

Conference on

Biofuels: an option for a less carbon-intensive economy

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Brazilian Experience on Biofuels
Perspectives for CDM Projects

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The views expressed are those of the author and do not necessarily reflect the views of UNCTAD

**United Nations Conference on Trade and Development (UNCTAD) and
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Brazil (EPE)**

**Conference on "Biofuels: an option for a less carbon-intensive
economy"**

Brazilian Experience on Biofuels Perspectives for CDM Projects

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10 Existing Myths about Brazilian Ethanol (?)

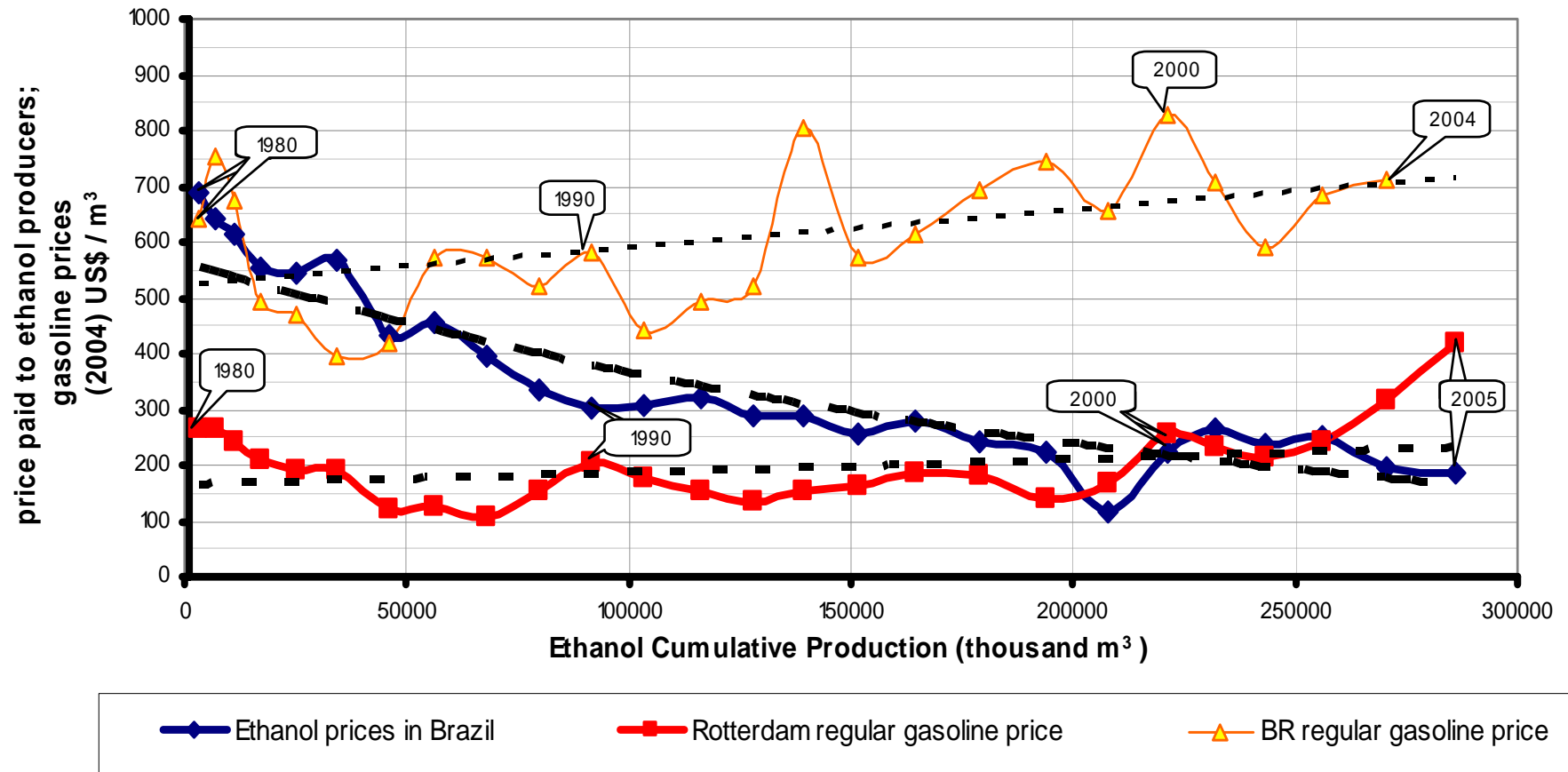
1. Brazilian experience is unique
2. incompatible with existing fleets;
3. low energy balances of biofuels
4. high pollutant emissions (cleaner fossil fuels preferable)
5. complex logistics
6. competition with food for land, unsustainable practices, deforestation
7. should only be produced domestically by developed countries
8. only subsidized production is possible
9. imports destroy local agriculture of developed countries
10. energy efficiency alone will preserve oil resources and fulfill Kyoto targets

