



Rome 30-31 May 2008

- **Brazil**
- **Comments on the world situation.**

**Prof. Luis Márquez &
Prof. Ettore Gasparetto**



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Presentations by:

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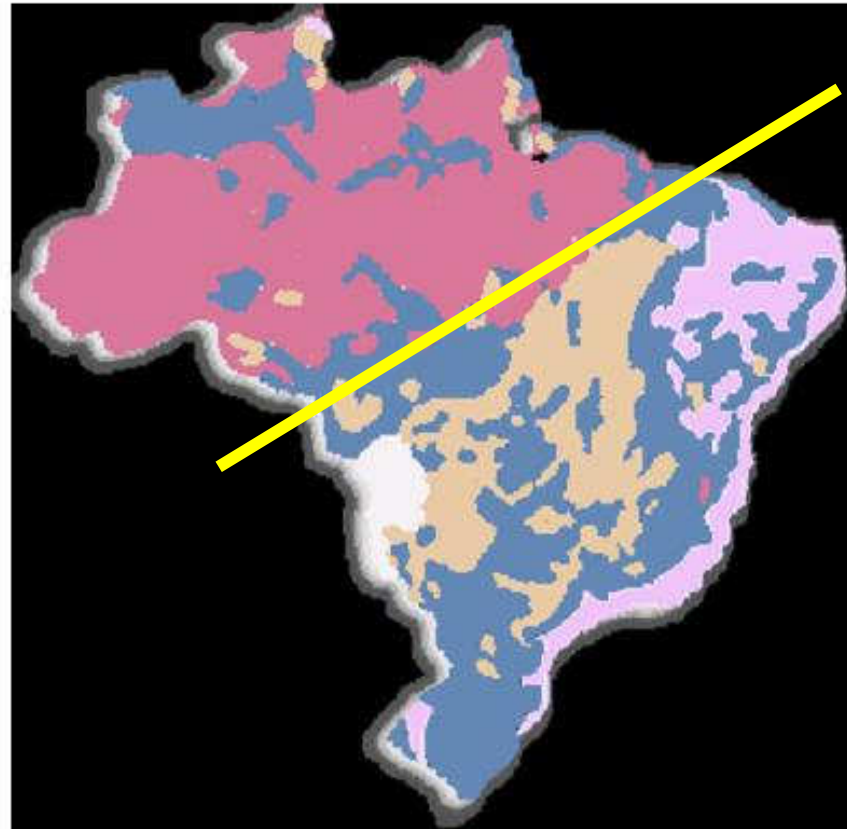
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Ecosystems Brazil

In its 8.5 million square kilometers, Brazil offers different landscapes ranging from semi-desert to evergreen tropical rainforests. It is regarded as one of the richest countries in bio diversity.



AVAILABILITY OF ARABLE LAND IN BRAZIL

Million Hectares (2007)			
Brazil	850		
Total preserved areas and other uses*	510 (60%)		
Total arable land	340 (40%)	% total land	% arable land
1 Cultivated Land: All Crops	63.1	7.4%	18.6%
Soybeans	20.6	2.4%	6.1%
Corn	14.0	1.6%	4.1%
Sugarcane**	7.8	0.9%	2.3%
Sugarcane for ethanol***	3.4	0.4%	1.0%
Oranges	0.9	0.1%	0.3%
2 Pastures	200	23.5%	58.8%
3 Available land (ag, livestock)	77	9.1%	22.6%
<p>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</p>			



BRAZIL: GRAINS PRODUCTION (thousand ton)

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
Brazil	57.899	140.774	5,37

BRAZIL: PLANTED AREA (thousand ha)

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
Brazil	37.894	46.701	1,24

Main fruit crops

1^{er}. Ranking:

- Coffee (2.4 Mha – 32.6 M bags-60 kg)
- Citrus (1.15 Mha – 93.8 Mt)

3^{er}. Ranking:

- Banana (506.9 kha – 6.9 Mt)
- Mango (69.6 kha – 826 kt)





Big fluctuations of GDP

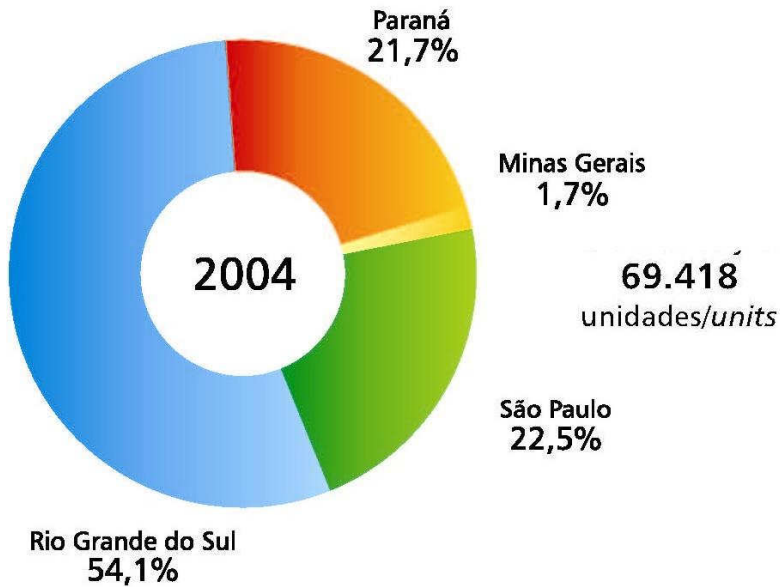
- Reasons: internal situation and evolution of agricultural produce world demand
- **Agricultural machinery manufacturing status:**
 - Staff: 41 000
 - Sales (2007): 3 024 M US\$
 - Export: 686 M US\$
 - Import: 193 M US\$
- Park renewal: “*Moderfrota*” Programme
 - Present average age: Tractors 5.28 years
 - Combines: 7.75 years

