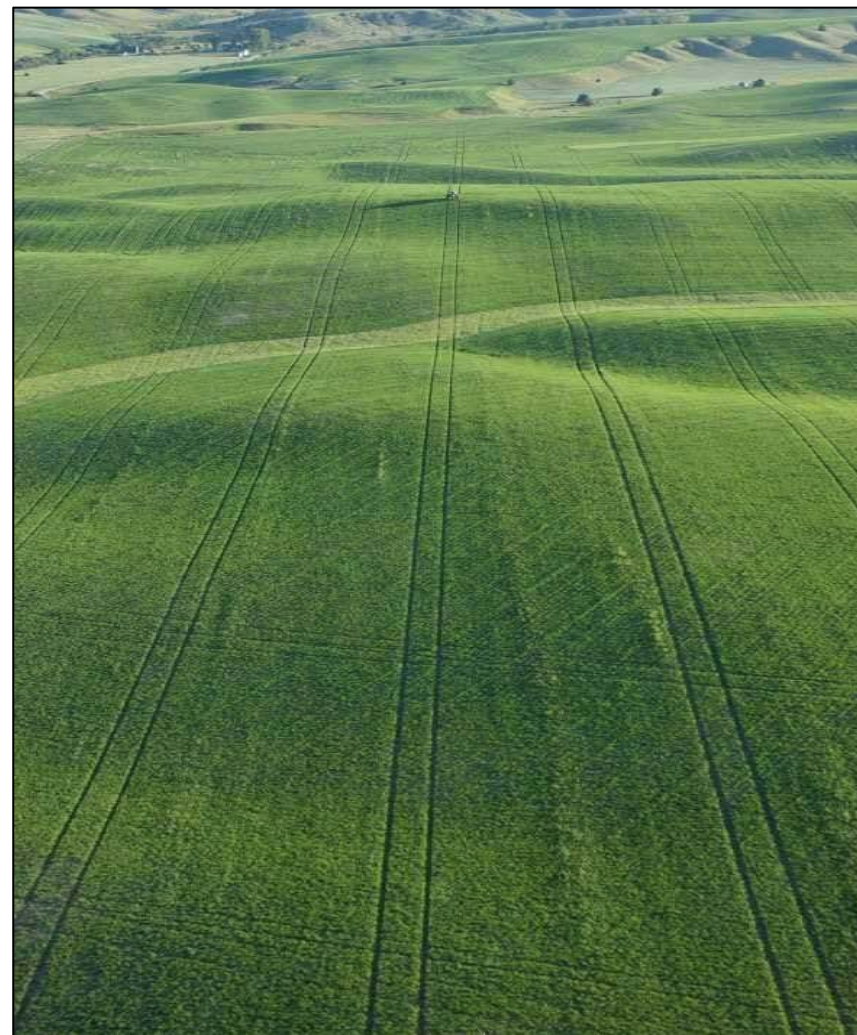


For small

# GPS – LOWER INPUTS; BETTER YIELDS



AUTOMATIC





# Irrigation - Evolution



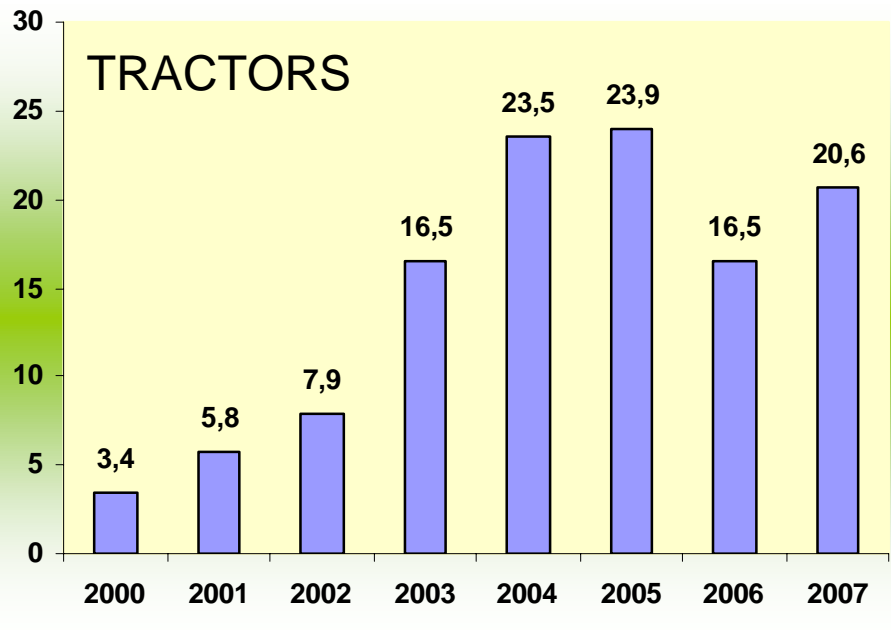
# TRACTORS EVOLUTION



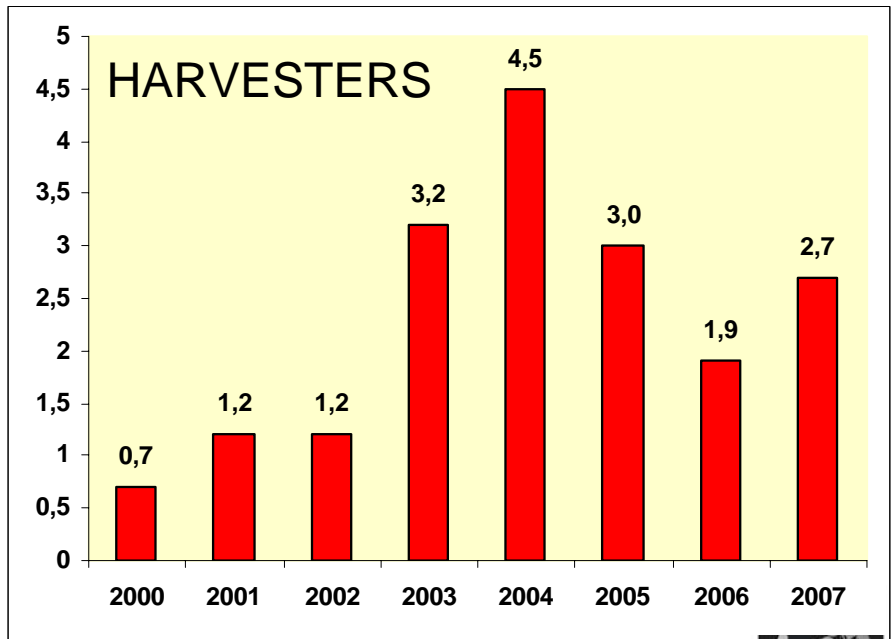
**EVOLUTION  
IN POTENCY  
AND TRENDS -  
BRAZIL**

<b>YEAR</b>	<b>HP</b>
<b>1998</b>	<b>93</b>
<b>2000</b>	<b>94</b>
<b>2002</b>	<b>100</b>
<b>2004</b>	<b>102</b>
<b>2013</b>	<b>115</b>

# TRACTORS



# TRACTORS AND HARVESTERS EXPORTED (IN THOUSAND UNITS)



**“Global Warming is unequivocal and caused by greenhouse gas emissions of anthropogenic origin”.**

**Solomon, S., et al: Climate Change 2007:The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment. Report Of the Intergovernmental Panel on Climate Change. Cambridge University Press, 2007 – pages 727-728.**

