

# *FAO Joint Meeting of the Intergovernmental Groups on Oilseeds, Oils and Fats, Grains and Rice*

*Santiago de Chile, November 2009*

## ***Some views on biofuels production and feedstock demand***

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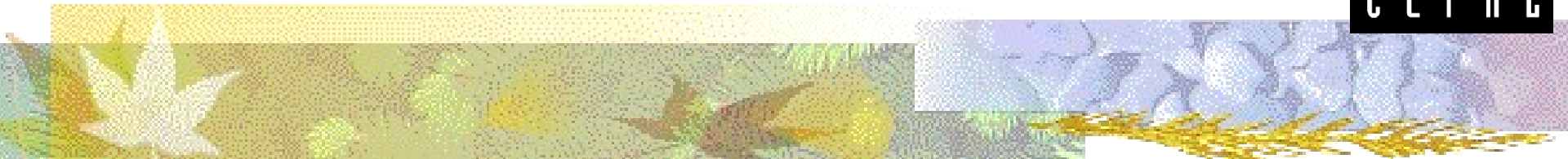
***Natural Resources and Infrastructure Division***

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# *From the beginning:*

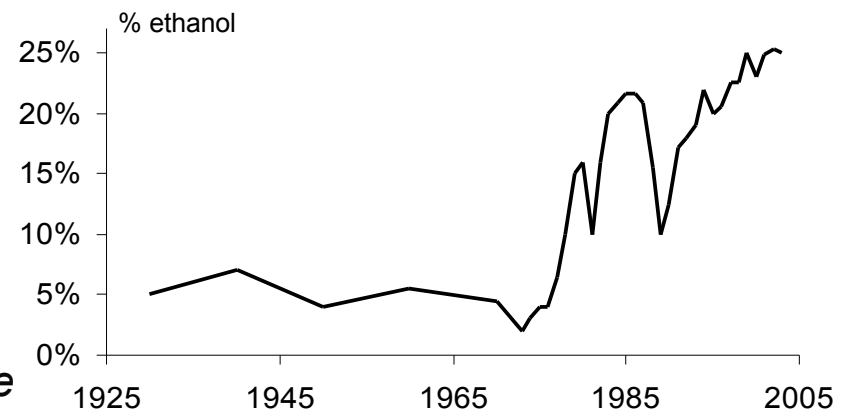
*Biofuel (as ethanol) as motor fuel is older as the automotive industry.*



*Henry Ford, pure ethanol car (1896)*

*Since 1931 Brazilian cars use regularly gasohol blends.*

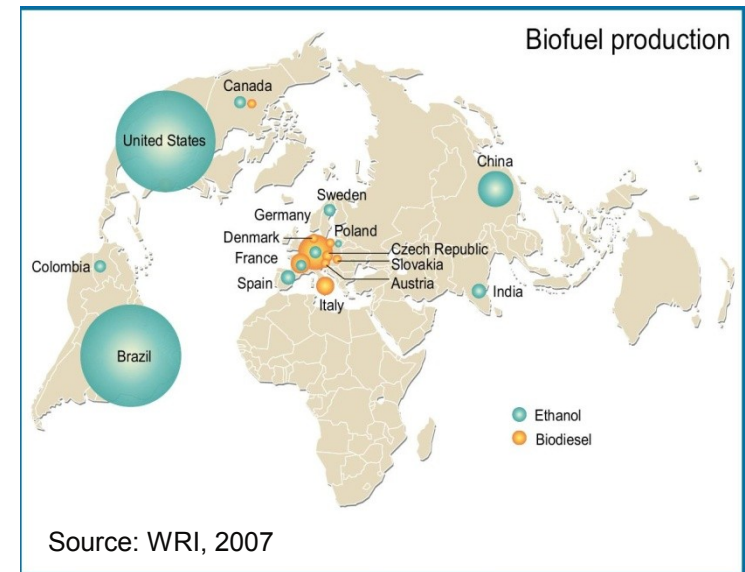
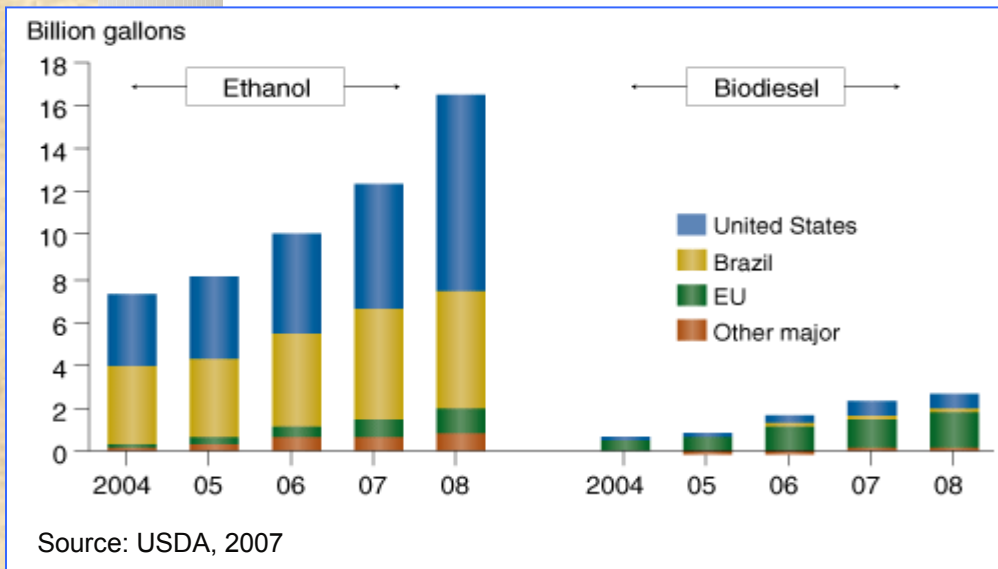
*Ethanol content in the Brazilian gasoline*



