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Instituto de Estudos do Comércio e Negociações Internacionais

A Brazilian Perspective on the EU Transition to More Sustainable Biofuels

Impact of the EU Biofuels Policy on Brazilian Land Use Dynamic and Food Prices

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The Context

- The EU is about to take very important decisions on its biofuels policy
  - Food crops (oilseeds, starch rich and sugar) => conventional, high-ILUC risks
  - Non food crops => advanced, low-ILUC risks
  - What about food crops with low-ILUC risks? Shouldn't their production be stimulated?
- Models have been improving and results are converging
  - Sugarcane ethanol ILUC
    - 1 ha expansion => 0.2 to 0.24 ha ILUC
    - ILUC ha / 1000 liters of ethanol => 0.23 to 0.38
    - ILUC factors: 4 to 13 gCO2/MJ
  - Although there still are major technical issues to be tackled
    - Even with the improvements, are they representing the reality with a minimum level of confidence => ILUC is a reality but it magnitude is still not known

The Context

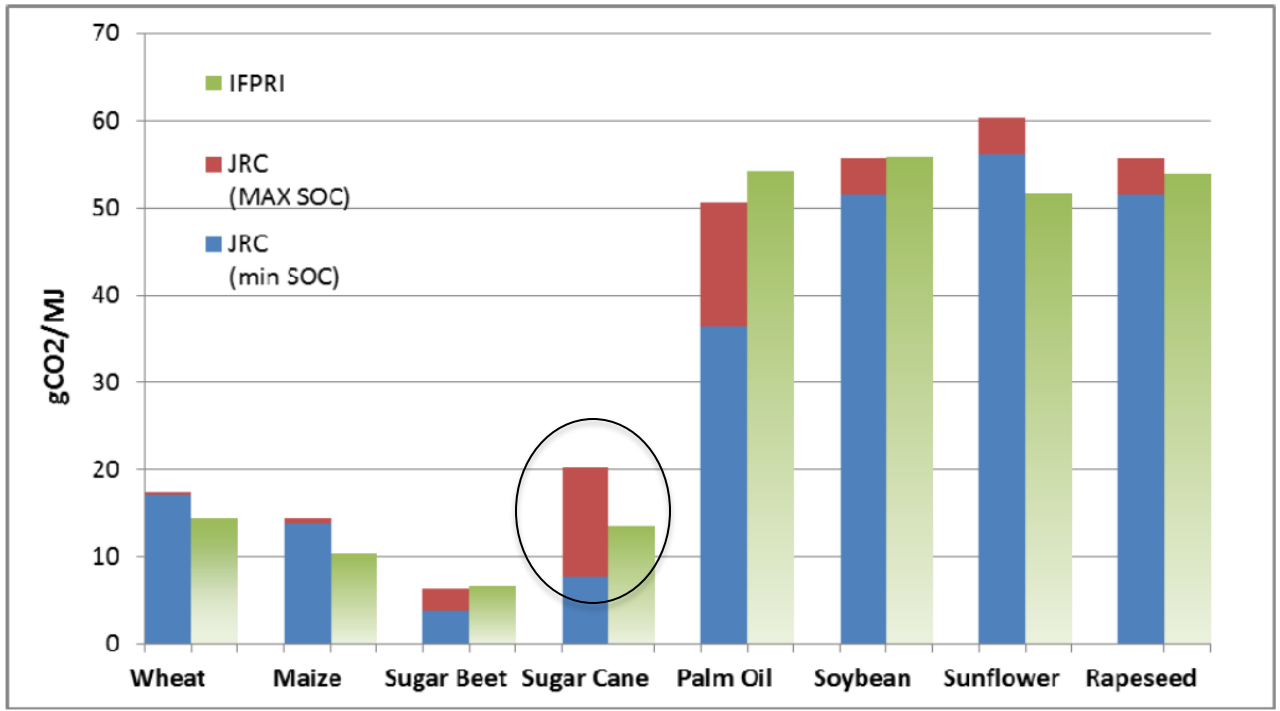


Figure 2: Comparison of total GHG emissions calculated with JRC-SAM and IFPRI methodology for the different feedstocks

Source: Marelli, L.; Ramos, F.; Hiederer, R.; Koeble, R. (2011) Estimate of GHG emissions from global land use change scenarios. JRC Technical Notes. EUR 24817 EN - 2011

- A very conservative approach for some feedstocks was taken

Feedstock'	ILUC emissions gCO2/MJ (IFPRI, 2011)	Direct emissions savings gCO2/MJ
Sugarcane (IFPRI)	13	-70
Sugarcane (JRC)	7.7 – 20.3	-70

Source: Laborde, D. 2011. Assessing the Land Use Change Consequences of European Biofuel Policies: Final Report. ATLASS Consortium.