The Brazilian Alcohol Program

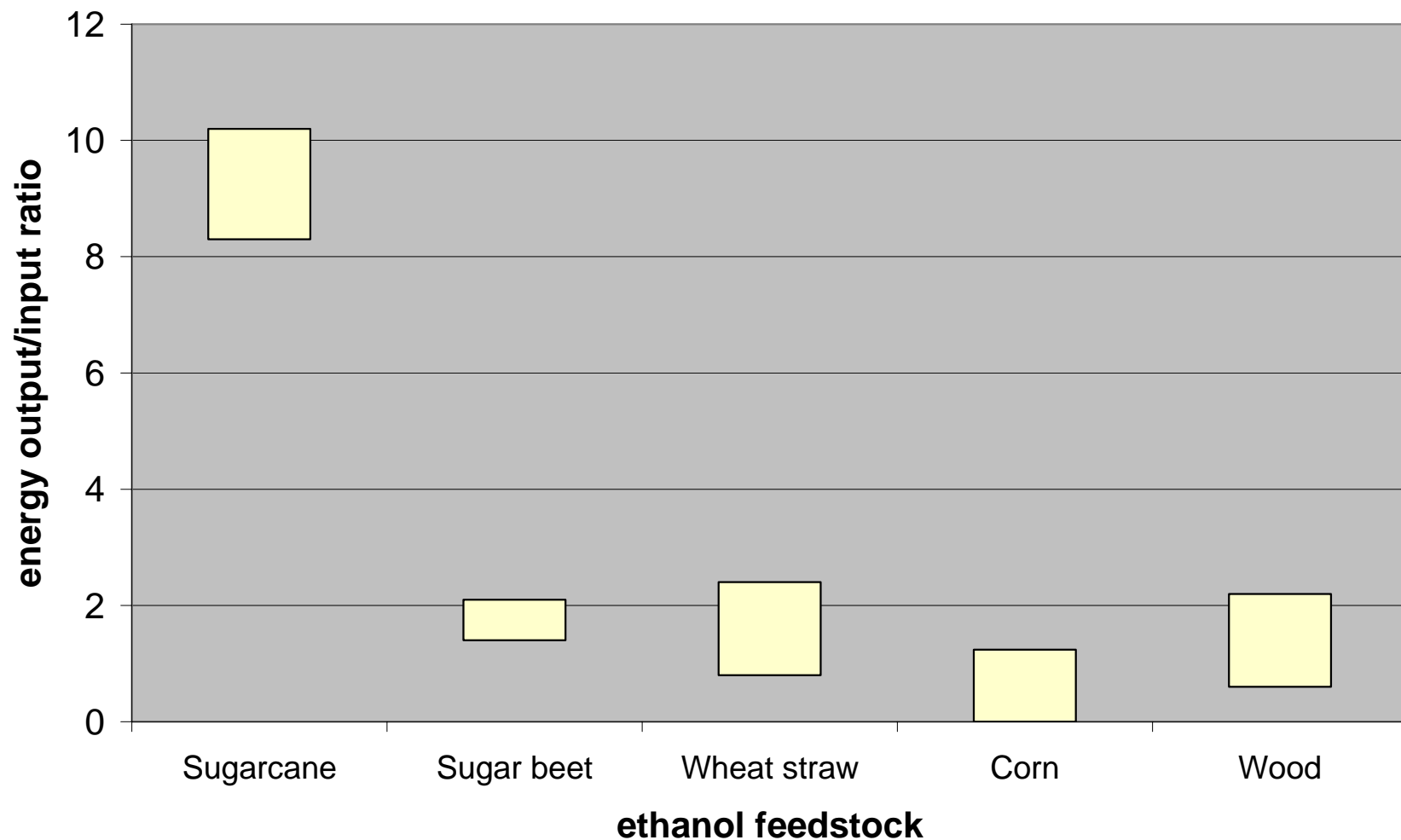
- 1975 PROALCOOL:
 - sugarcane ethanol due to the oil shock
 - mandatory blend to gasoline (20 - 26% vol.)
 - high-octane fuel in vehicles, replacing lead and/or MTBE
- 2007:
 - fully competitive to gasoline: 3.72 billion liters exports
 - 14 billion liters consumed
 - saving 35.1 Mt CO₂ eq (~ 14% of national CO₂ emissions from fossil fuels)
 - increased mechanical harvesting and productivity high industrial (70 - 86 l/tc) and agricultural productivity (60 - 84 tc/ha/yr).
 - 1.3 mln pure ethanol cars and 2.3 mln FFVs
- perspectives to 2013:
 - increased demand to 37 million m³ of ethanol.