# Relevant facts:

## 1. Biofuels production have been increasing

Biofuels (bioethanol and biodiesel) is becoming more and more adopted in many countries, due to several reasons, such as energy security, local and global environmental benefits, rural economy activation. The biofuels technology is open and available.





## *Relevant facts:*

### 2. Biofuels production will increase

Global energy demand should expand in the next years, mainly in developing countries, for transportation and electricity generation.

Oil production, source of 98% of fuels used in the transport sector, seems at a threshold, is stabilized in about 86 Mb/d.

According to the IEA World Energy Outlook 2008, some 30 Mb/d of additional gross capacity – *the equivalent of almost three times that Saudi Arabia today* – needs to be brought on stream until 2015.

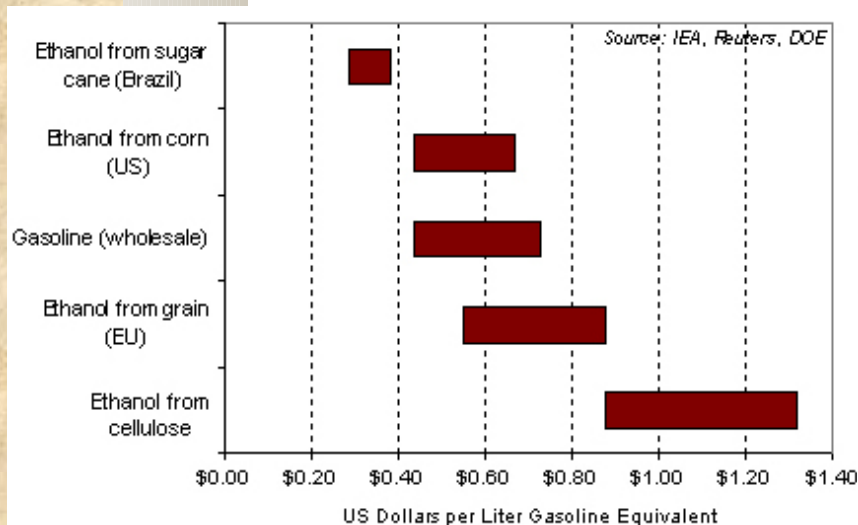
Besides biofuels (which use basically the same conventional engines and logistics), all other options are not enough developed yet, including the so called “second generation biofuels”. IEA forecasts that biofuels production will grow 6.8% annually until 2030.



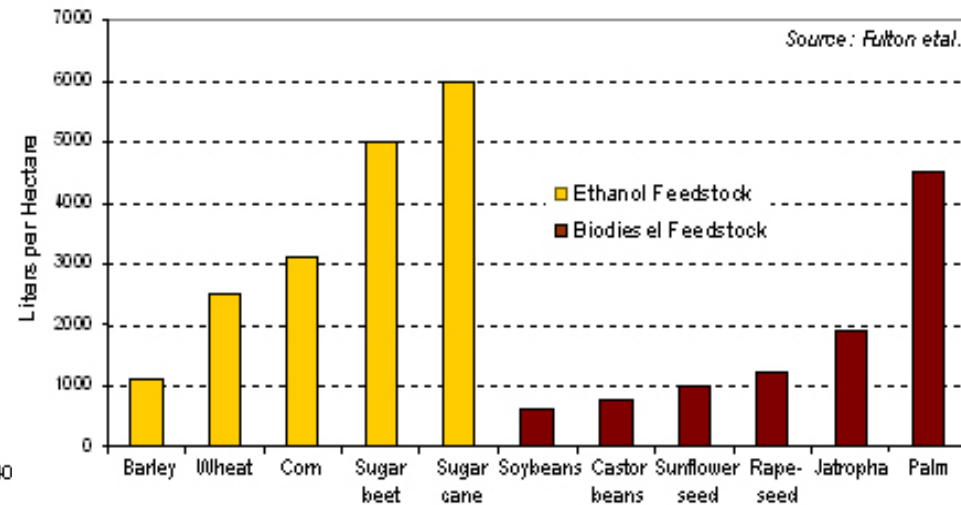
## Relevant facts:

### 3. Biofuels impacts and benefits depend basically on the feedstock

Essential parameters of biofuel sustainability, such as: cost, yield, energy net output (energy balance) and GHG mitigation effect depend directly of feedstock.