Big fluctuations in the tractor and agricultural machinery internal market

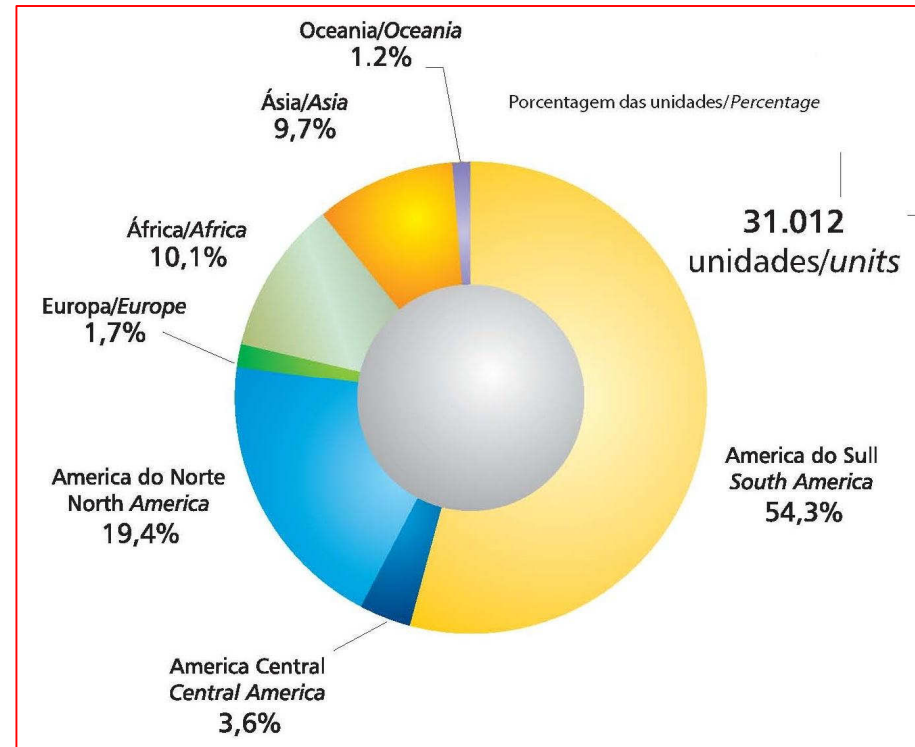


Tractor production and export

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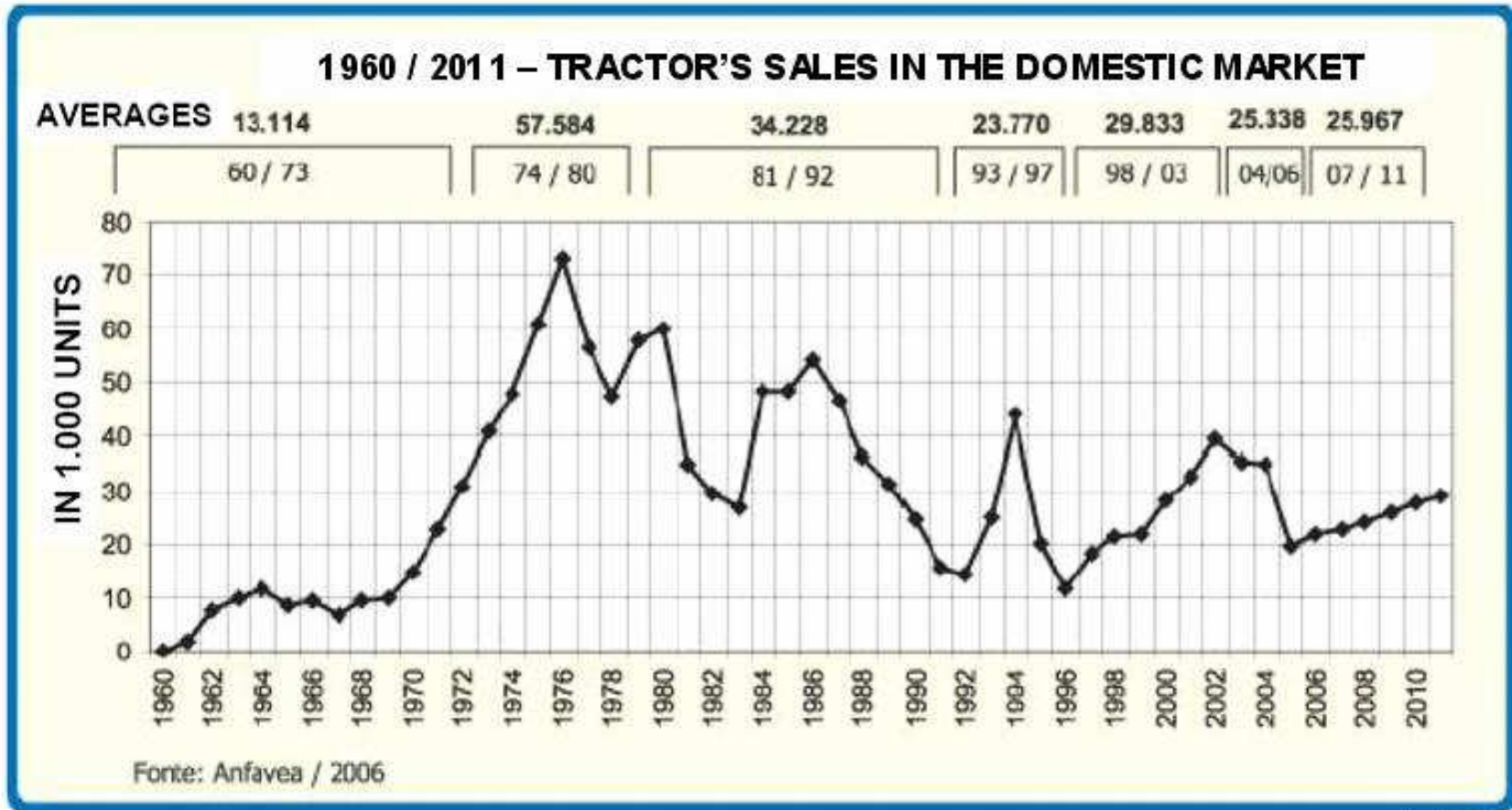


Estados/States	Empresas/Companies
Rio Grande do Sul	AGCO, Agrale, John Deere
Paraná	CNH Case, CNH New Holland
Minas Gerais	CNH Case, CNH Fiatallis
São Paulo	Caterpillar, Komatsu, Valtra



Source: ANFABEA, 2005

AGRICULTURE MACHINERY EVOLUTION IN DIFFERENT MOMENTS

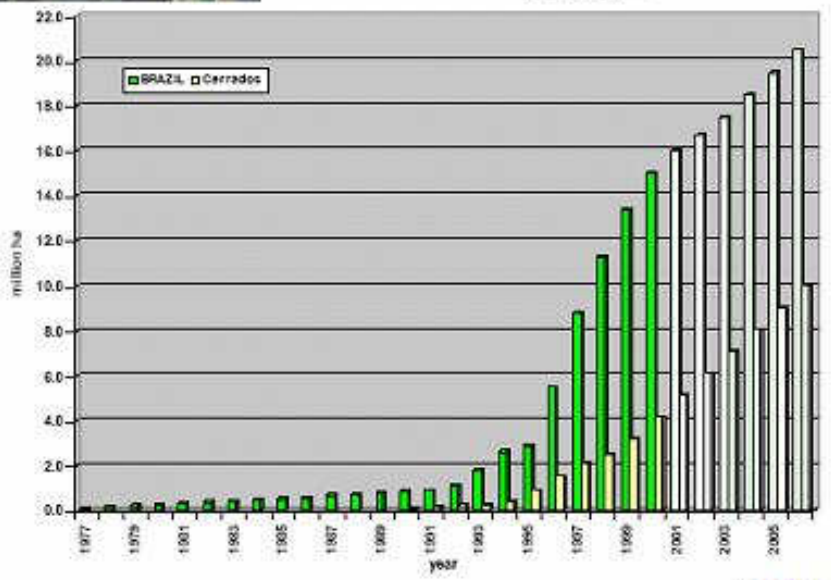


MECHANIZATION

FULL MECHANIZED SOYBEAN PRODUCTION



PLANTING AND HARVESTING AT THE SAME TIME

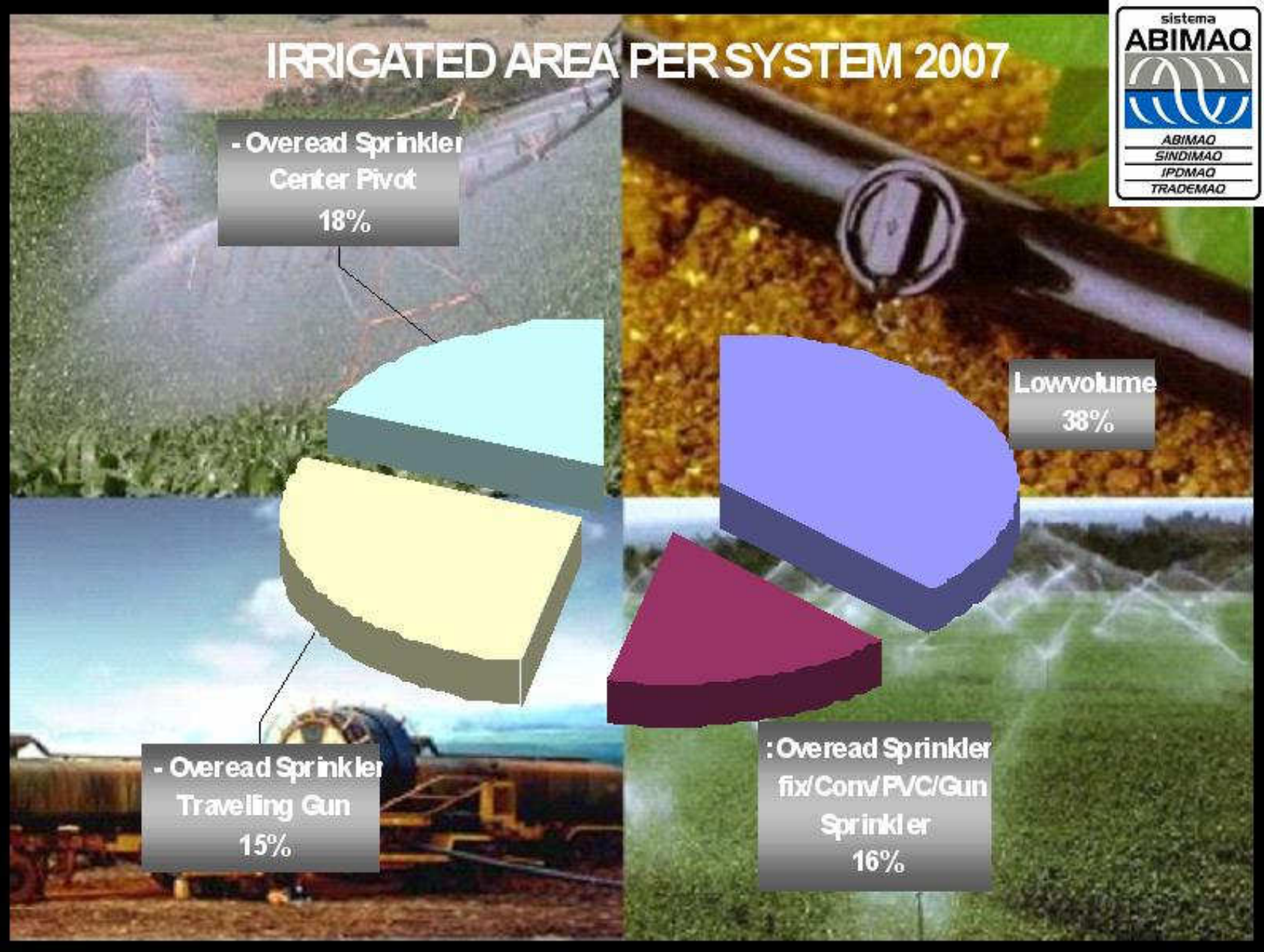




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IRRIGATED AREA PER SYSTEM 2007



- Overhead Sprinkler
Center Pivot
18%

Lowvolume
38%

- Overhead Sprinkler
Travelling Gun
15%

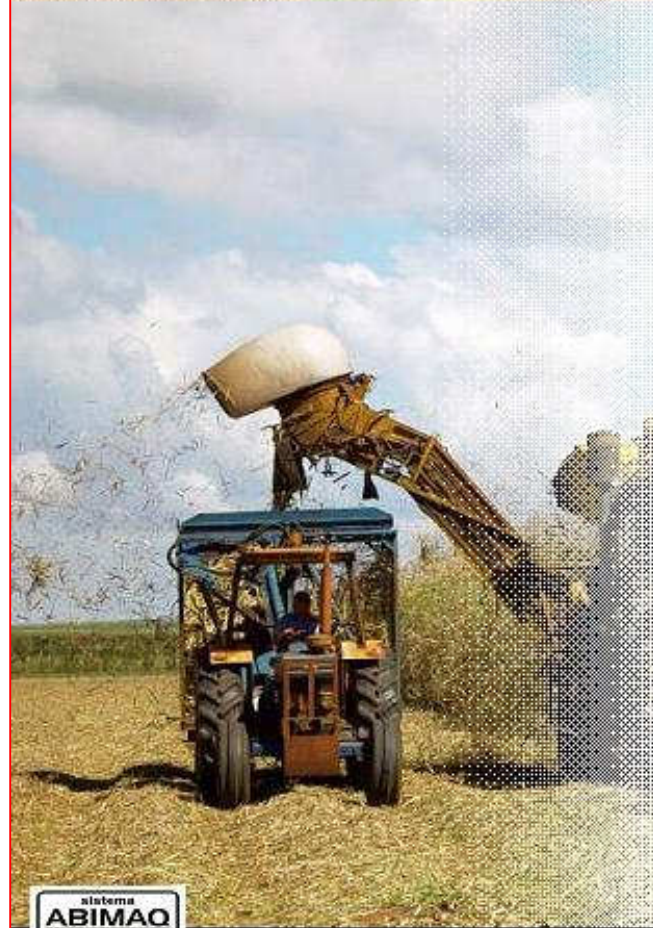
: Overhead Sprinkler
fix/Conv/PVC/Gun
Sprinkler
16%



Moderfrota

✓ Objective: Finance new or used tractors and harvesters and new implements, all manufactured in Brazil, duly registered at the BNDES.