- EPA: 4.1 gCO2/MJ => sugarcane ethanol is advanced
- CARB: 71% reduction LUC in hectares => 13.3 gCO2/MJ

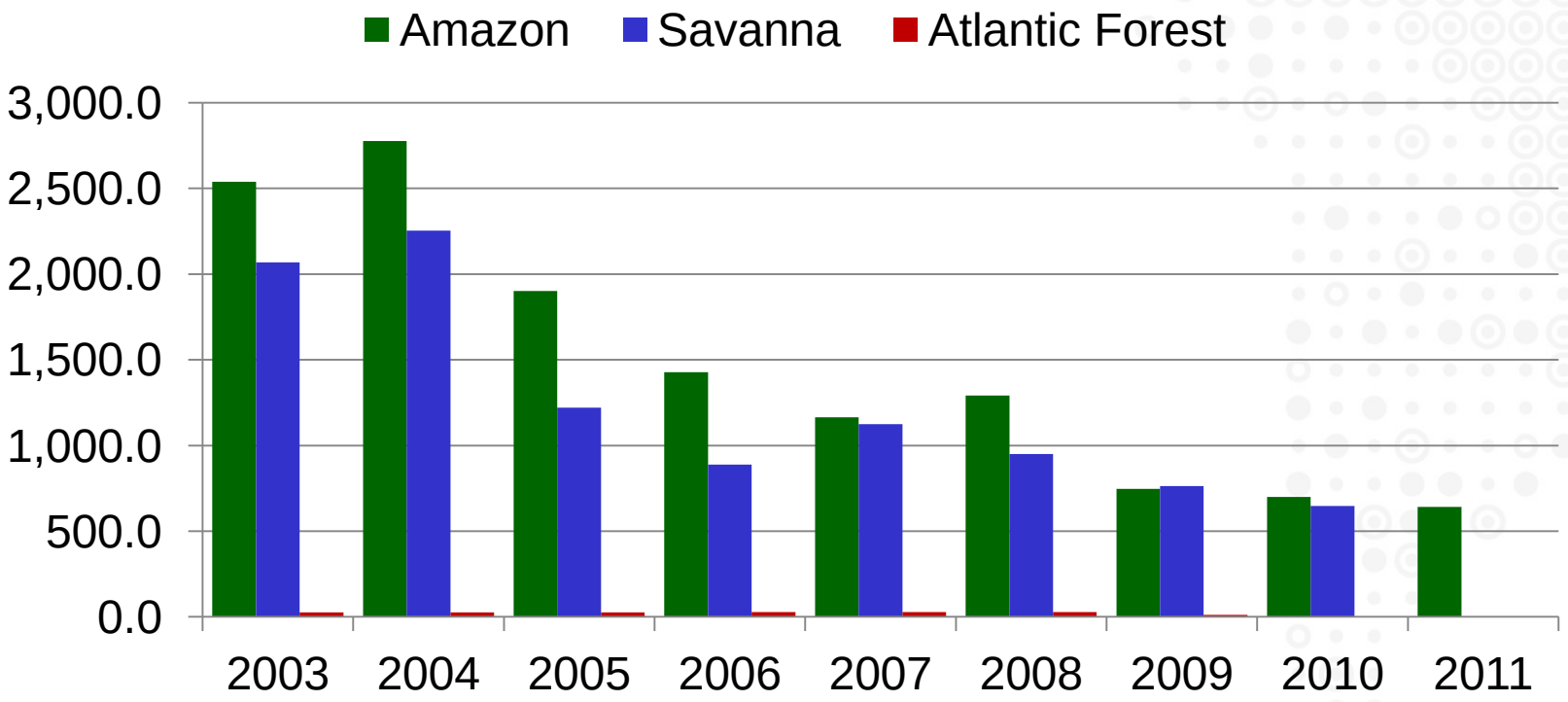
My objective

- Make you understand, based on evidences, that
  - Sugarcane ethanol produced in Brazil is a low-ILUC feedstock, it is energy efficient and it also uses residues
  - Being a food crop as well as a low-ILUC risk crop, there should be an intermediary category between conventional and advanced biofuels
  - Wishful thinking?
- Evidences are based on the following topics
  - Intensification and efficiency gains in the Brazilian agriculture
  - Land use changes caused by the expansion of sugarcane ethanol
  - Integrated production systems
    - With annual crops: area under renovation
    - In the processing: high level of utilization of the sugarcane energy content
  - No impact on food prices
    - Sugar has supported ethanol expansion
    - Cane expansion, for ethanol or for sugar, is competing with low productivity pastures. In sugarcane expansion regions, cattle is facing a cane-induced intensification

Evidence 1. Intensification and efficiency gains in the Brazilian agriculture

- Brazil has a unique combination of:
  - Availability of land for sugarcane not occupied with native vegetation => pastures
  - Large amount of protected native vegetation
  - Agricultural sector with high productivity levels
  - Strong conservation laws based on “control-command” enforcement
- Name a country: I bet you can list other countries with this combination
  - One factor, at least, is always missing

Accumulated Deforestation (1,000 hectares)



Source: LAPIG/UFG, PRODES/INPE, SOS Mata Atlântica, MMA

Evidence 1. Intensification and efficiency gains in the Brazilian agriculture

- The expansion of biofuels in Brazil is not undermining the expansion of food, feed and fiber crops
- Brazilian agriculture is intensifying more and more: productivity of pastures is growing, double cropping systems are expanding and energy yields in sugarcane production is growing => less land extensification
- Sugarcane expansion promotes food production in the areas under renovation
- Yields in new areas are very similar to those in consolidated areas, particularly for annual crops
- Indirect effects caused by the expansion of biofuels in Brazil must occur predominantly within Brazil and the most important effect is the intensification of cattle raising, which minimizes ILUC effects
- Carbon stocks in pasturelands in Brazil are very similar or even lower than in areas under sugarcane cultivation

Why ILUC outside Brazil?