The Economic Competitiveness of Alcohol Fuel Compared to Gasoline



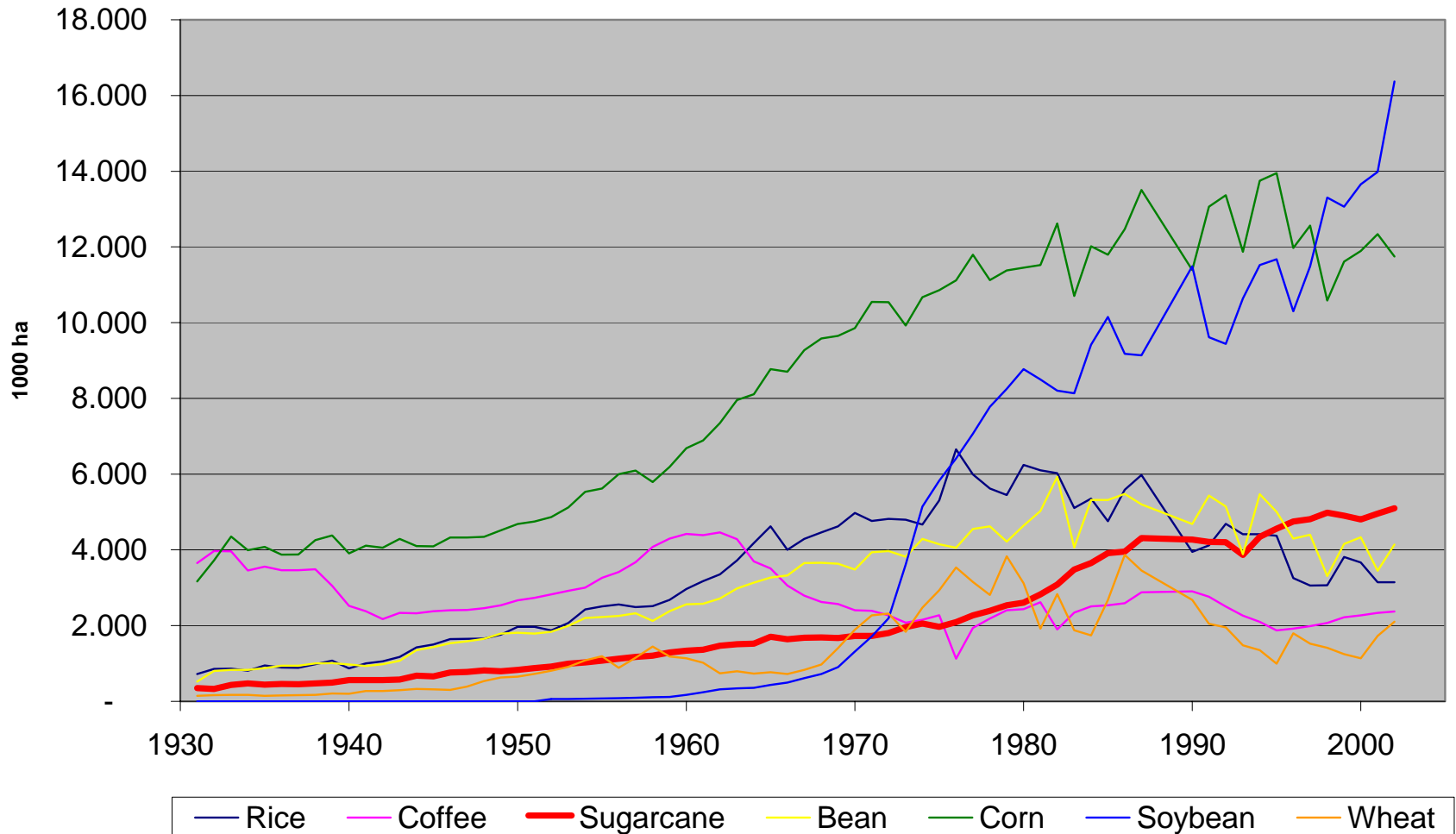
Energy balance of alcohol production from different feedstocks