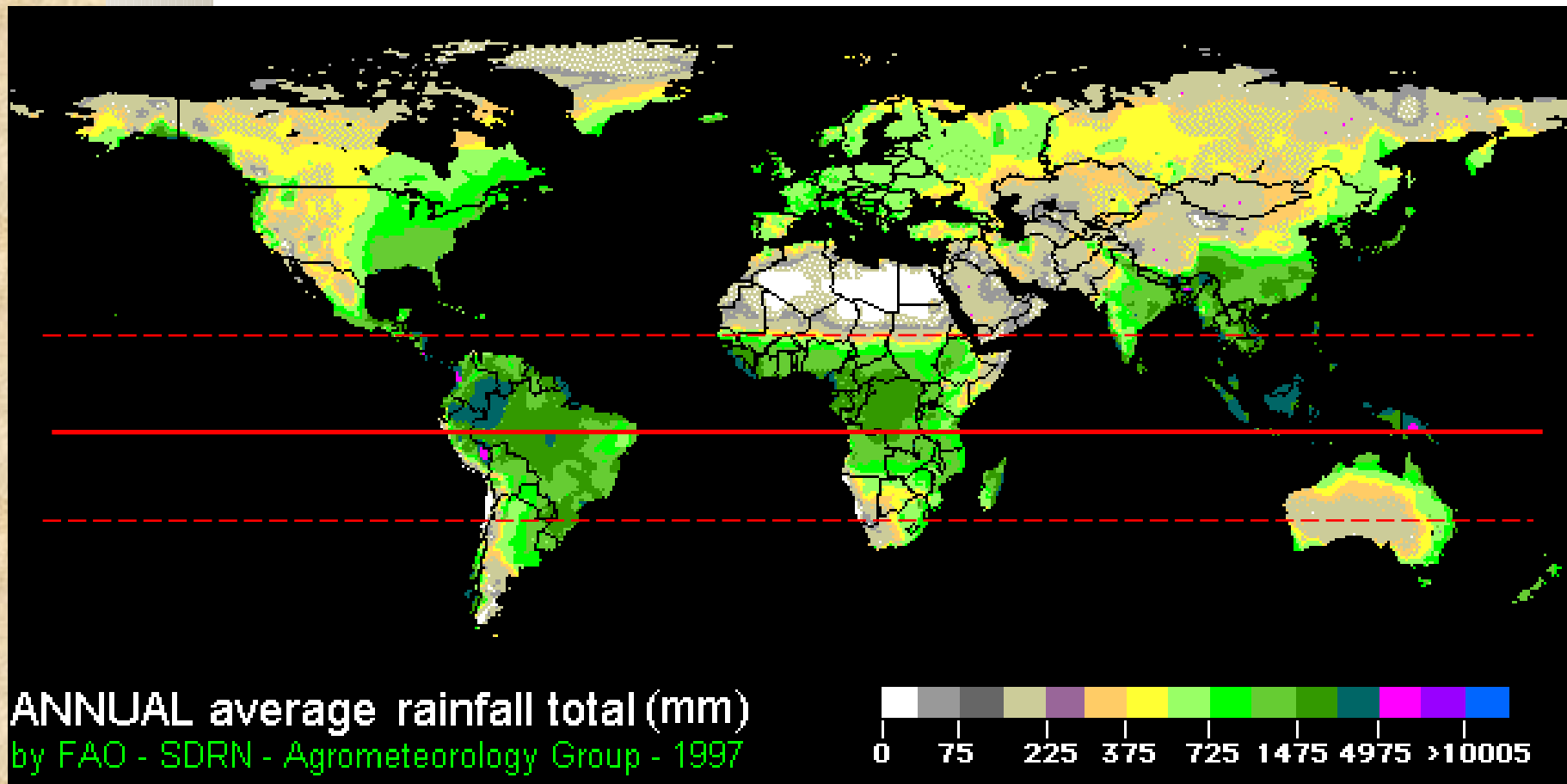
Cost



Yield

## Biofuels are liquid solar energy

For a sustainable biofuel production, is fundamental to have proper climate conditions (temperature, solar radiation, water availability), as well as good soil and topography.