IFPRI model: intensification needs to be improved and no double cropping

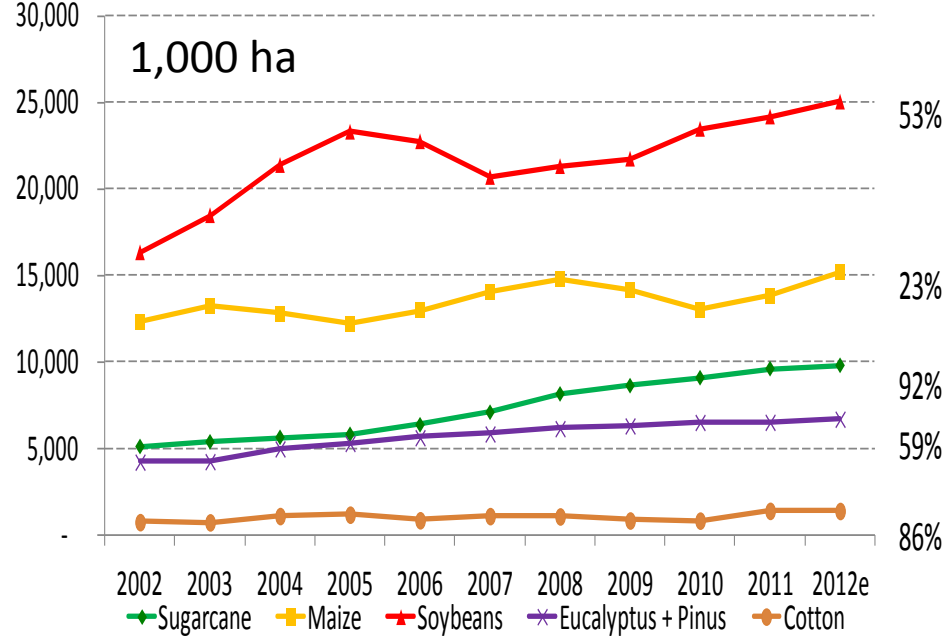
IFPRI model: an avoided ILUC credit must be addressed

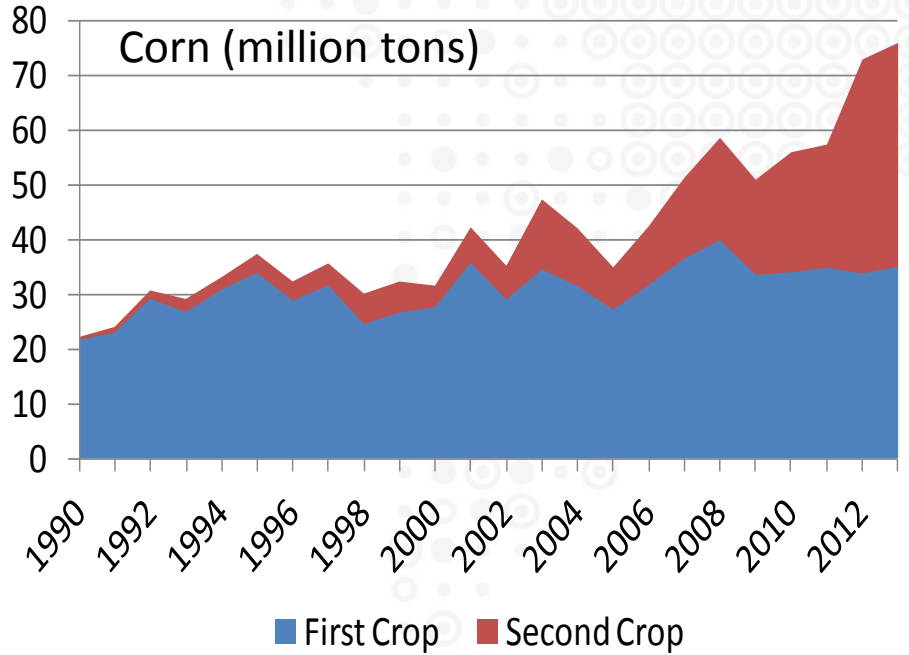
IFPRI model needs improvements

IFPRI model needs improvements

JRC addressed correctly

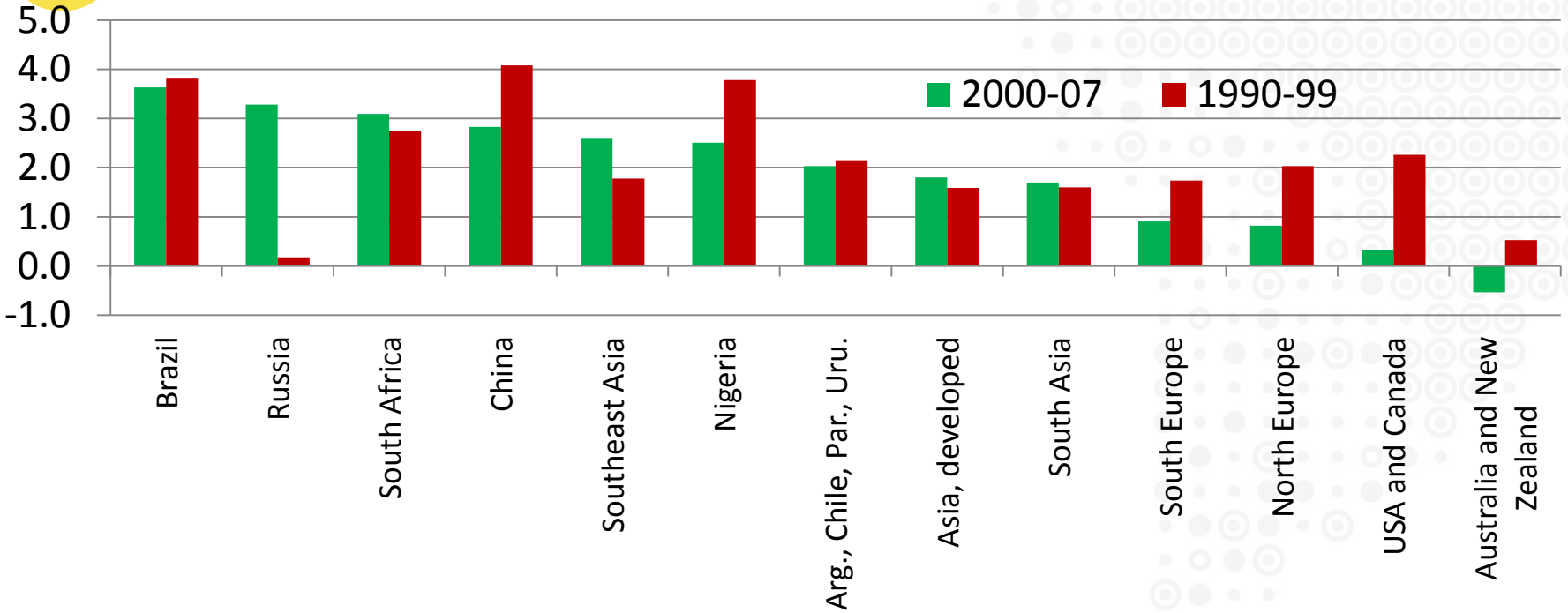
Simultaneous expansion of ethanol and major crops