# EFFECTIVE DROUGHT IN AUSTRALIA



## EFEITO PROLONGADO

A Austrália vive uma de suas mais graves secas: reflexo na produção de alimentos

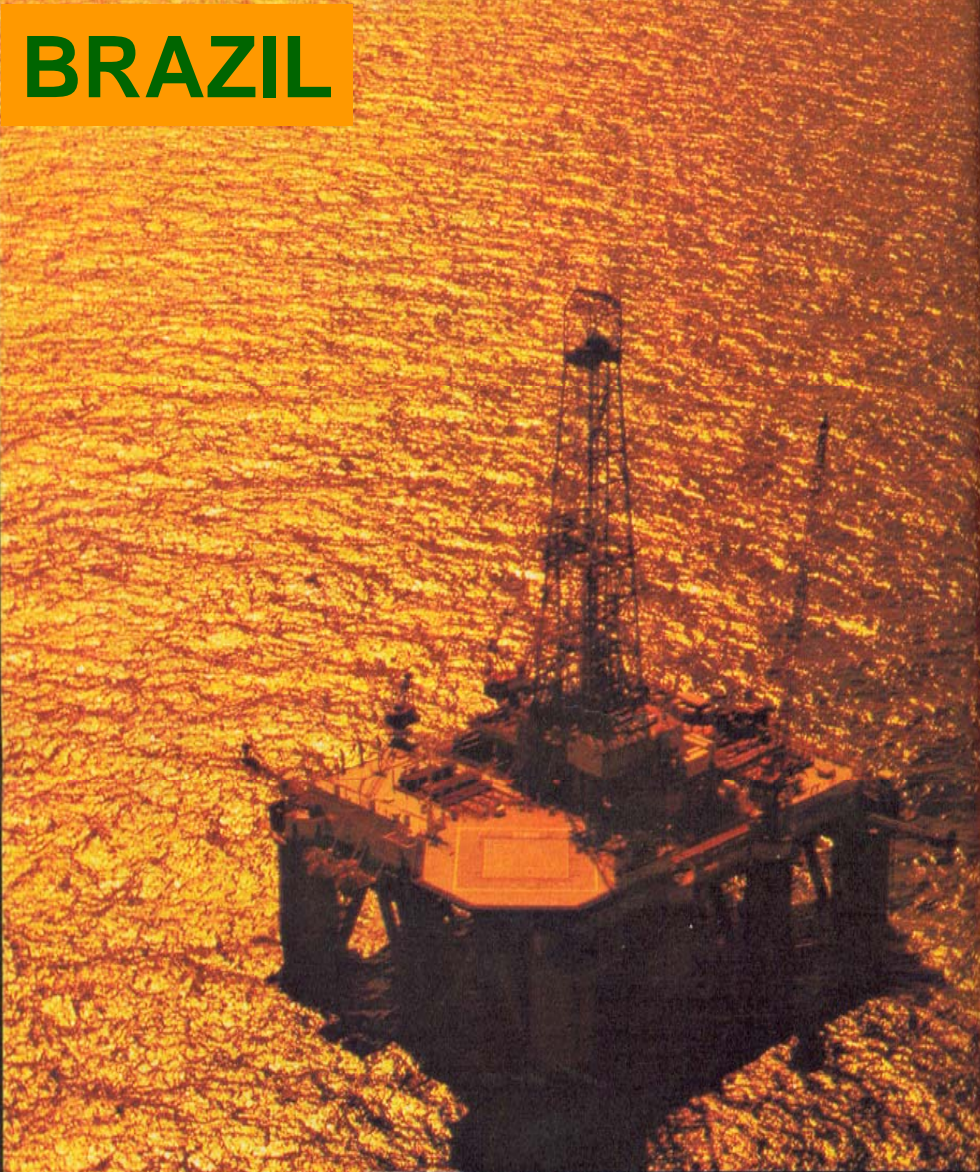
# OPPORTUNITIES FOR AGRI - ENERGY

**1. GHG – How to reduce it in the transportation sector ?**

**2. How to reduce the world's addiction to oil ?**

**In a sustainable way.....**

**BRAZIL**

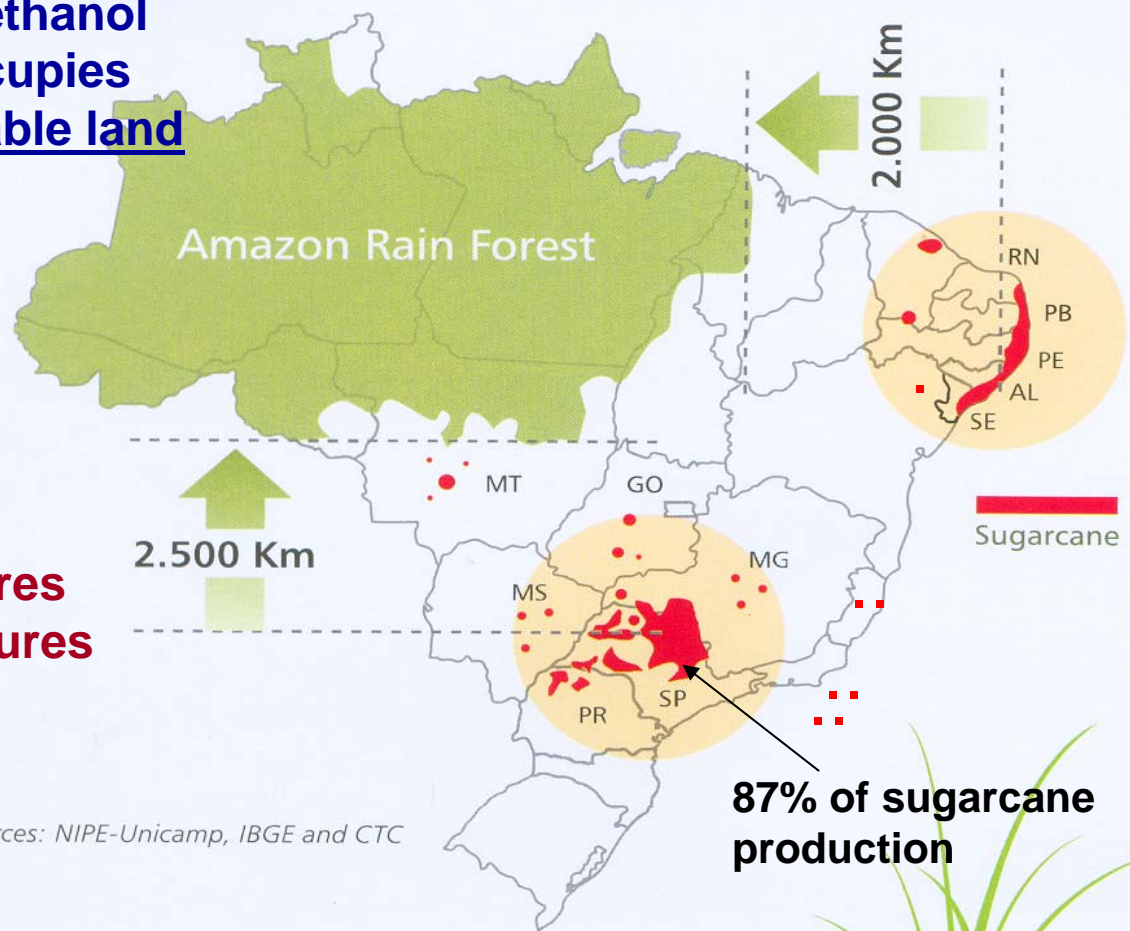


Petróleo e etanol: combustível para um mundo ávido por crescimento