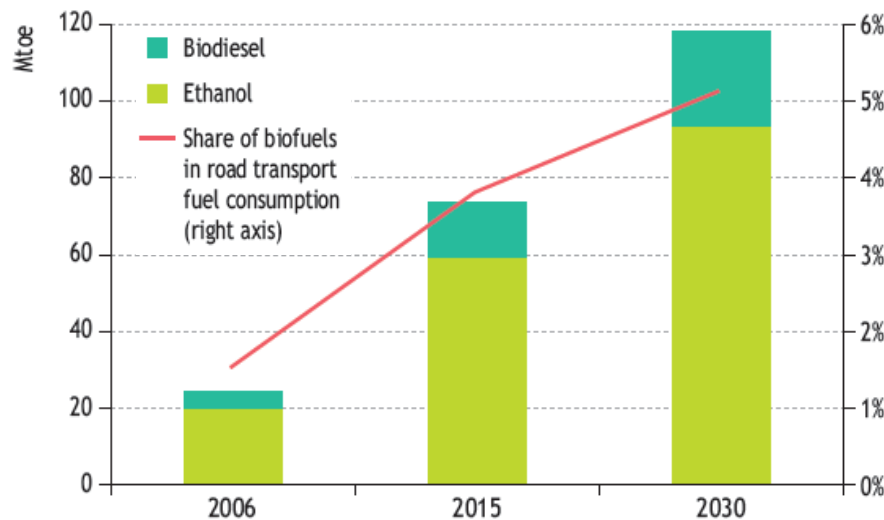


# Consequences:

## Biofuels impacts will depend how biofuels will be produced

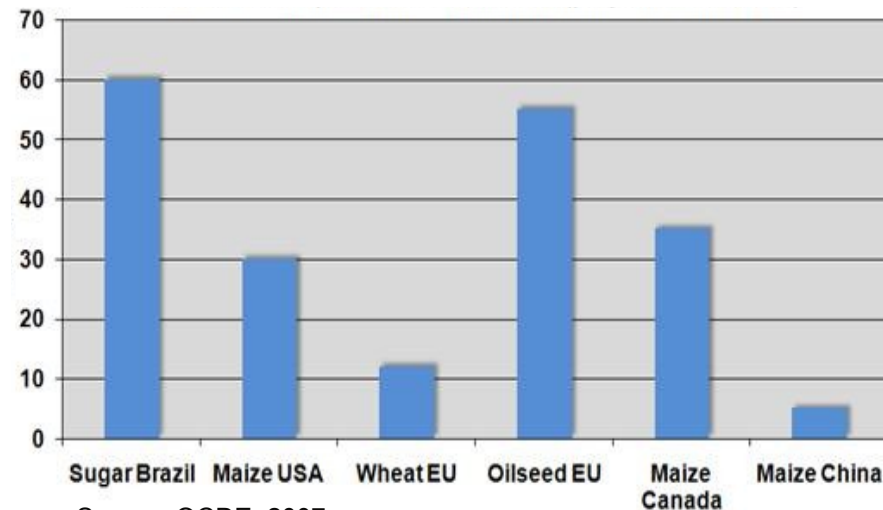
The same amount of energy can be produced using different technologies and with impacts on natural resources very unlikely.

Forecast of biofuel production



Source: IEA, 2009

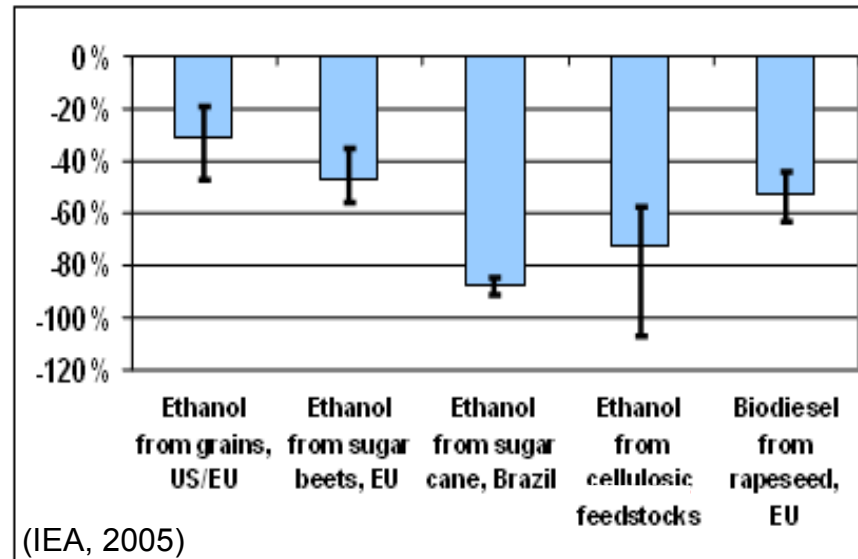
Feedstock requirements for biofuels as % of output (projection for 2016)



Source: OCDE, 2007

# Consequences:

## Biofuels can make sense, not necessarily



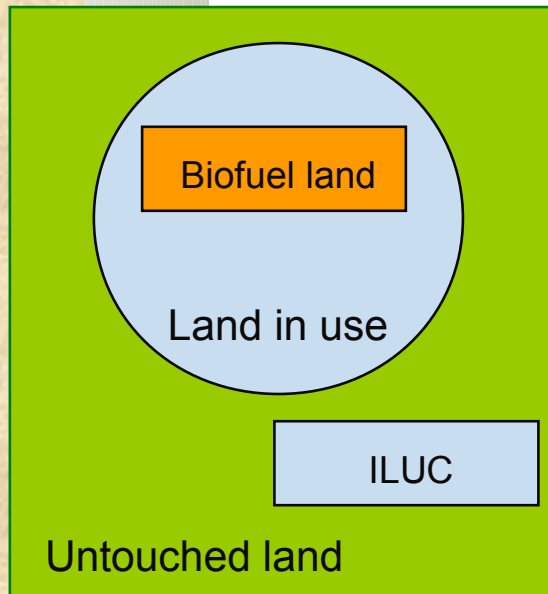
Relative reduction of GHG emission for biofuels

Biofuels is a rational option just when produced efficiently. Up to now, in some cases, unfair trade barriers have been promoting inefficient biofuels production, with limited domestic advantage and undesirable impacts on commodities market and environment.