Sources: CONAB; IBGE; ABRAF; UNICA

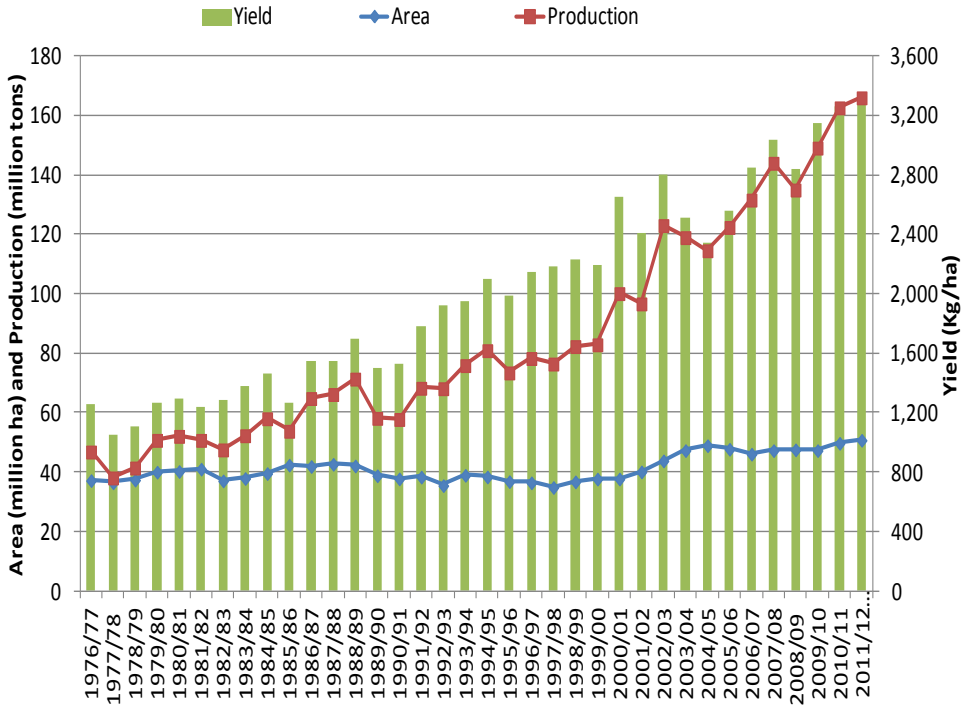
Productivity Growth (TFP)

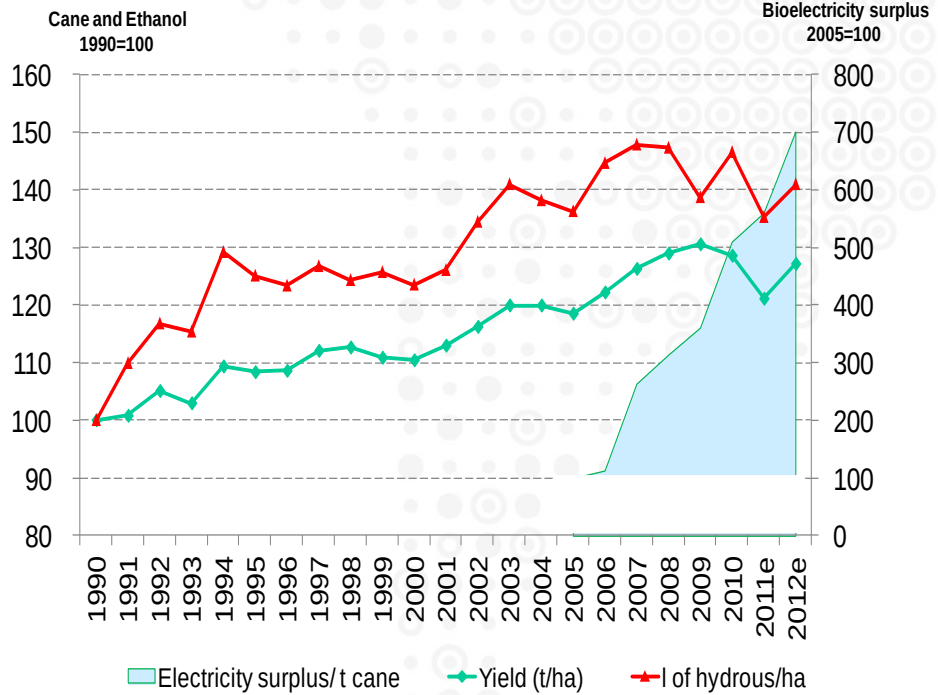


TFP (total factor productivity): represents resources efficiency (labor, capital and land). Higher TFP, higher production efficiency.