# OIL AND BIOFUEL – THE NATURAL TRANSITION



**Sugarcane for ethanol production occupies 1% of Brazil's arable land**



**35 million hectares of degraded pastures are available**

**87% of sugarcane production**

Sources: NIPE-Unicamp, IBGE and CTC

# Sugarcane

**Overview of the industry in Brazil.**





# SUGAR CANE AGRIBUSINESS EVOLUTION

**PAST** → **TODAY** → **FUTURE**



- **Sucrose / ha**
- **No energy optimization**



- **Sugars / ha**
- **Low energy optimization**
- **Mechanization**

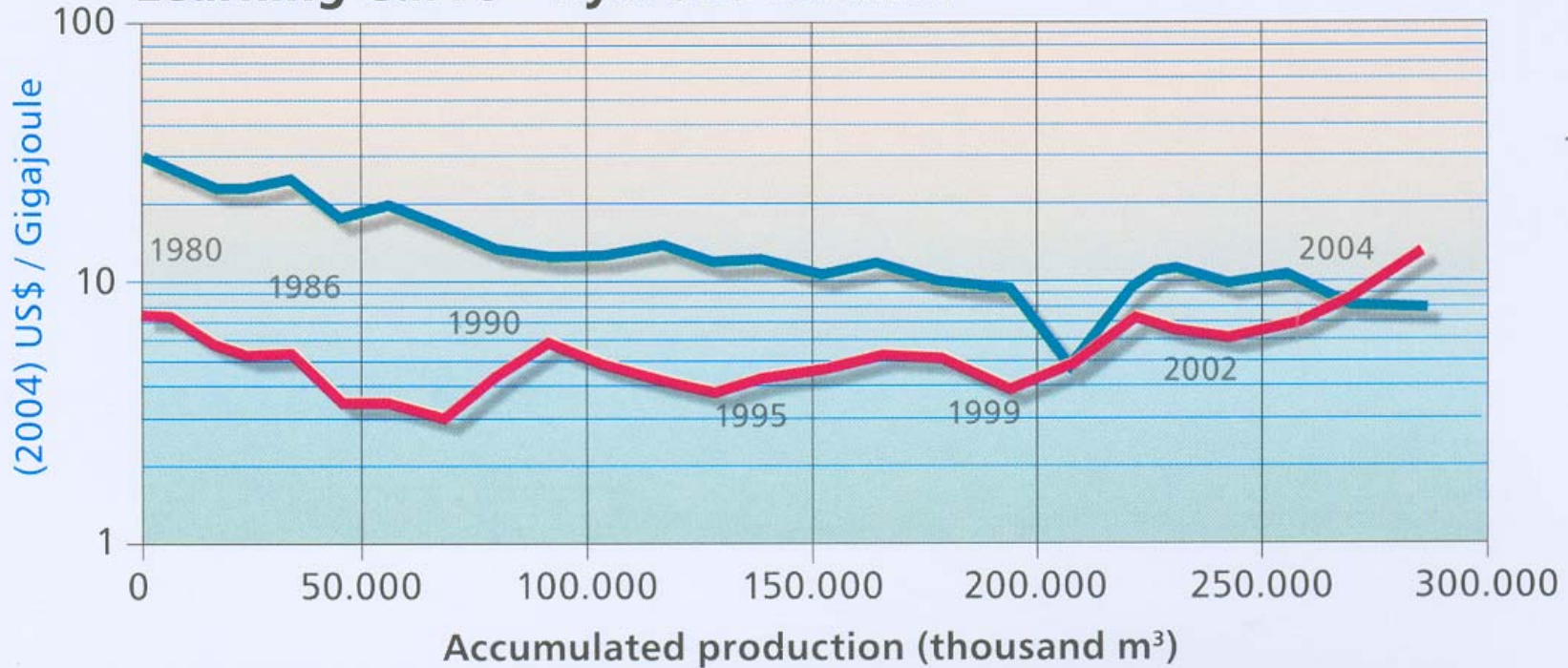


- **Biomass / ha**
- **Energy optimization**
  - **special varieties**
  - **high mechanization**
  - **irrigation**

**Gains in yields/ year in the last 30 years: > 3,0%**

# BRAZIL

## Learning Curve – Hydrous Ethanol



ethanol prices in Brazil

Rotterdam regular gasoline price

**Note:**  $1\text{m}^3$  ethanol = 23 gigajoule;  $1\text{m}^3$  gasoline = 31 gigajoule.

**Source:** Nastari, P. "Competitividade da Produção de Etanol de cana-de-açúcar: as 3 ondas de desenvolvimento", V Conference of Datagro, São Paulo, September 20, 2005.