Sources: (Macedo et alii, 2004; UK DTI, 2003 and USDA, 1995)

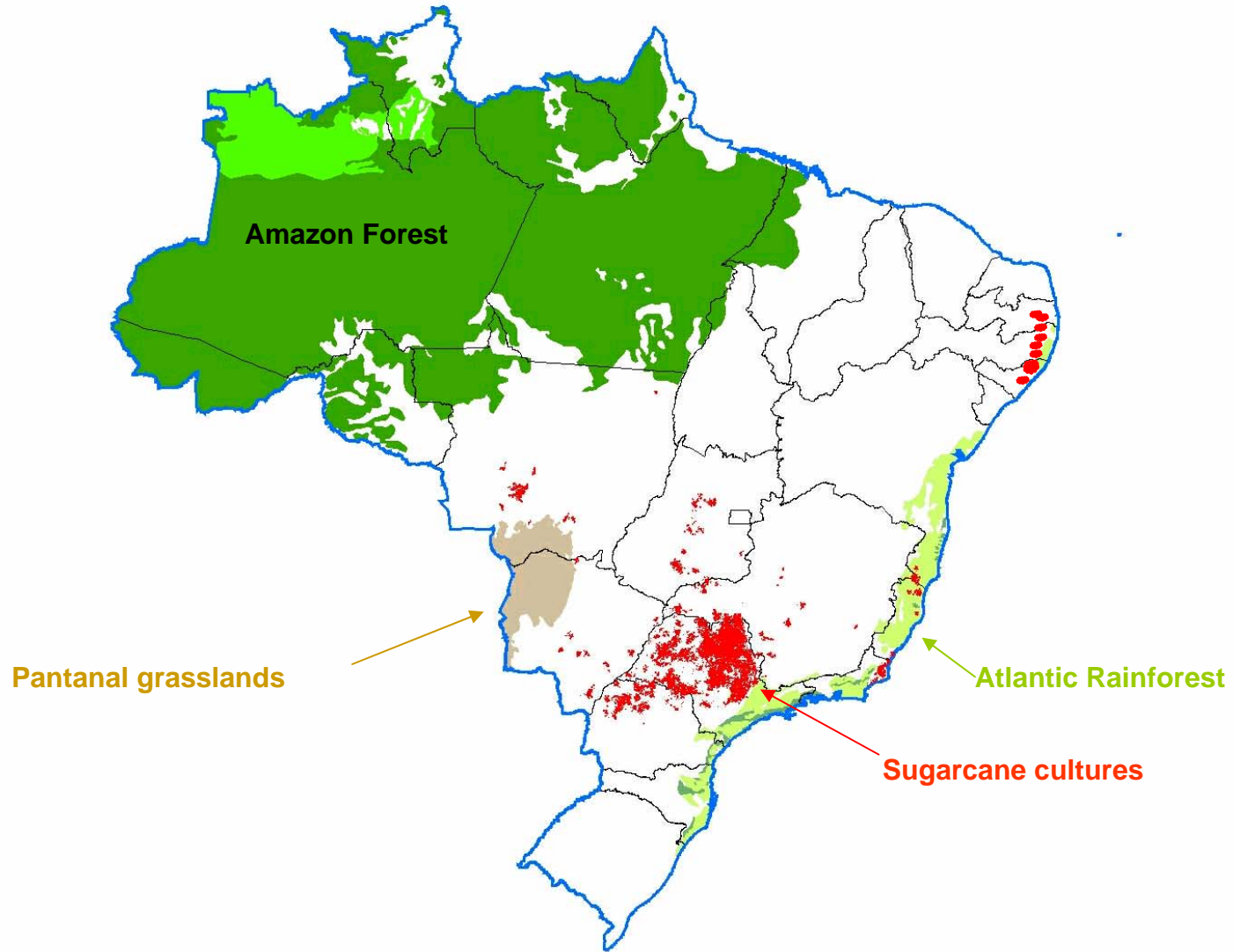
No competition for land with food

Harvested Area in Brazil



Source: Brazilian Statistics Bureau, several years

Map of Brazil locating sugarcane cultures



Deforestation of Amazon Forest (?)

Cattle-breeding in São Paulo State

	2001	2005
Cattle		
(heads)	13.154.649	14.072.447
Pasture		
(hectares)	10.288.887	10.010.491
Density (heads of cattle/hectare)	1,28	1,41

Trend to more intensive cattle-breeding

Compatibility of Existing Fleets with Ethanol-gasoline Blend

Ethanol Content in the Fuel	Carburetor	Fuel Injection	Fuel Pump	Fuel Pressure Device	Fuel Filter	Ignition System	Evaporative System	Fuel Tank	Catalytic Converter	Basic Engine	Motor Oil	Intake Manifold	Exhaust System	Cold Start System	
≤ 5%	For any vehicle NN														
5 ~ 10%	For relatively new fleets (10 ~ 15 years old) NN														
10 ~ 25%	Brazilian Application PN NN														
25 ~ 85%	USA Application PN NN														
≥ 85%	Brazilian Application PN														