- ✓ Annual Interest rate: 7,50% to 9,50%;
- ✓ Terms: up to 60 months (72 months to harvesters)
- ✓ Shortage: up to 18 months
- ✓ Guarantees: 125%
- ✓ Finance limit:
 - 100% of the budget for Stockbreeding Gross Revenue (SGR) equal or less than R\$ 250 thousand – annual interest rate 7,55%
 - 90% of the budget for SGR above R\$ 250 thousand – annual interest rate 9,5%
 - R\$ 20 thousand for coffee preparing, drying and processing equipment



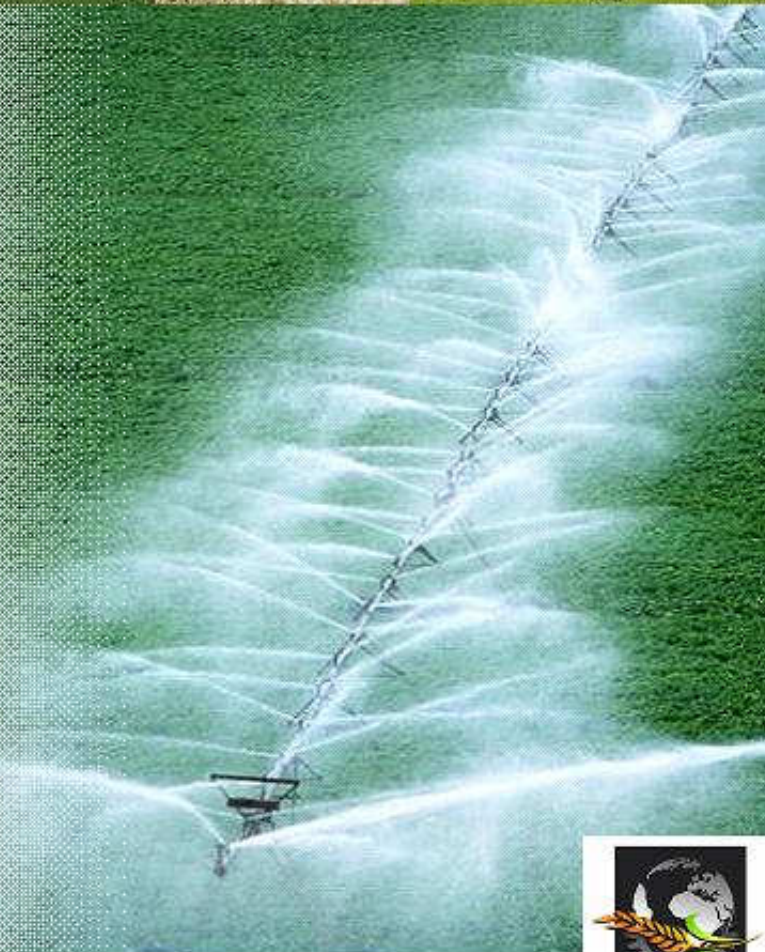
Agricultural Machinery and Implements from Brazil





Moderinfra

- ✓ **Objective:** irrigation and storage support, through the sustainable irrigated agriculture financing
- ✓ **Target:** rural producers, individuals or companies
- ✓ **Annual interest rate:** 6,75%
- ✓ **Term:** up to 96 months
- ✓ **Shortage:** up to 36 months
- ✓ **Guarantees:** 130%
- ✓ **Finance:** Up to 100% of the limited budget of R\$ 1 million for individual undertaking and R\$ 3 million for general undertaking.



Agricultural Machinery and Implements from Brazil





PRONAF

**(PRONAF – national programme to
incentivate the small family production)**

PRONAF D

Annual interest rate 2,00%

- ✓ **Target:** Familiar Gross Earning between R\$ 18 thousand and R\$ 50 thousand
- ✓ **Maximum Value:** up to R\$ 27 thousand
- ✓ **Term:** up to 5 years (60 months)

PRONAF E

Annual interest rate 5,50%

- ✓ **Target:** Familiar Gross Earning between R\$ 50 thousand to R\$110 thousand
- ✓ **Maximum value:** Up to R\$ 54 thousand
- ✓ **Term:** Up to 5 years (60 months)



Agricultural Machinery and Implements from Brazil





In every farm or production area it is compulsory to preserve:

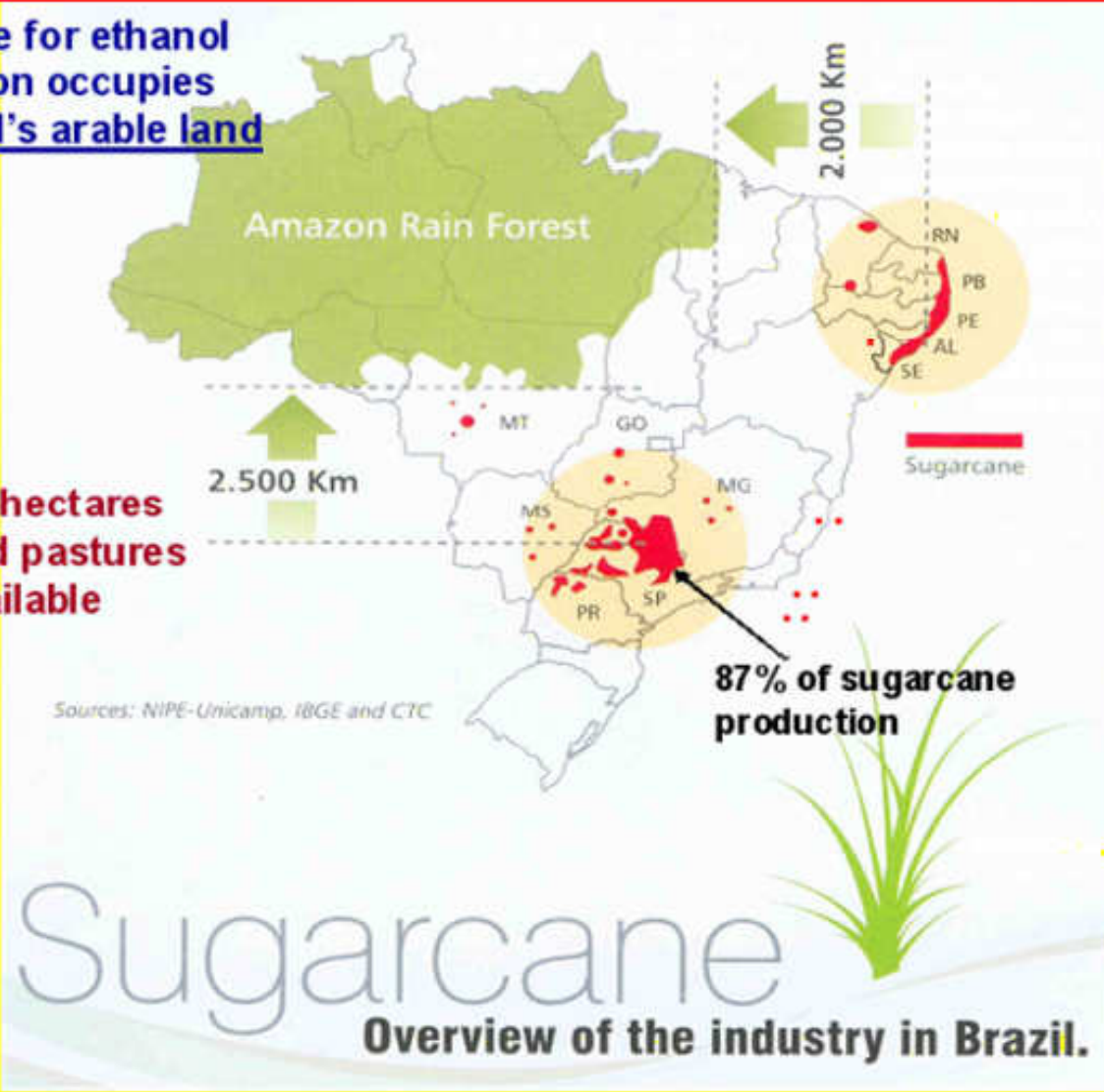
- 20% of native forest / vegetation in Southern Center Region
- 35% in the Savannah Region.