# ETHANOL FROM CANE: THE BRAZILIAN EXPERIENCE

- **>50% of gasoline consumption is replaced by ethanol (in volume) produced on 1% of the Brazilian arable land (3.4 million hectares).**
- **35 million hectares of degraded pastures are available for low cost sugarcane expansion.**
- **Cane products are the 2<sup>o</sup> primary energy consumed in Brazil after oil products.**
- **Emissions reduced by 25.8 million tons of CO<sub>2</sub> equivalent, in 2007, thanks only to the use of ethanol in Brazil.**

# PROJECTIONS FOR THE BRAZILIAN SUGARCANE INDUSTRY

	2007/08*	2010/11	2015/16	2020/21
Sugarcane Production (million tonnes)	487	601	829	1,038
Cultivated Area (million hectares)	7.8	8.5	11.4	13.9
Sugar (million tonnes)	30.6	34.6	41.3	45.0
Internal Market	10.4	10.5	11.4	12.1
Surplus Export	20.2	24.1	29.9	32.9
Ethanol (billion liters)	22	29.7	46.9	65.3
Internal Market	18.4	23.2	34.6	49.6
Surplus Export	3.6	6.5	12.3	15.7
Bioelectricity (MWa) *	1,800	3,300	11,500	14,400
Bioelectricity in Brazilian Energy Matrix (%)	3%	6%	15%	15%

**Note:** \* MWa = firm capacity. Potential generation of surplus electricity has been calculated as follows:

- For 2007/08 and 2010/11, remaining surplus in MWa to be sold on the commercial power market, once mill's own need for electricity has been used, based on the utilization of 75% of the available bagasse.
- For 2015/16 and 2020/21, remaining surplus in MWa to be sold on the commercial power market, once mill's own need for electricity has been used, based on the utilization of 75% and 50% of the available bagasse and straw. The remaining 50% of straw is left on the field as organic matter.