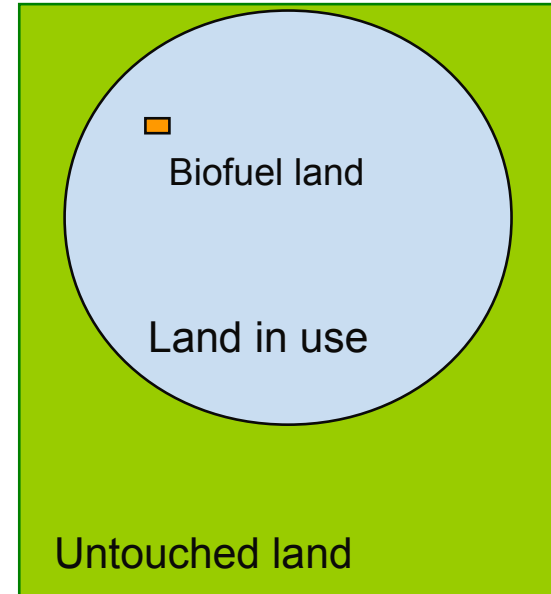


## *Additional points:*

### *Land use impact (ILUC, Indirect Land Use)*



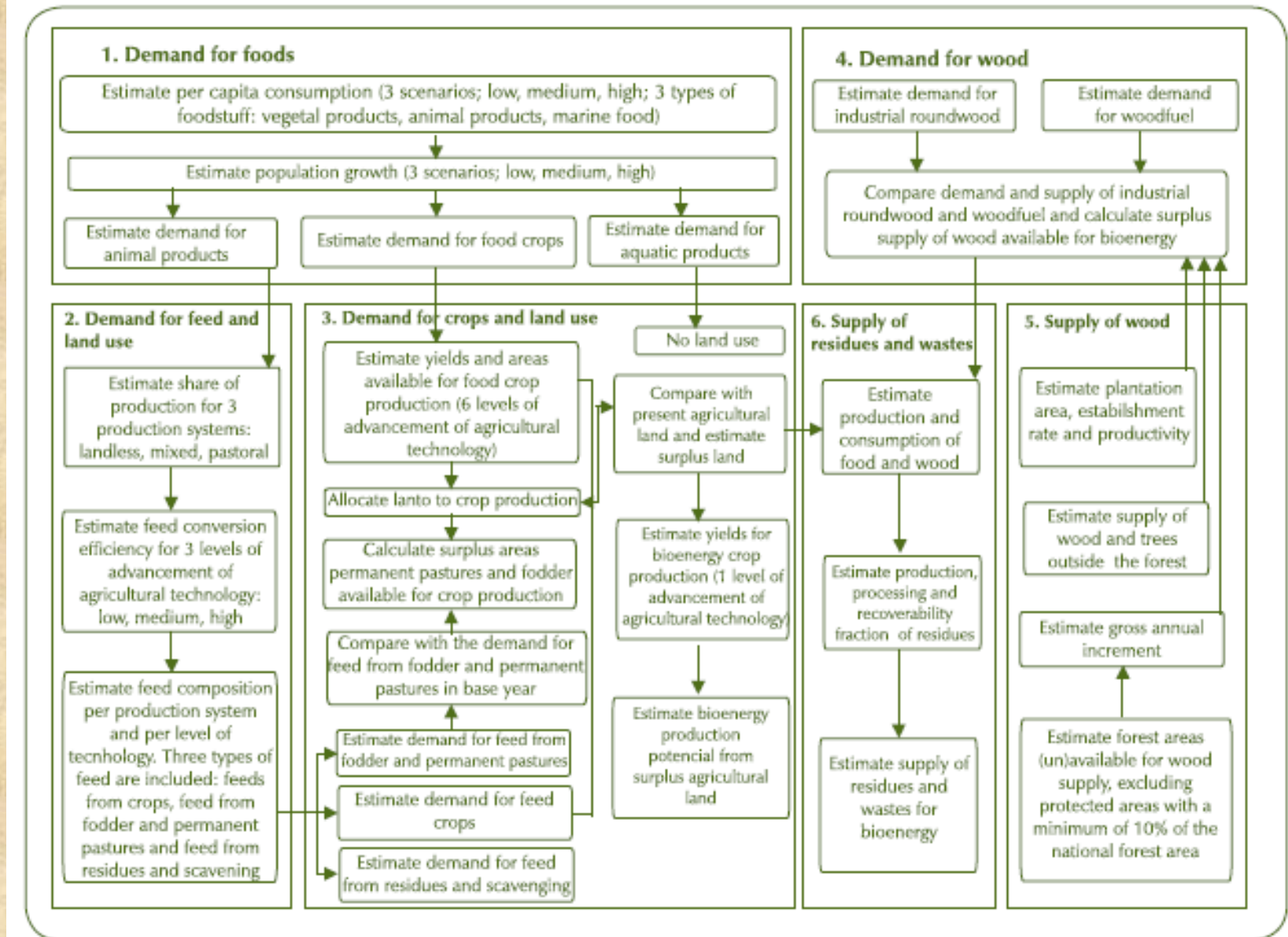
"Ceteris Paribus" model



"More close to reality" model

Biofuels actual impact on land use depends directly on yield, deforestation are mostly related to expansion production of beef production. The increasing demand of animal protein demands grains the are occupying important tracts of land.