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

35 million hectares of degraded pastures are available



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

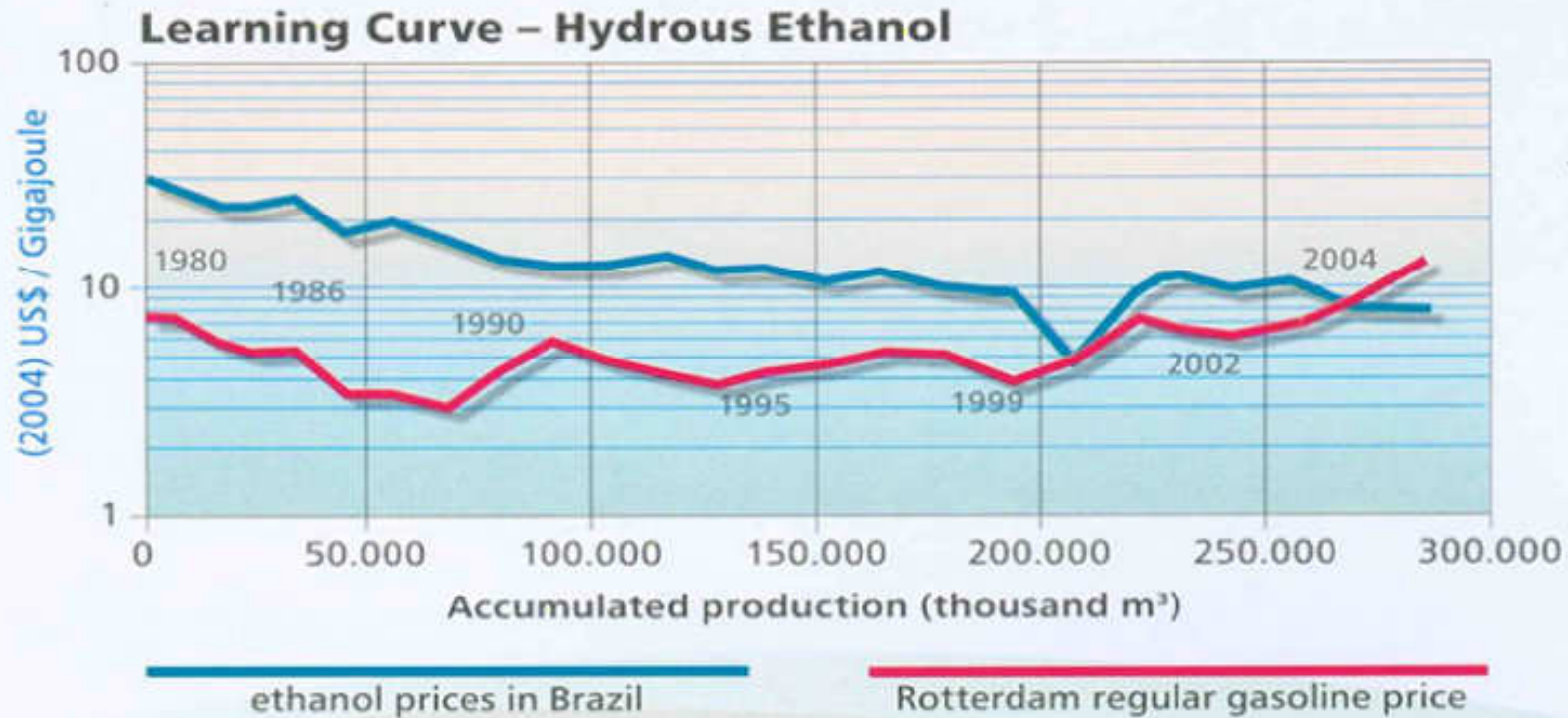


- Biomass / ha
- Energy optimization
 - special varieties
 - high mechanization
 - irrigation

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



BRAZIL



Note: 1m³ ethanol = 23 gigajoule; 1 m³ 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^o primary energy consumed in Brazil after oil products.
- Emissions reduced by 25.8 million tons of CO₂ 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:

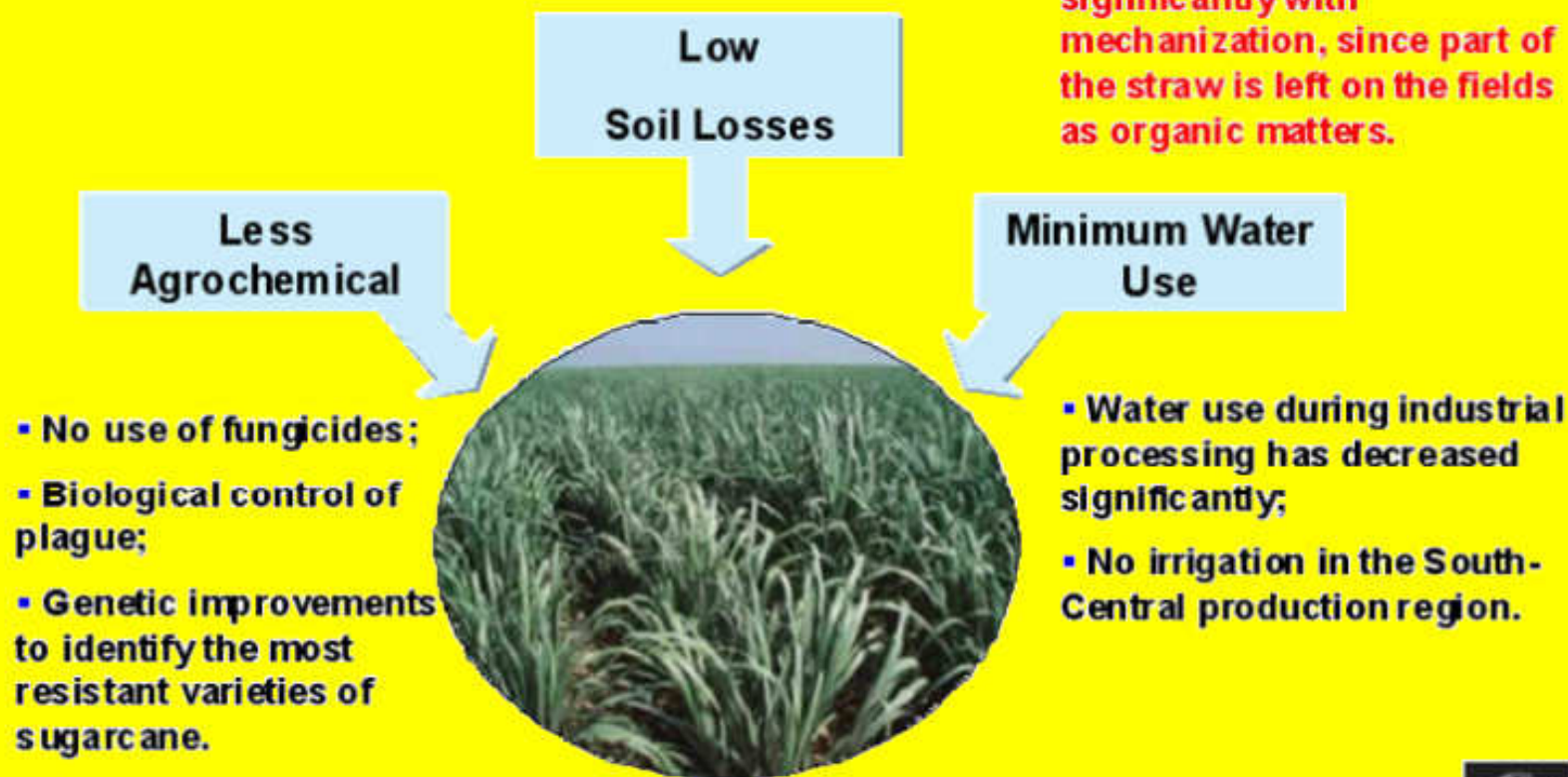
- For 2007/08 and 2010/11, remaining surplus in MWa to be sold on the commercial power market, once mill's own need for electricity has been used, based on the utilization of 75% of the available bagasse.
- For 2015/16 and 2020/21, remaining surplus in MWa to be sold on the commercial power market, once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





EXAMPLES OF BEST AGRICULTURAL AND ENVIRONMENTAL PRACTICES





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.





Agricultural Machinery and Implements from Brazil - Conclusions

Agriculture

- Not only a source of food and raw materials for industry, but also of renewable clean energy
- Compatible in a sustainable agriculture and environmental protection
- Increasing demand for better quality foods

Machinery

- Consideration of operator, area and environment. Safety and certification are basic
- Process of **continuous technological innovation**, considering also social, cultural, economical and human factors, analysed universally and with an interchange of ideas and experiences



Other reference for Brazil

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**ELIMA, Bologna (Italy)
18th-19th November 2006**

**AGRICULTURAL AND MECHANIZATION
DIAGNOSTIC IN BRAZIL AND THE INFLUENCE OF
LEGISLATION/SUBSIDIES ON THE MARKET OF
AGRICULTURAL MACHINERY**