 - Not Necessary

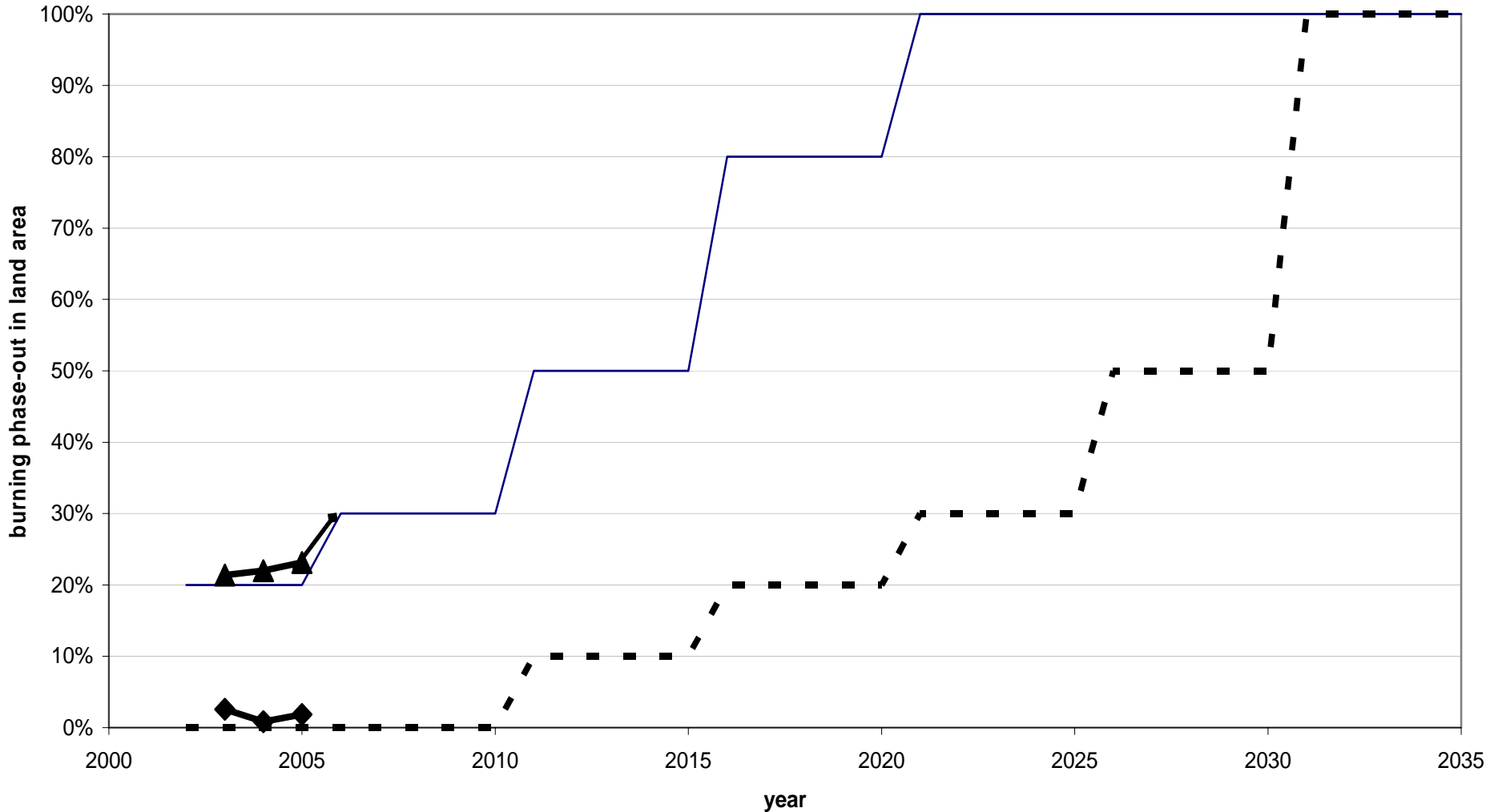
 - Probably Necessary

Source: ANFAVEA, 2005

Sustainability of Ethanol Production

- Legislation improved and enforced specially in the State of São Paulo (60% of all Brazilian sugarcane mills);
- Discharge of effluents with high organic loads replaced by controlled fertirrigation practices (CETESB – São Paulo Environmental Agency);
- Harvest burning practices are being phased-out, through a strict legal enforcement (Law 11,241/2002);
- Land use is severely controlled: preserving riparian forests and other natural ecosystems and avoiding deforestation (20% of native forest mandatory);
- Industrial ethanol plants have their atmospheric emissions controlled;
- Low water use

Elimination of sugarcane harvest burning in Sao Paulo (Law 11241/2002)