Source: Alston, J.M., B.A. Babcock, and P.G. Pardey eds (2010). The Shifting Patterns of Agricultural Productivity Worldwide,.CARD-MATRIC Electronic Book, Center for Agricultural and Rural Development. The Midwest Agribusiness Trade Research and Information Center, Iowa State University, Ames, Iowa,.Available at: www.matric.iastate.du/shifting_patterns

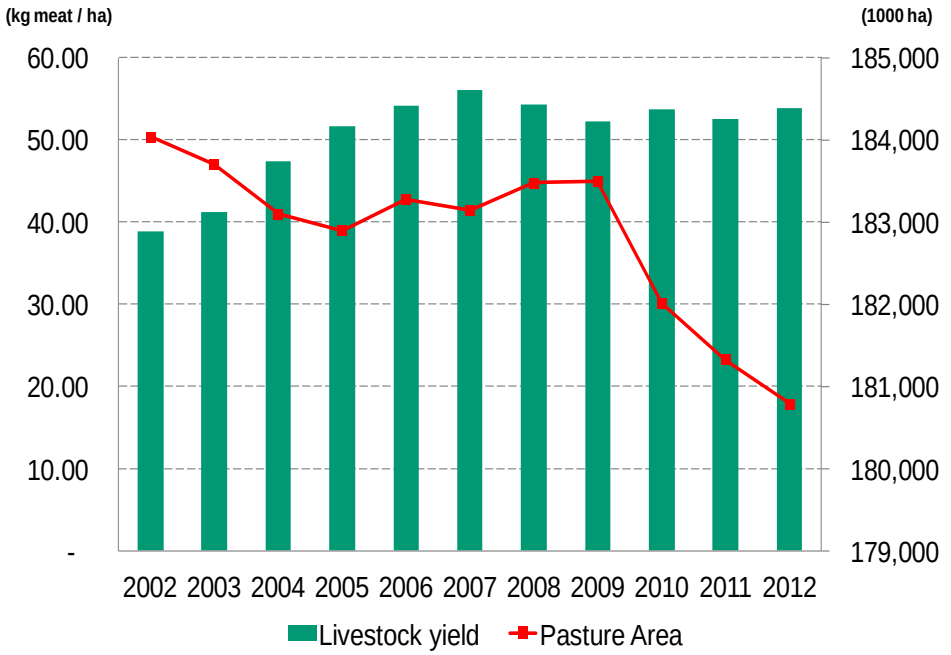
Grains and Sugarcane: Yield Improvement





Sources: CONAB; UNICA; IBGE: ICONE.