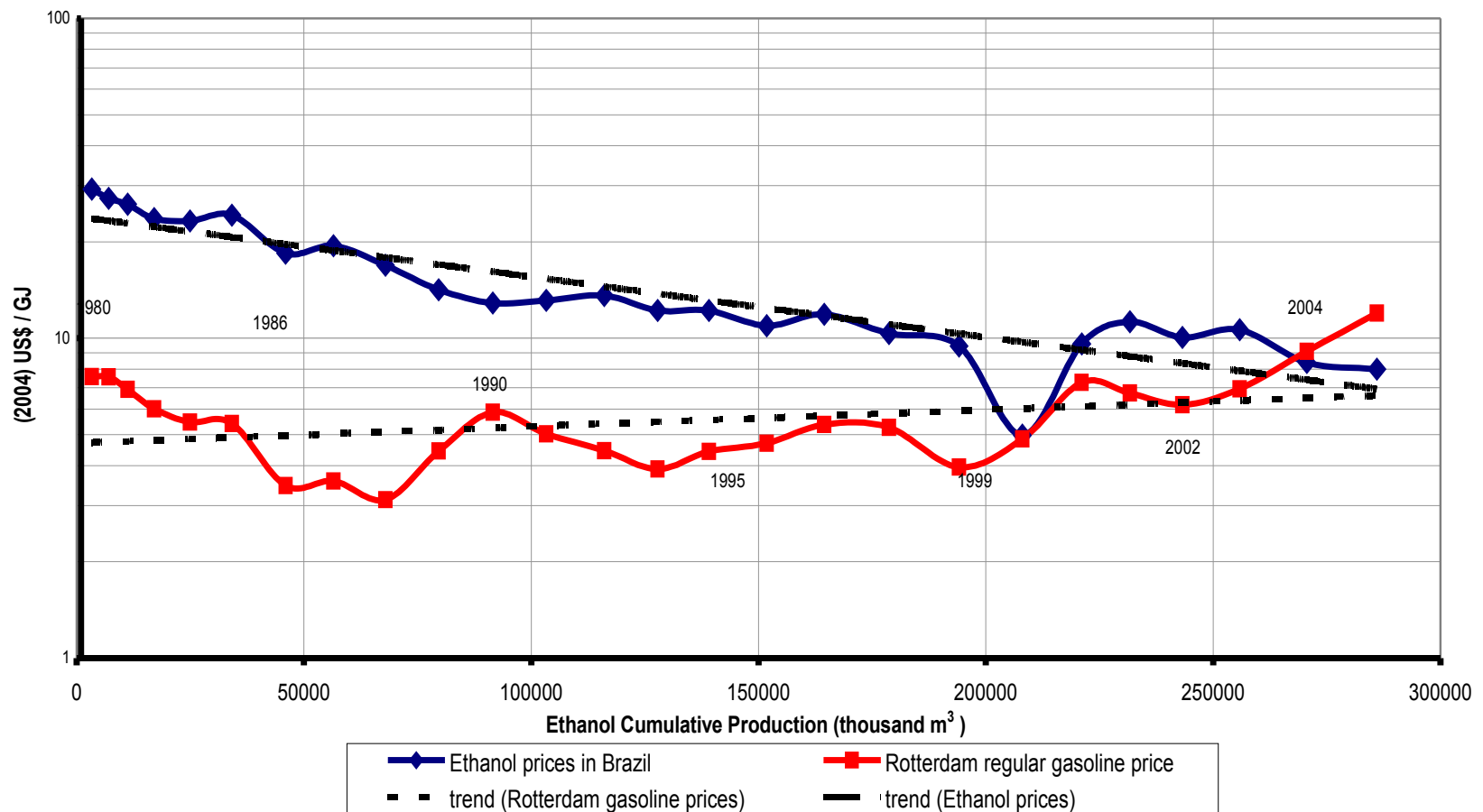
Complex models are required to evaluate the real impact of biofuel production.



# The ethanol perspective

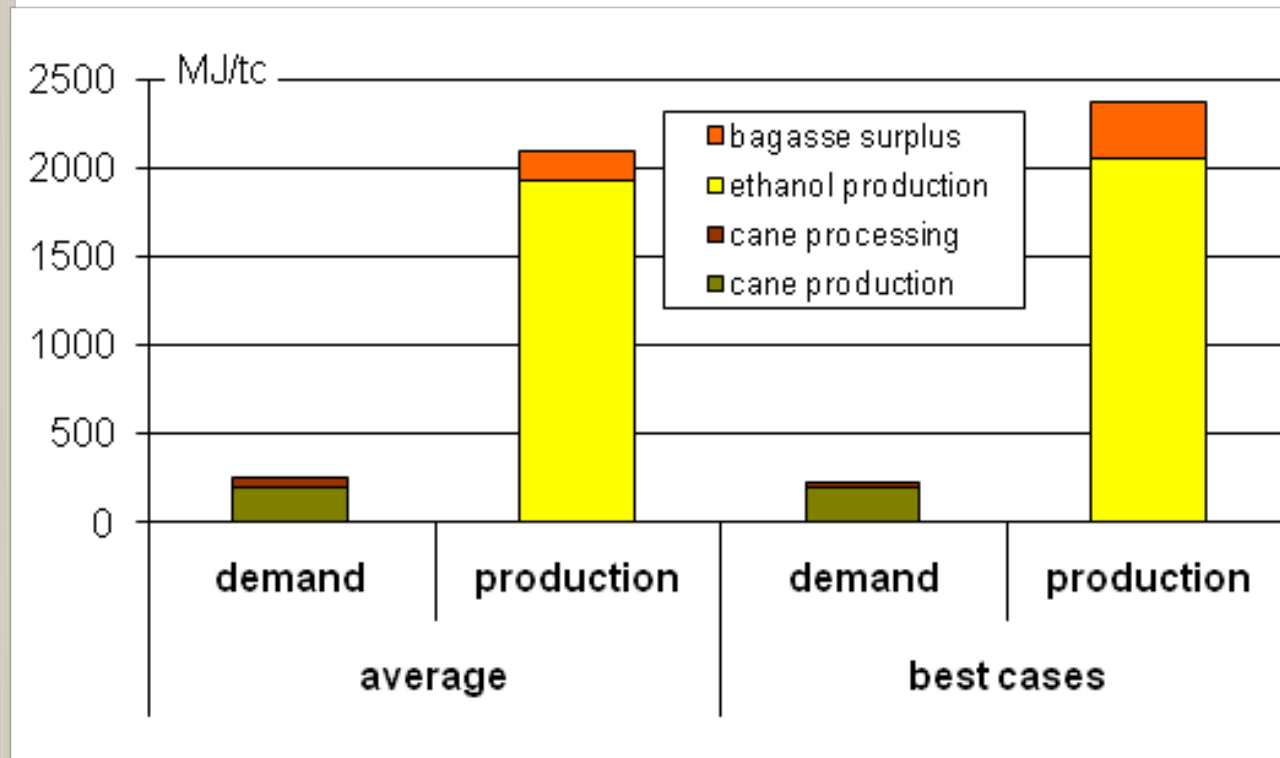
Ethanol cost learning curve or:

- how ethanol became cheaper than gasoline...



# The ethanol perspective

*It is crucial for the ethanol sustainability the demand of natural resources, as energy and water...*



***Energy balance of ethanol production in Brazil,  
Center/South region***





# ***Prospects for ethanol in Latin America***

***Evaluating ethanol from sugarcane production in 23 countries Latin-American (excluding Brazil), just taking into account the available exhausted molasses from sugar mills will be possible to reach 22% of ethanol required to make E10.***

***In another scenario, assuming autonomous distilleries, processing straight cane juice to ethanol, will be necessary to grow cane in about 1.14 million ha (4% of available agricultural area) in those countries to reach E10 demand.***

***The potential ethanol production in this case is equivalent to 65.4 million barrels of oil every year, representing imported fuel savings of about US\$ 4,600 million per year.***



## *The biodiesel perspective*

### ***Oil bearing plants with potential for biodiesel***

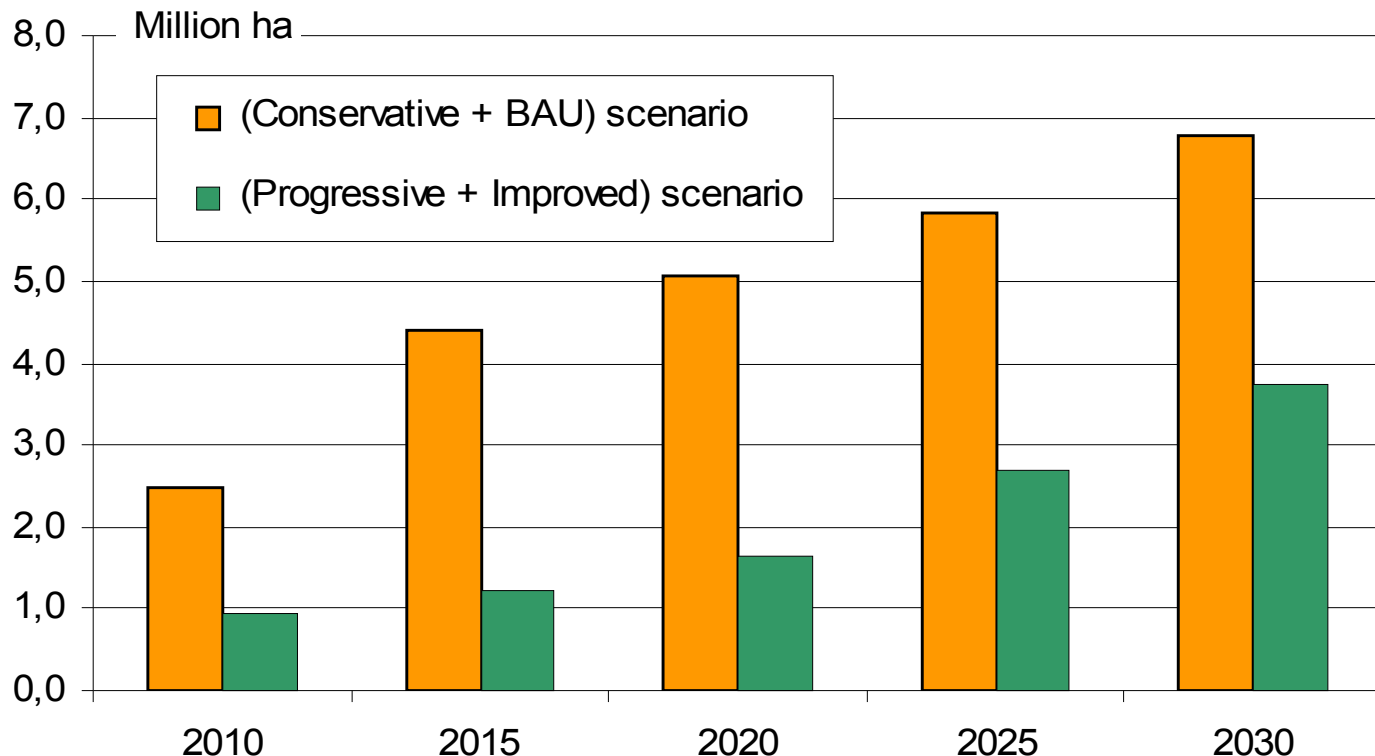
Specie	Oil bearing part	Oil content (%)	Months of harvest	Oil yield (t/ha)
Palm ( <i>Elaeis guineensis</i> N.)	fruit	26	12	3,0-6,0
Babassu ( <i>Attalea speciosa</i> M.)	almond	66	12	0,4-0,8
Sunflower ( <i>Helianthus annus</i> )	Seed	38-48	3	0,5-1,5
Rapessed ( <i>Brassica campestris</i> )	Seed	40-48	3	0,5-0,9
Castor ( <i>Ricinus communis</i> )	Seed	43-45	3	0,5-1,0
Peanut ( <i>Arachis hipogaea</i> )	Seed	40-50	3	0,6-0,8
Soybean ( <i>Glycine max</i> )	Seed	17	3	0,2-0,6