**Source:** Unica, Copersucar and Cogen.

# Sugarcane Productive Sector: Investments

**Period:  
2008/2012**

**- TOTAL US\$ 33,0 billion**

**80 New Projects in  
Implementation**

**19 in 2007/2008**

**30 in 2008/2009**

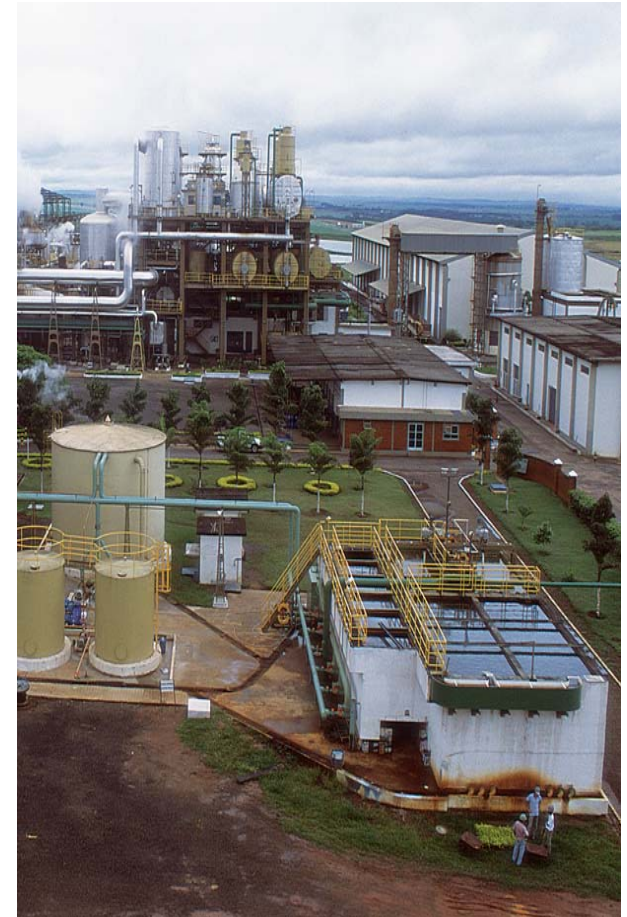
**23 in 2009/2010**

**08 in 2010/11/12**

**61 Announced Projects.**

**Total: 147 new projects..... ~ 15 million m3**

**Foreign Investments in Brazil: ?  
2007/08 – 36 mm ton of cane – 7% of total  
After 2007 - Increased presence!**



# SUGARCANE AND MECHANIZATION IN BRAZIL PERSPECTIVES FOR THE NEXT TEN YEARS

PHASES	2008	2018
<b>SOIL PREPARATION</b>	<b>100%</b>	<b>100%</b>
<b>Conventional</b>	<b>90%</b>	<b>30%</b>
<b>Conservationist</b>	<b>10%</b>	<b>70%</b>
<b>PLANTING</b>	<b>100%</b>	<b>100%</b>
<b>Semi - Mechanized</b>	<b>96%</b>	<b>20%</b>
<b>All Mechanized</b>	<b>4%</b>	<b>80%</b>
<b>HARVESTING</b>	<b>100%</b>	<b>100%</b>
<b>Semi - Mechanized</b>	<b>70%</b>	<b>20%</b>
<b>All Mechanized</b>	<b>30%</b>	<b>80%</b>