Livestock yield and pasture area

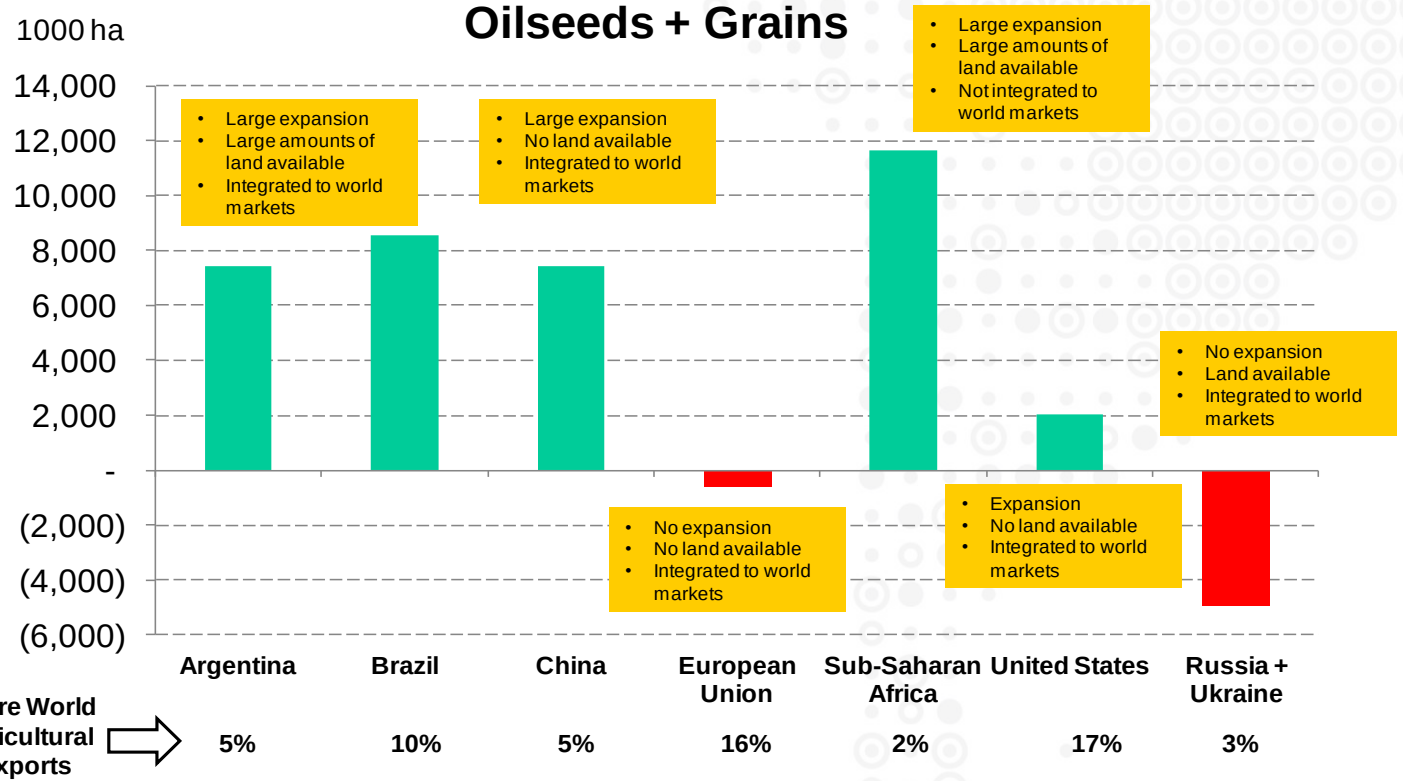


	2002	2012	Variation	CAGR (%)
Pasture area (1000 ha)	184,037	180,785	-3,252	-0.14%
Herd (1000 Head)	185,349	213,239	27,890	0.98%
Meat production (1000 MT)	7,139	9,748	2,609	2.64%
Livestock yield (kg of meat/ha)	39	54	15	2.78%
Milk production (1000 liters)	24,172	33,996	9.824	3.6%
Milk production per cow (liters/cow)	1,286	1,479	193	1.4%

Sources: IBGE, UFMG, INPE, BIGMA Consulting, ICONE

Indirect effects caused by the expansion of biofuels in Brazil should occur predominantly within Brazil

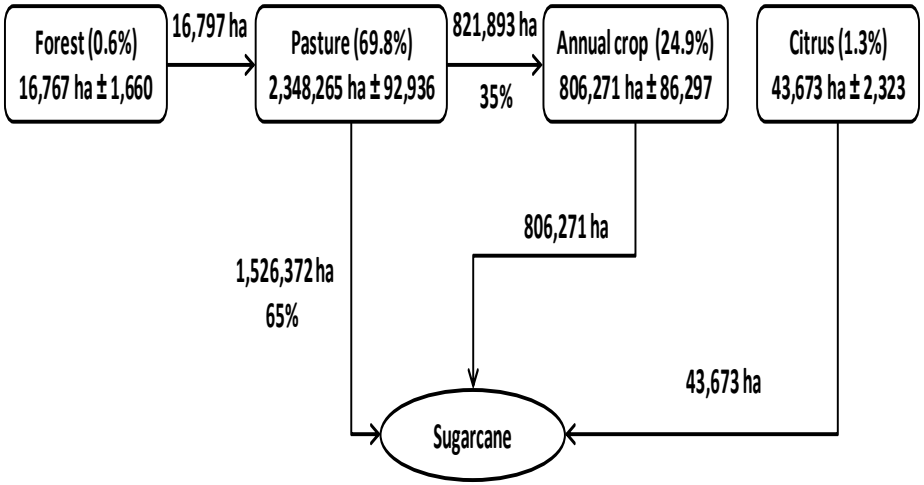
Harvested Area: Absolute Variation from 2004-06 to 2010-12



Source: USDA – PSD; WITS/COMTRADE.

Evidence 2. Direct Land Use Change: induces pasture intensification and increases food production

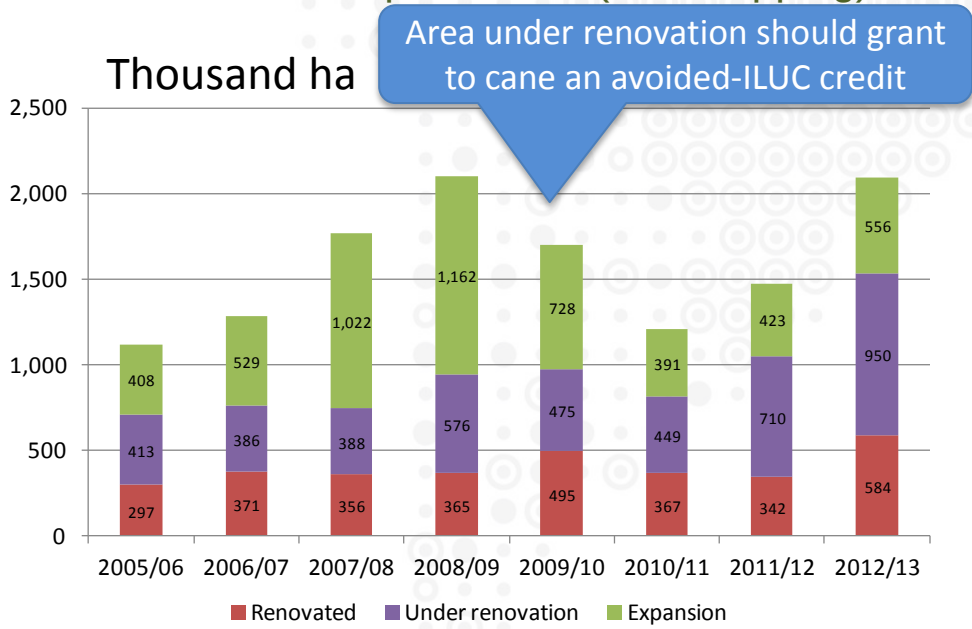
- Regardless the land availability, sugarcane expansion dynamic has been pasture-based



Expansion (2005-09): 3.2 million ha

Source: Adami, M.; Rudorff, B. F. T.; Freitas, R. M.; Aguiar, D. A.; Sugawara, L. M.; Mello, M. P. (2012). Remote Sensing Time Series to Evaluate Direct Land Use Change of Recent Expanded Sugarcane Crop in Brazil. Sustainability 2012, 4, 574-585 (doi:10.3390/su4040574).