*The importance of by-products and energy balance*

*The potential of tropical palm trees*

# *The biodiesel perspective*

## *Potential demand of land for biodiesel in Brazil*



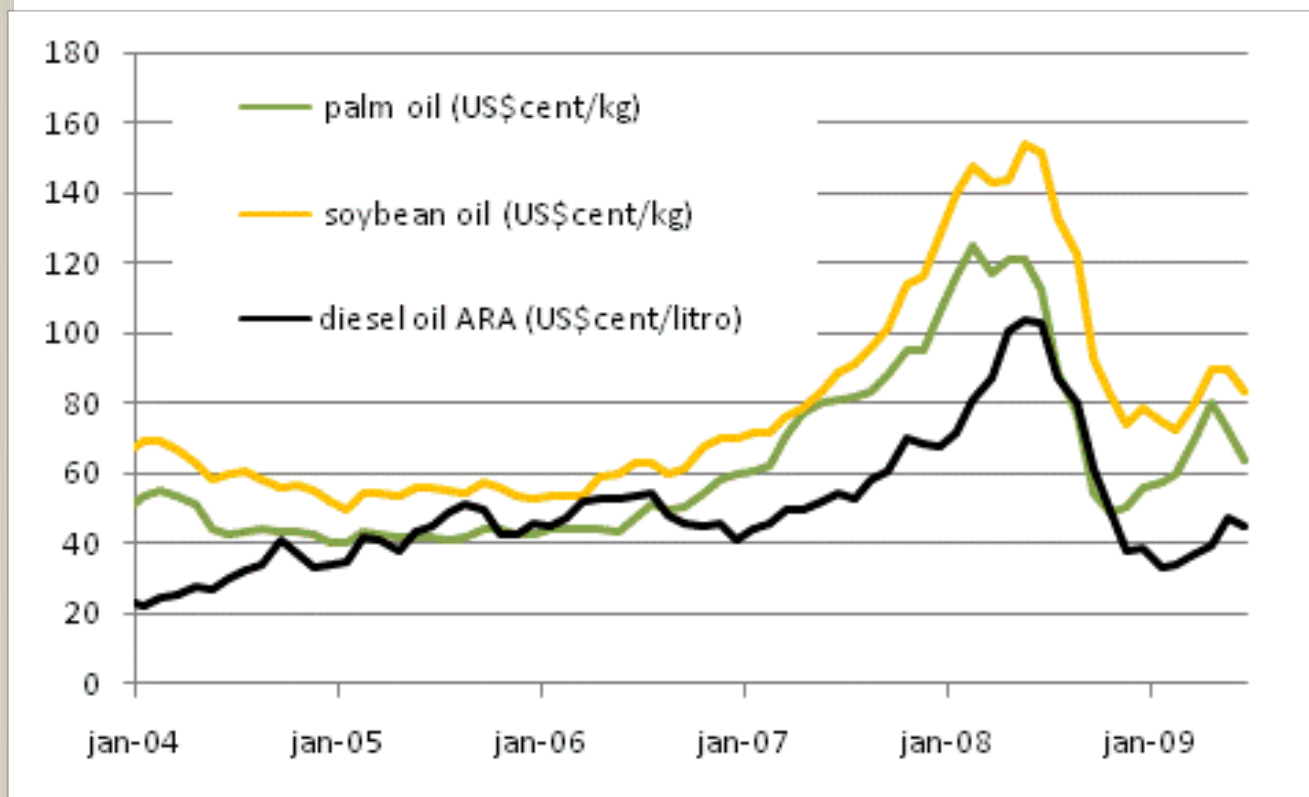
Area required for biodiesel production in Brazil (CCAP, 2008)

(Conservative+BAU): low demand (B5), mainly soybean biodiesel

(Progressive+Improved): high demand (B12), mainly palm oil biodiesel

# *The biodiesel perspective*

## *Economic competitiveness of biodiesel*





## ***Some points to remember:***

- ✓ *Ethanol from sugarcane and ethanol from grains are different animals.*
- ✓ *Ethanol and biodiesel are even more different animals.*
- ✓ *Feedstock selection is decisive on final results.*
- ✓ *Efficiency in production is crucial on biofuels sustainability.*



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