federal


**José Fernando Schlosser
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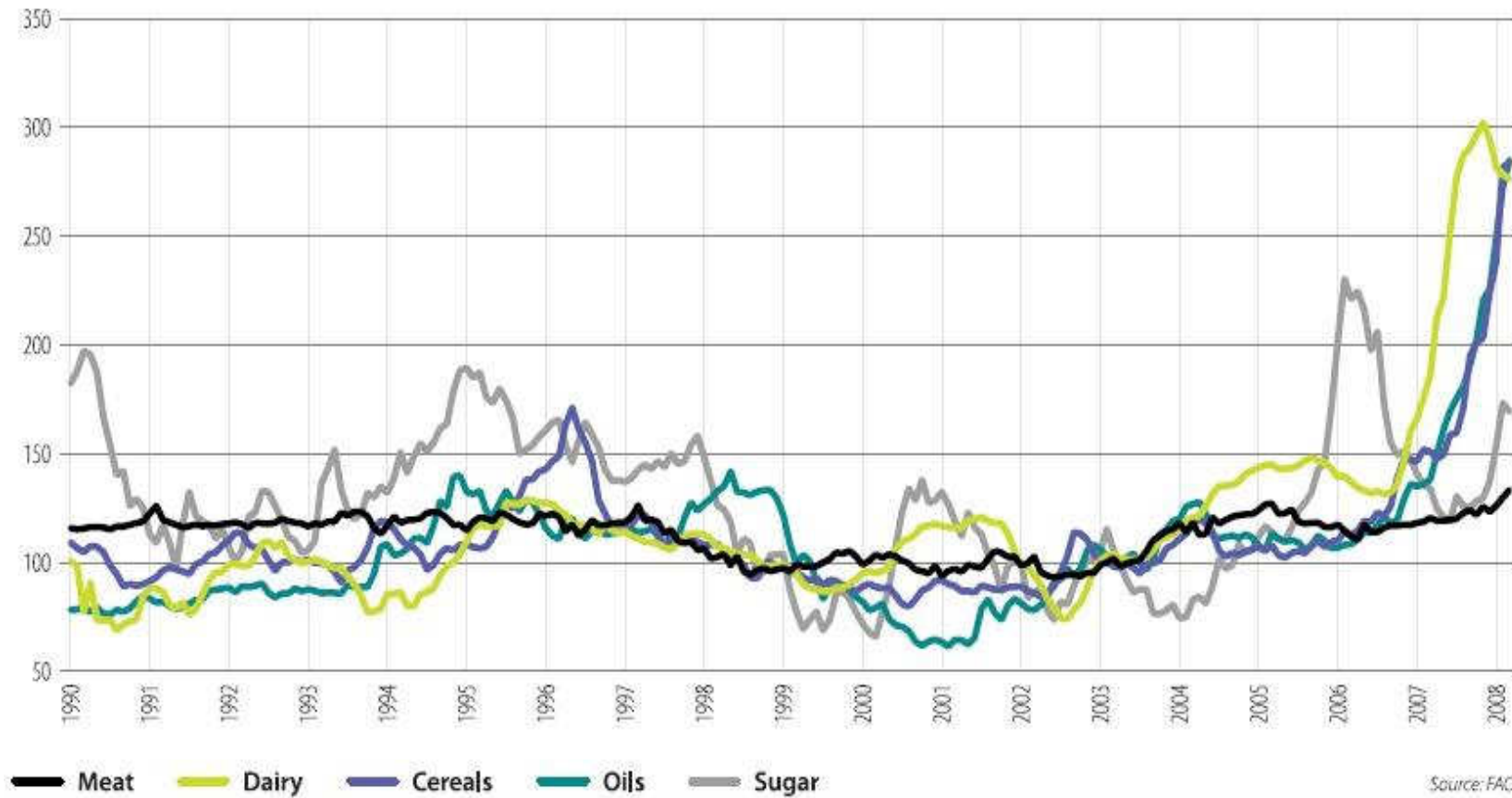
- Brazil;
- **Comments on the world situation.**



Agriculture and food supply

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Figure 1 Monthly FAO price indices for basic food commodity groups (1998-2000=100)