- Each hectare of cane can bring together 1/6 hectare of food production (intercropping)



Source: Canasata/INPE

Evidence 3. Cane ethanol: no competition with food, either sugar or other crops

Argument on sugar:

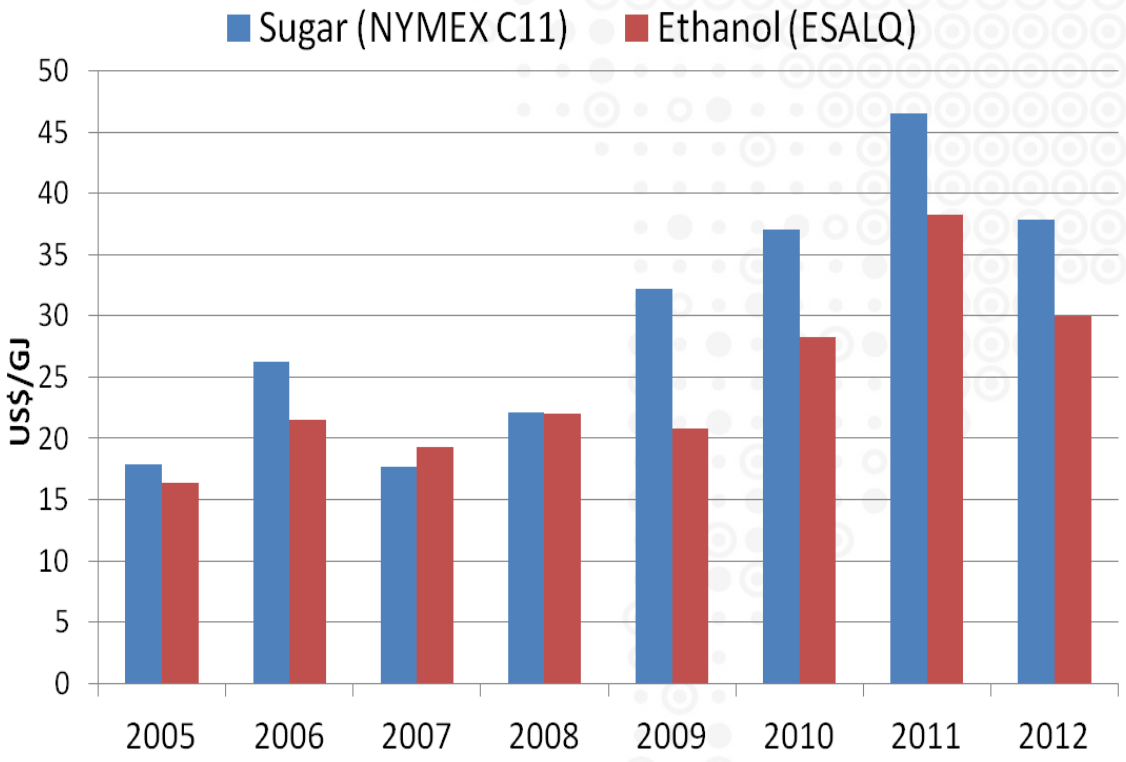
- Sugar market has supported ethanol expansion in Brazil
- Without sugar, ethanol would not be produced competitively
- If the supply of sugarcane is short, adjustments in the demand occur in the ethanol market rather than in the sugar market
- Sugar and ethanol share industrial and logistics costs: cane transportation, crushing and juice treatment and concentration
- Synergies, such as the cogeneration system: due to the large capacity on sugarcane crushing, boilers also need to have large capacity to process the bagasse

Argument on no land competition:

- Expansion over pastures, pastures is intensifying
- Cane area under renovation

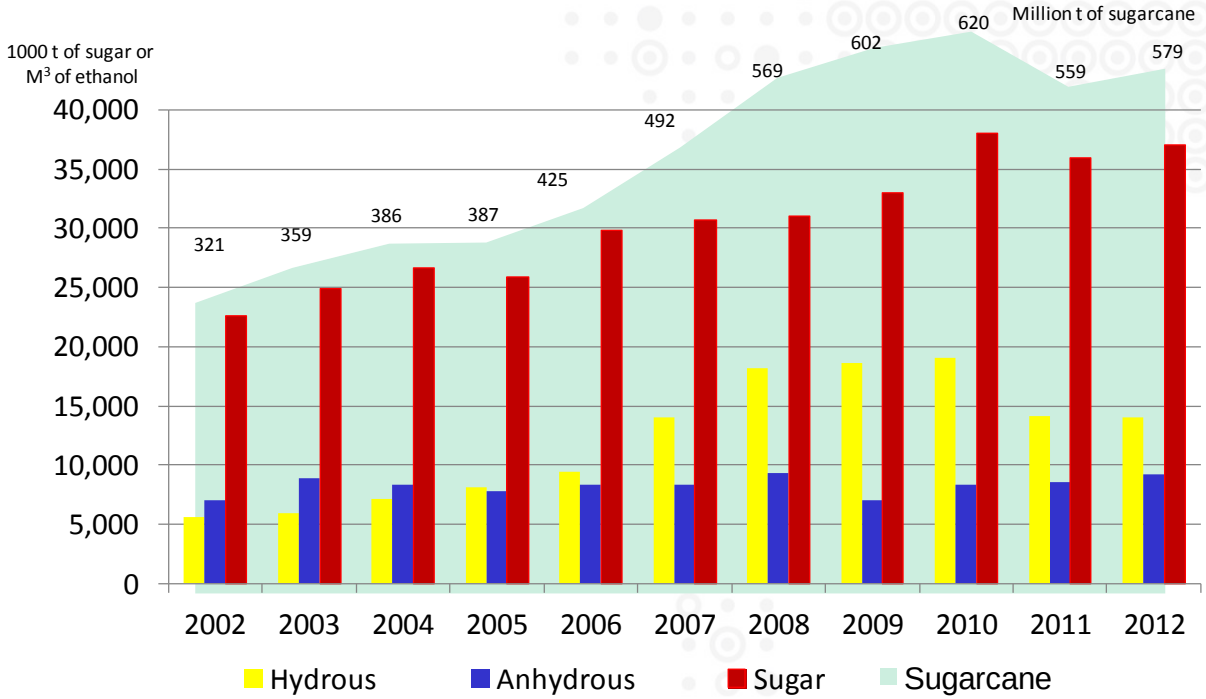
Evidence 3. Cane ethanol: no competition with food, either sugar or other crops