Especial Agrishow

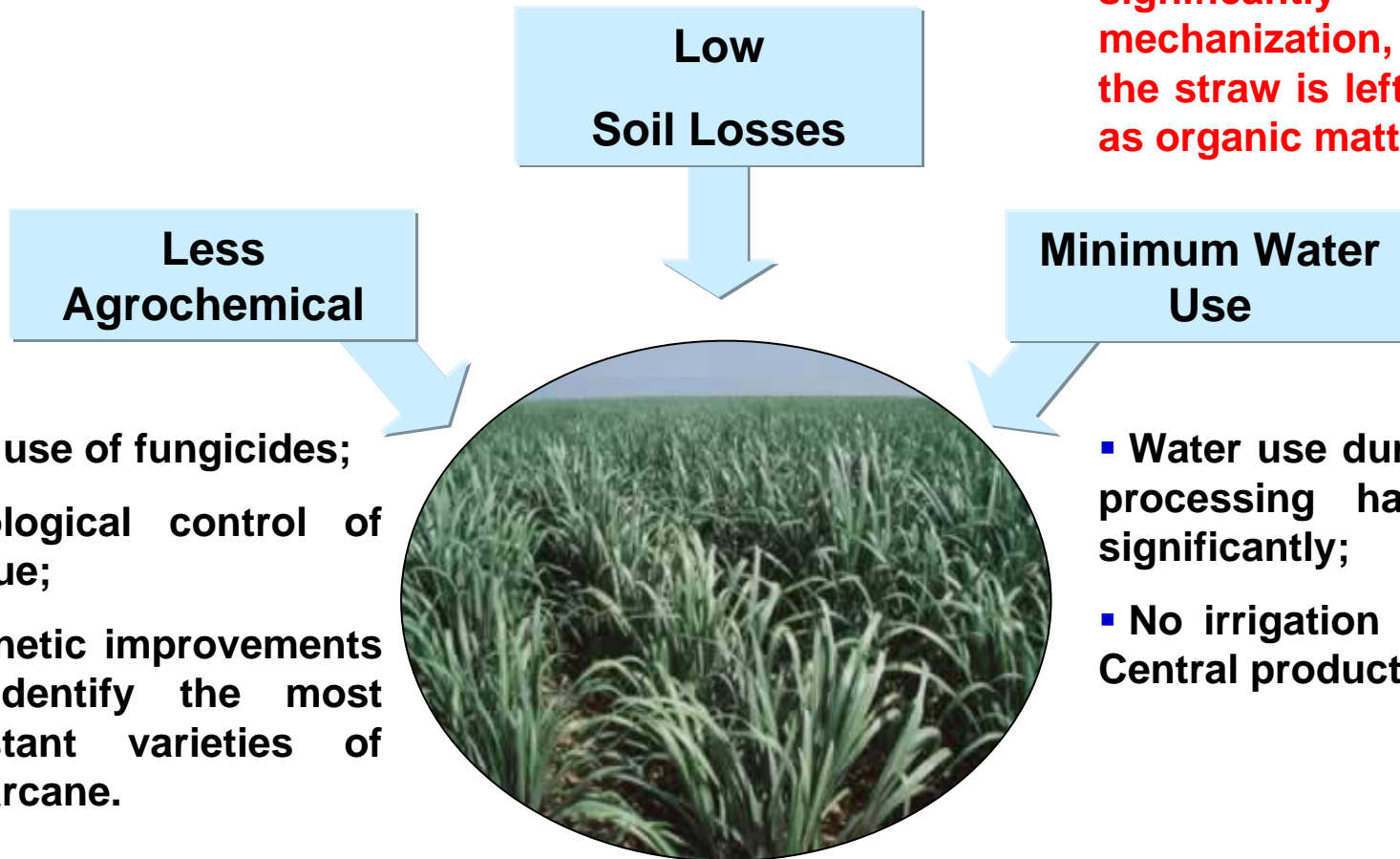


# MACHINERY FOR SMALL AND FOR BIG FARMERS



# EXAMPLES OF BEST AGRICULTURAL AND ENVIRONMENTAL PRACTICES

- Low levels of soil losses due to the semi-perennial nature of the sugarcane;
- **Soil losses decrease significantly with mechanization, since part of the straw is left on the fields as organic matters.**



- No use of fungicides;
- Biological control of plague;
- Genetic improvements to identify the most resistant varieties of sugarcane.

- Water use during industrial processing has decreased significantly;
- No irrigation in the South-Central production region.



# ENHANCING THE WORKING CONDITIONS IN THE SUGARCANE AGRICULTURE:

1. Gradual elimination by 2011 of the practice of outsourcing in the sugarcane manual cutting.
2. Improvement in the transport system for rural workers.
3. Transparency in the systems of labor evaluation and payment in the production of sugarcane.



# AGRIBUSINESS TRENDS IN THE XXI CENTURY - SUPPLY DRIVERS:

- Climate change and Global warming
- Limited natural resources
- Potential new diseases
- Food vs Fuel
- Rising rural income but no agrarian (Asia)
- Concentration ( business)
- Multinationals growth presence
- Adding value to agriculture
- New technologies: biotechnology;  
**mechanization**; management.

# AGRIBUSINESS TRENDS IN THE XXI CENTURY - DEMAND DRIVERS:

## Rich countries – qualitative demand

- Health and well being
- Conveniences and preferences
- Regulations

## Developing Countries – quantitative demand

- Population growth
- Rising Per Capita Income
- Urbanization
- Change in food habits
- Mobility rising fast

# **AGRIBUSINESS TRENDS IN THE XXI CENTURY - COMMERCE DRIVERS:**

- **Strong expansion of agriculture commerce in the long run**
  - **Exports from developed to emergent countries (specially South America; East Europe)**
  - **Imports from developed to emergent (specially Asia, East Europe and Middle East) countries**
- **Protectionism**
- **Real fall in agriculture prices (long run trend)**
  - **Price volatility will rise**



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# THANK YOU!!

Rome 30-31 May 2008