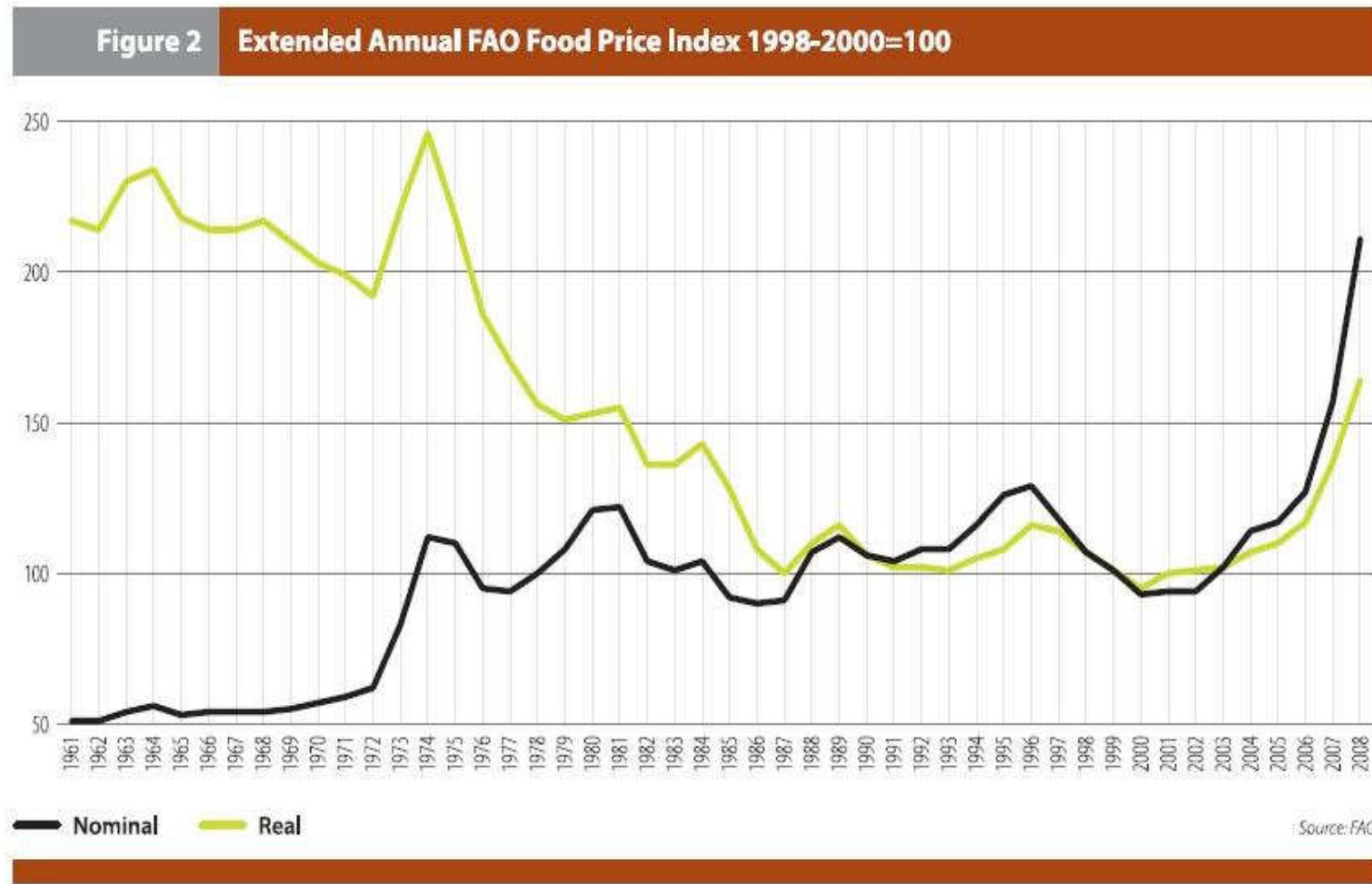
Source: FAO

FAO – HLC08-inf-1-E



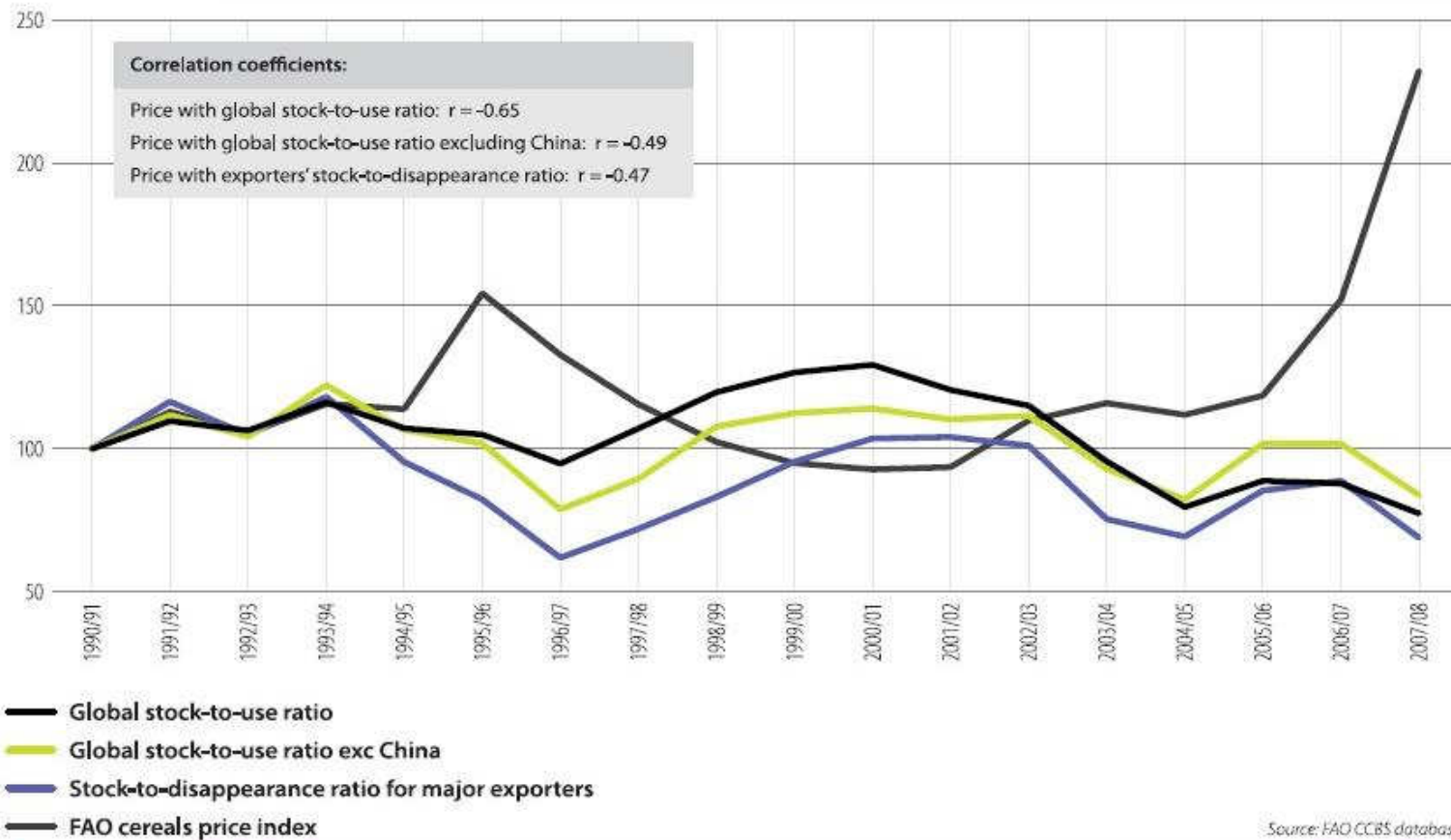
Agriculture and food supply

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Agriculture and food supply

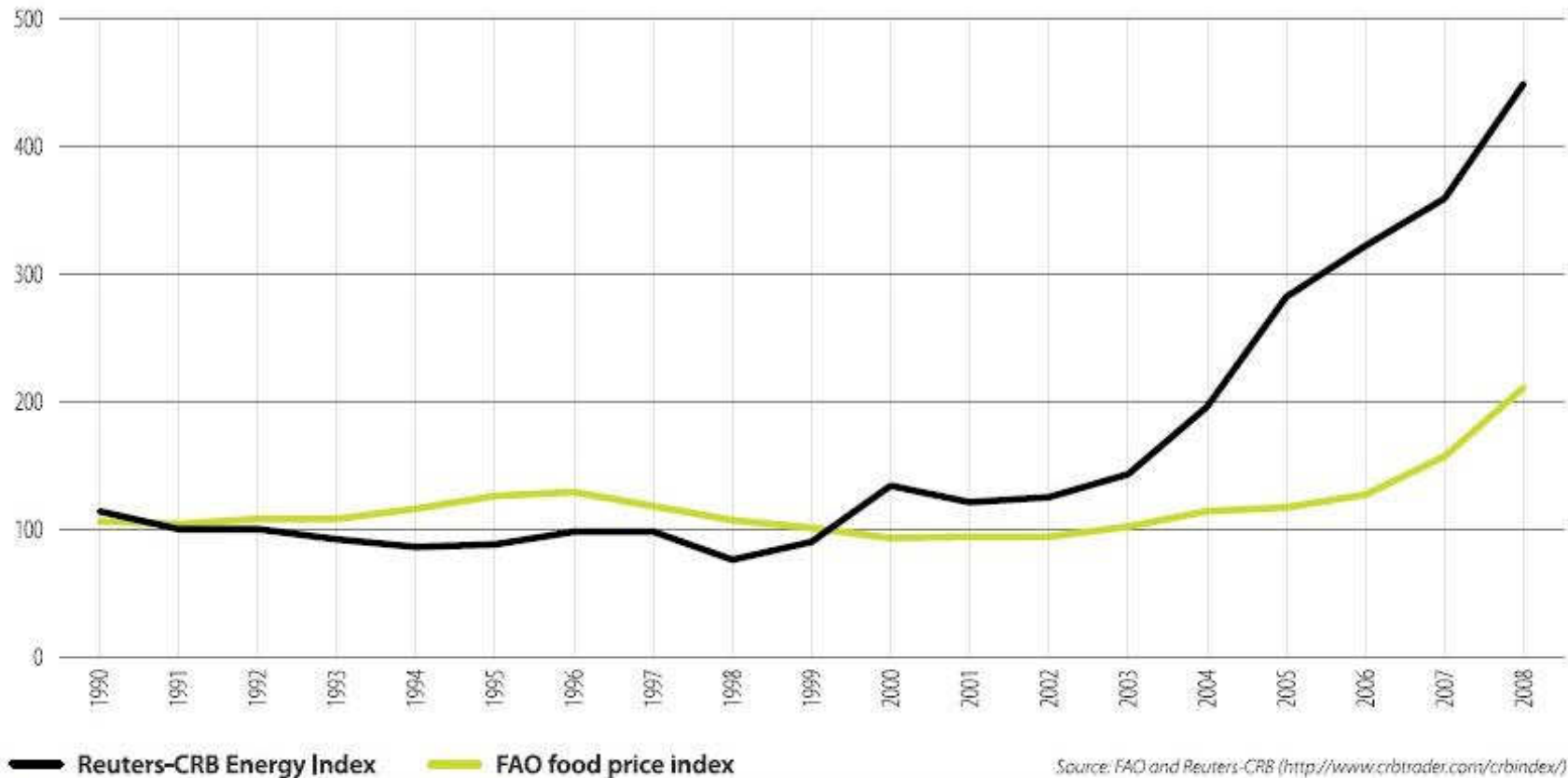
Figure 3 Relationships between cereal stocks ratios and prices



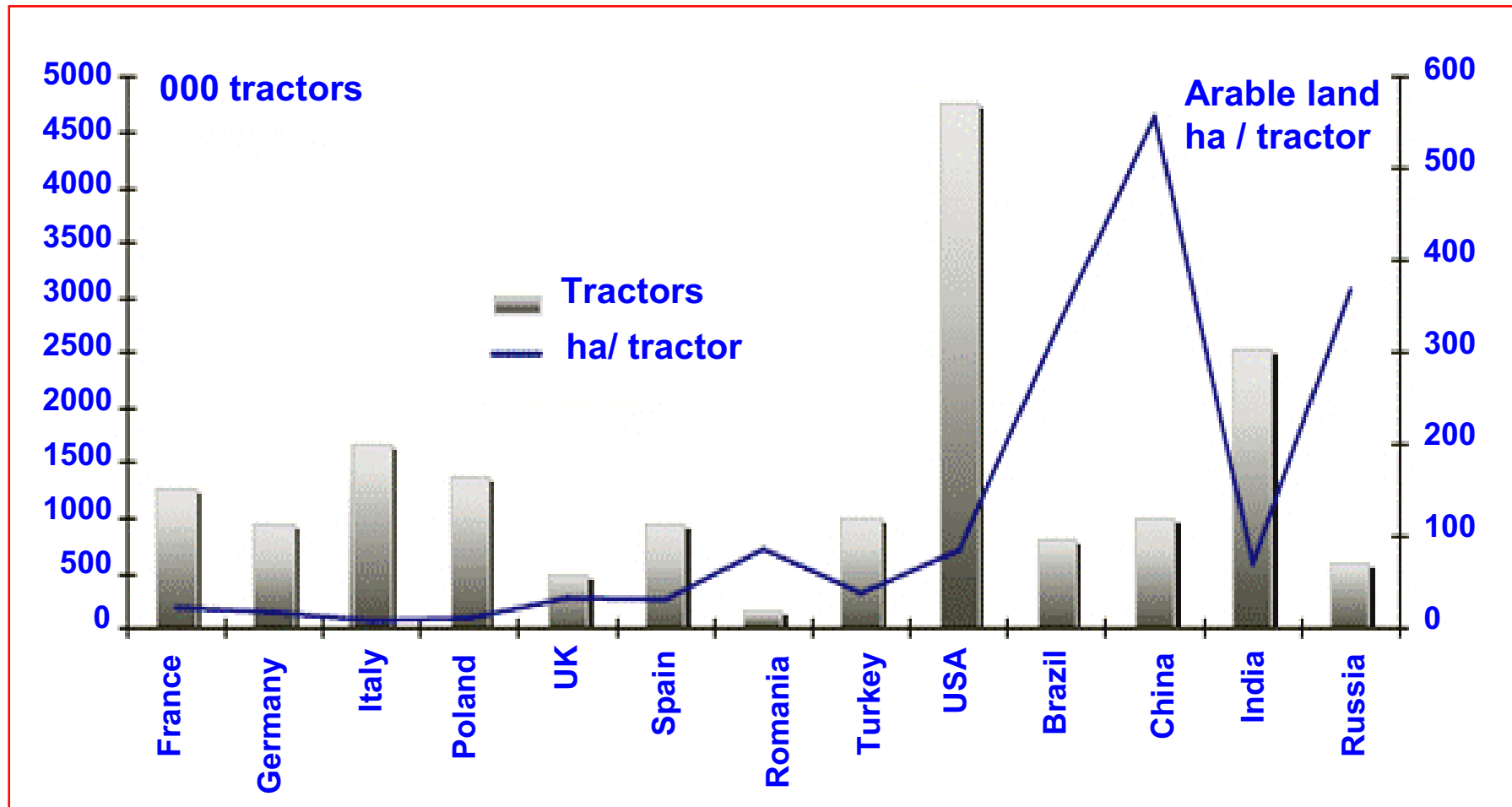


Agriculture and energy

Figure 4 Reuters-CRB Energy and FAO Food Price Indices 1998-2000=100



Agricultural mechanisation indices (2003)



Source Unacoma-Nomisma



Energy: present situation

- **Biofuels (1st generation) in the world fuel demand for transport (min & max):**
 - At present: 1-2%
 - In 2015: 2.3% 3.3%
 - In 2030: 3.2% 5.9%
- **Surface necessary to produce them**
 - In 2004: 14 M ha - 1% of arable land)
 - In 2030: 2% 3.5%
 - With 2nd generation technologies: 0.6%