- Sugar prices have been higher than ethanol prices
- Sugar has been more profitable than ethanol
- Sugar prices were lower than ethanol only when sugar world market had a surplus

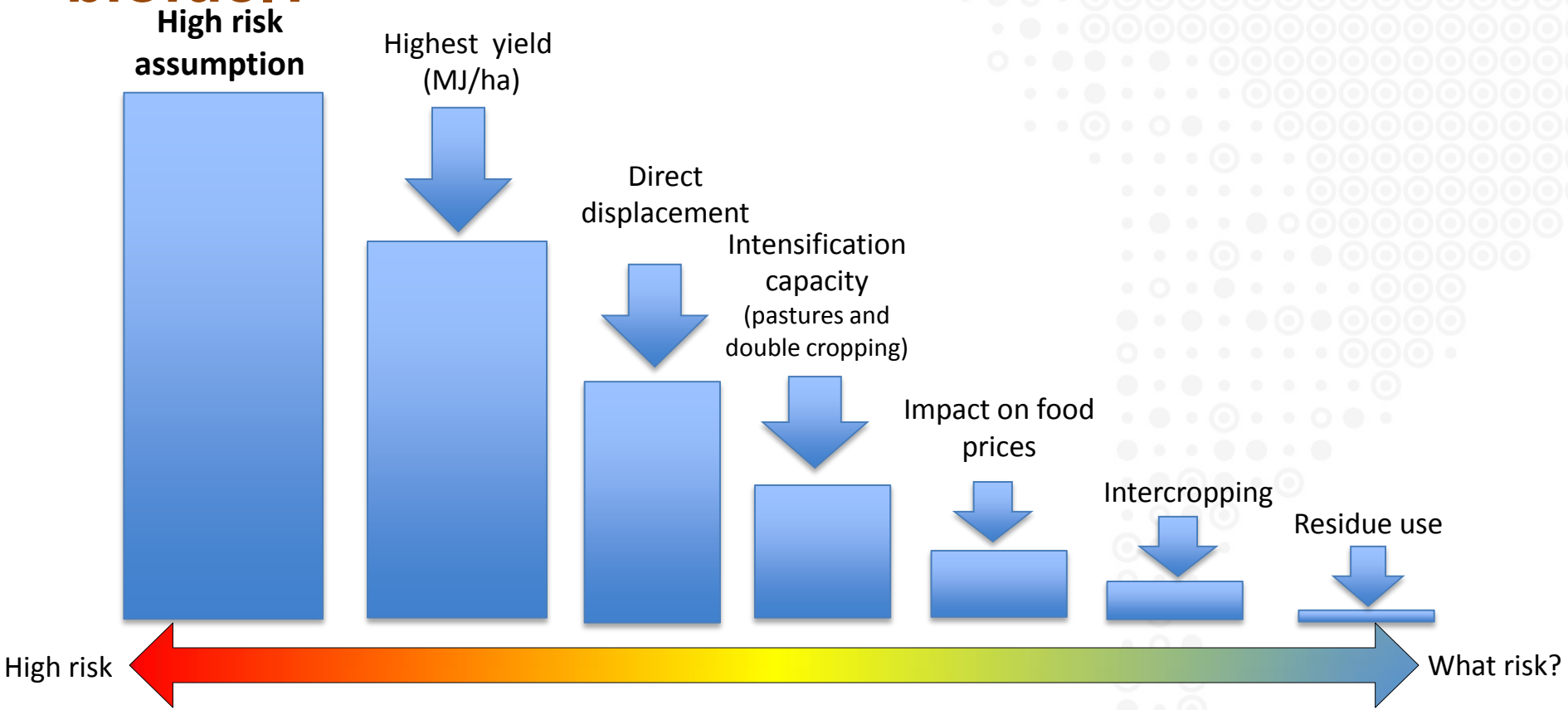


Evidence 3. Cane ethanol: no competition with food, either sugar or other crops

- If the market is short in sugarcane, adjustments take place in the ethanol demand
- Hydrous demand drops
- If cane is expanding, ethanol supply grow without jeopardizing sugar production



Conclusion: why cane ethanol is a low-ILUC biofuel?



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Thank you

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