Source: International Energy Agency – World Energy Outlook 2006 y 2007



Comments on the world situation

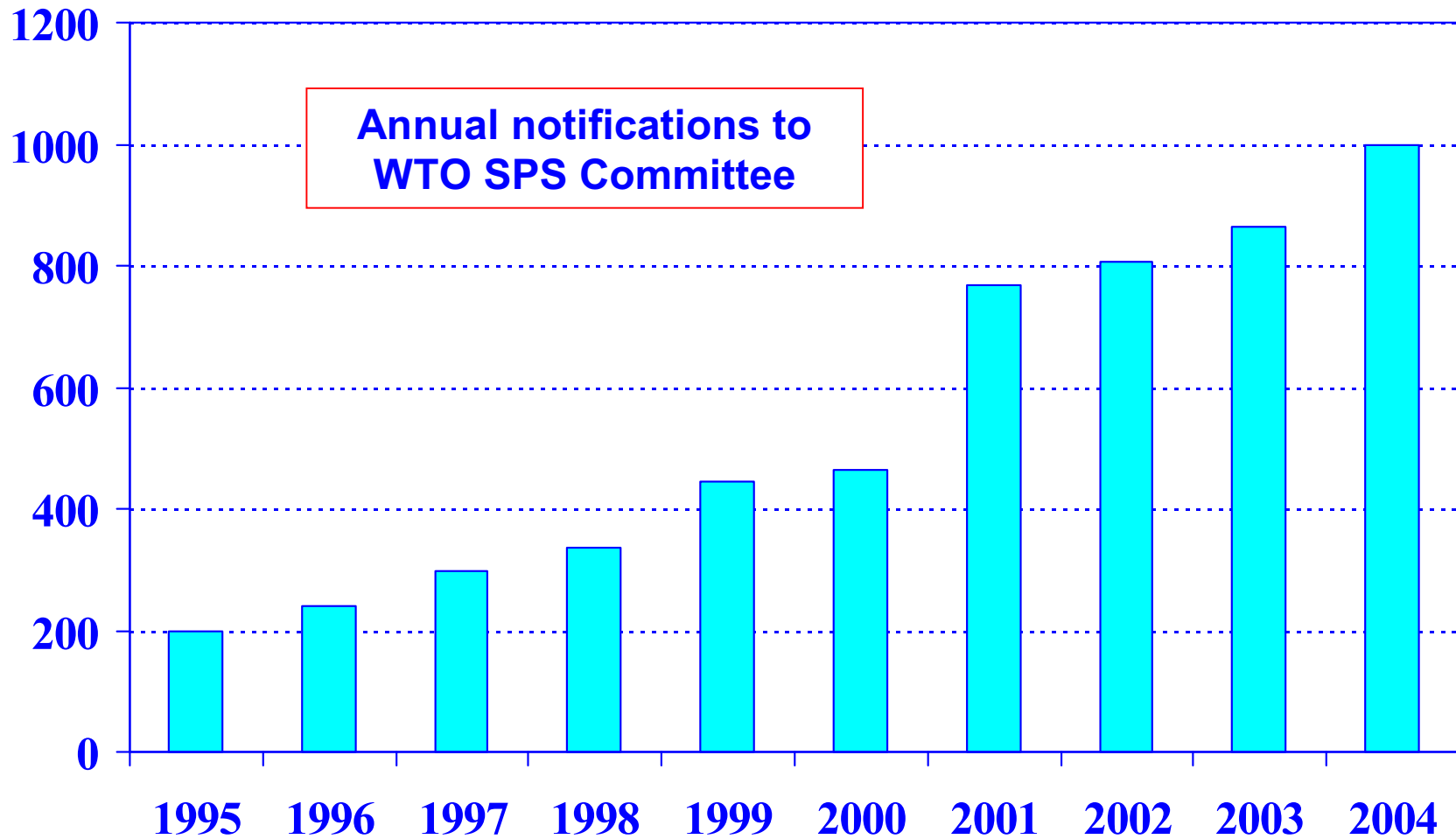
Agriculture:

- It is clear that it became again **important as an economic sector**, so that farmers and agricultural machinery manufacturers may take benefit
- In some countries natural resources permit to make **agriculture a motor for their economical and industrial development**
- In other countries at least on looks at self-sufficiency, as a means to guarantee **food security (quantity and quality)**
- Concern for the development of a **sustainable and environment compatible agriculture**
- Energy crops at least in a share of agriculture, thinking to **2nd generation fuels**, cultivated without subsidies



Notifications of sanitary and phyto-sanitary measures reflect the growing influence of standards on trade

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Source Sarris (WTO)



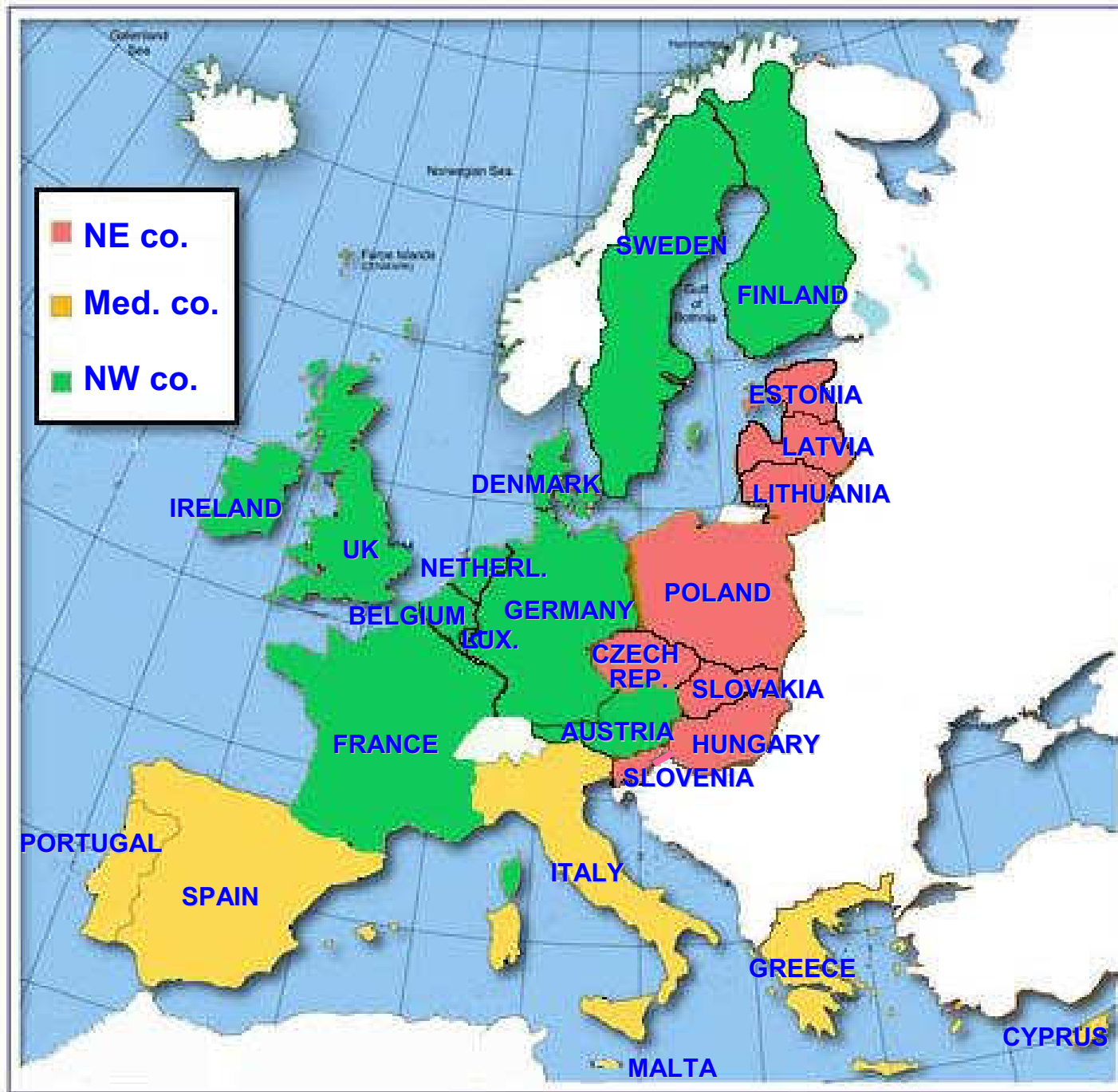
Agricultural Mechanisation

- **Stabilized** markets with a demand for a better technology to substitute obsolete machines. Low level of manpower in agriculture (West Europe; North America; Japan?)
- **Growing markets, due to structural changes** in the production systems, which demand reliable and high performance machinery, even with reduced electronic parts (Russian Federation, East Europe)
- **Growing markets, due to new opportunities** in agriculture following large natural resources (Brazil, Paraguay, Argentina)
- **Growing markets, to increase production** and feed a growing population (China, India, Egypt). Smaller machinery, to limit the population redeployment from the agricultural to the industrial and services sectors.
- **Potential growing markets,** depending on their **political and social stability** (Africa).



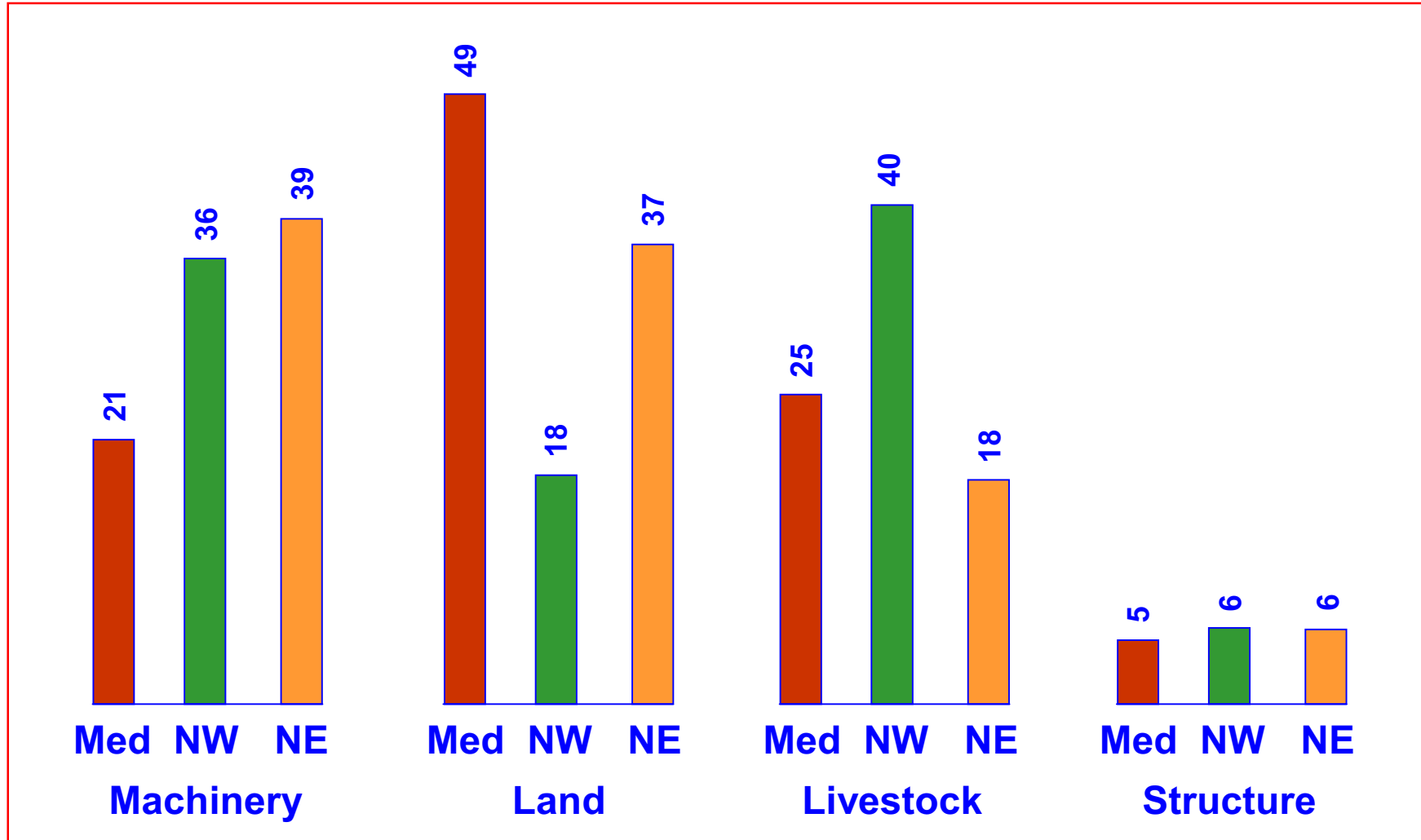
Agricultural machinery industry (1)

- **Most developed geographical areas (USA, EU):**
 - **Manufacturing of tractors and machines with a high and/or very high power and with a high technological level**
 - **Centralized manufacturing with parts coming from any world's region, to lower costs**
 - **Special attention to low emission engines, automated transmissions, electro-hydraulics and ergonomics/safety**
 - **Export and interchange of products**





Share in capital stock (%) in 2002 for each group of countries (Med = Mediterranean co.; NW & NE = North West co. & North East co.)



Source FAO



Agricultural machinery industry (2)

- **Geographical areas with a very high internal demand (China, India):**
 - **Manufacturing of tractors and machines: with low power, strong and reliable, with a basic technology (agriculture and transport)**
 - **Manufacturing of parts to be sold to other international manufacturers**
 - **Export of simple and low cost tractors and machines to developed countries and particularly to less and to the least developed countries (Africa).**
 - **Presence of the big multinational groups, with their own units or associated with local enterprises**



Agricultural machinery industry (3)

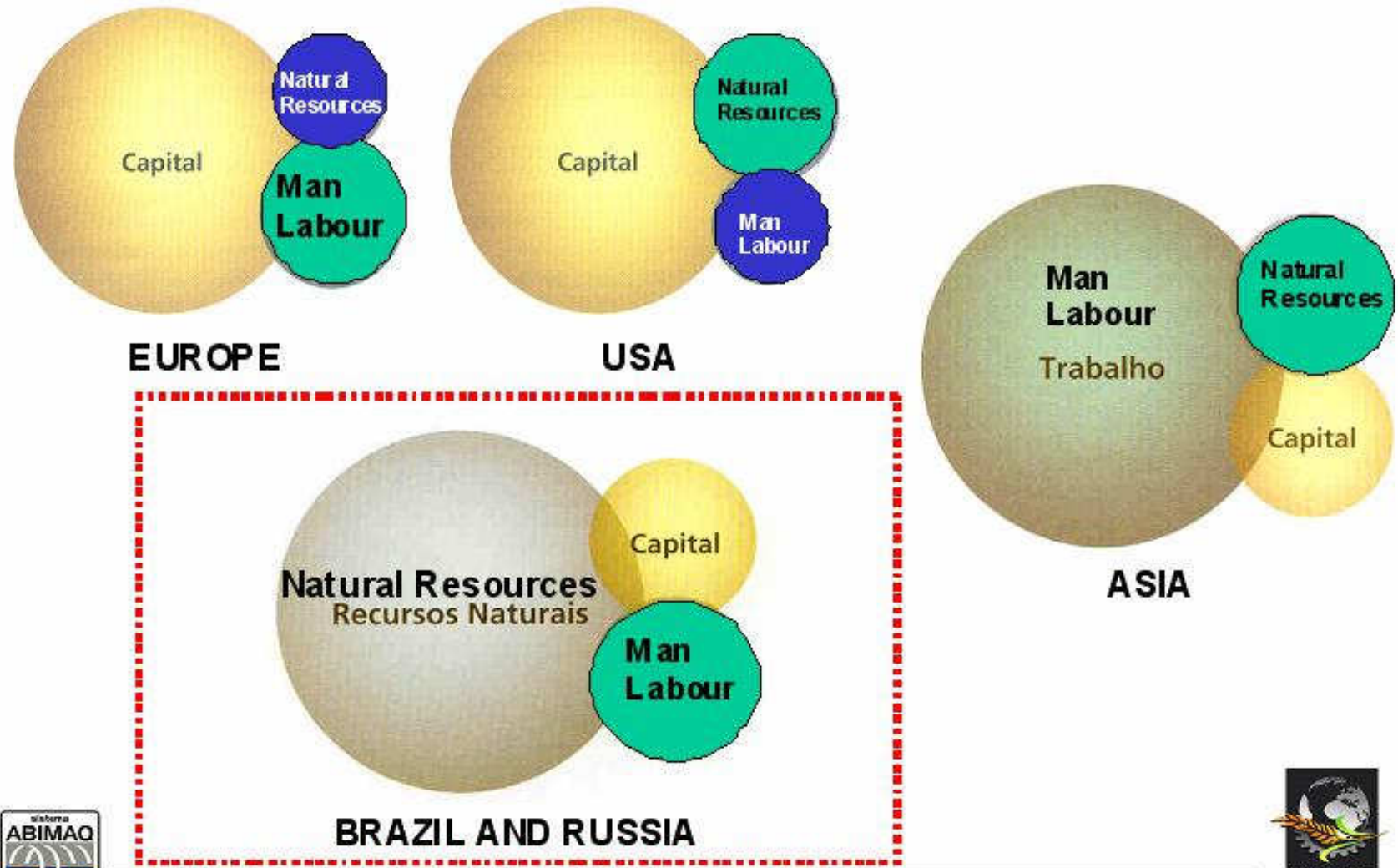
- **Geographical areas with internal demand and out-of-date manufacturing units (Russian Federation)**
 - **Change of manufacturing structures through internal design and/or agreements with multinationals groups**
 - **Tractor and agricultural machinery manufacturing with an intermediate technology and a high working capacity**
 - **Export of tractors and machinery to developed and developing countries**
 - **Necessity to expand both commercial network, customer care and product guarantee**



Agricultural machinery industry (4)

- **Geographical areas with internal demand and a very competitive agriculture (Brazil, Argentina):**
 - **Tractor and agricultural machinery manufacturing, with an intermediate technology and a high working capacity**
 - **Manufacturing of machines for and in charge of the multinationals groups present in the region**
 - **Export of tractors and machines to developed and developing countries, competing for the price**
 - **Manufacturing of machines specialized in direct seeding technology and with high performances (seeding and crop protection machines)**

EX: REGIONS AND DEVELOPMENT STRATEGIES



Source: Mello, Pedro Carvalho de. "Estratégias de desenvolvimento, baseadas em recursos naturais e o papel da BM&F; Resenha nº 167, jan-abr/06"



2008

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Innovation and new technologies

- Agricultural mechanisation problem is solved in case of big extensions (advanced technology)
- **New developments** for biomass harvesting with energy purposes and for industrial vegetable crops
- Set off of the “Precision Agriculture” and of the communication systems between tractors and trailed/PTO driven machines (ISO-Bus)
- **Mechatronics and robotics** are on test for peculiar situations, such as glass houses, with a middle-long term objective



Observations

- Increase of raw material prices (oil, metals) depends on the high rate of development of some developing country (China, India, Brazil)
- This will determine a great pull to energy agriculture, as an alternative to oil use. Biofuels are taking a strategic role in Europe
- It is advisable that the present GMO policies are modified. These policies are justified with a high degree of subsidies, but with international product prices in Europe, the agriculture will be canceled
(e.g. with the use of GMO the cost of weeding and insect control chemicals decreases from 250 to 60 €/ha)



Comments on the world situation

- Previous comments take into consideration the **positions expressed in Agrievolution 2008** and other informations of the up-to-date FAO documents
- They agree with the point of view of the representatives of the **Agricultural Machinery Manufacturers**
- It could be appropriate to know **the thinking of the multinationals managers**, that deal in all the examined countries and that specialize their manufacturing units for the different markets, hoping to know soon their ideas



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