— legal phase-out, mechanizable area

—▲— mechanized area

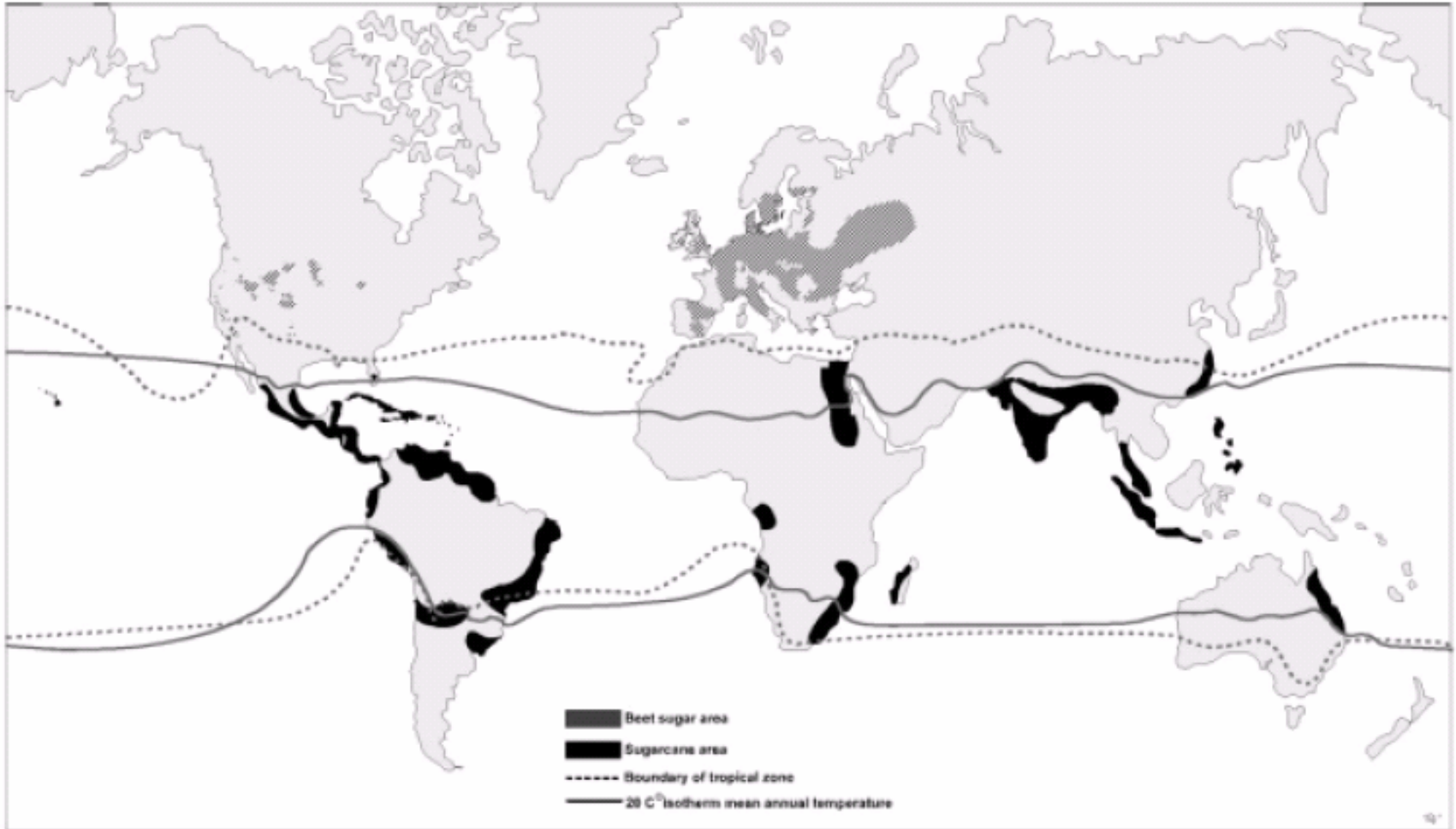
- - - legal phase-out, slope above 12% or areas below 150ha

—◆— verified elimination in non-mechanizable areas

Perspectives for Developed Countries

- EU target of 5.75% oil displacement by 2010: will require large-scale, rapid investment in conversion facilities. High local production costs
- Utilization of biofuels produced locally → high production costs
- Import of biofuels from developing countries → good idea
- Advantages of biofuels import
 - reduction on Carbon emissions → targets from Kyoto Protocol (CDM projects).
 - diversification of energy matrix → energy security.
 - biofuels → unique renewable energy option commercialized for transport sector.

Possibilities of Replication in Developing Countries



The Equator Belt; sugarcane potential (SI, suitability index). Source: FAO (2005)

Possible Policies for Developing Countries

- There are two main issues to be addressed:
 - Countries already producing some sugarcane for sugar and interested in producing ethanol for local consumption, reducing oil/derivatives imports: these countries could start an alcohol program using part of the existing sugarcane production for alcohol production
 - Countries with no sugarcane production but with existing deforested land: these countries must start since the very beginning, including the choose for the best crop to be used for biofuels

Possible Policies for Developing Countries

- For sugarcane producer countries:
 - Establishment of policies for a mandatory blend of ethanol in gasoline up to 5%, which does not need any change in existing fleet;
 - Malawi and Colombia are examples of it.
 - Discussion of fiscal policies (if necessary) regarding economic competitiveness of alcohol fuel.



Perspectives for biofuels trade (1)

- South-North and South-South trade: important for developing countries producing biofuels.
- Biofuel production (Brazil's experience): sustainable production and low production cost.
- Biofuels from developing countries: can be commercialized with developed countries;
- Reduction of carbon emissions from developed countries (Kyoto Protocol).
- Brazilian experience:
 - be repeated in other developing countries
 - allow benefits for developing and developed countries under the Kyoto Protocol (CDM).

Perspectives for biofuels trade (2)

- International trade in biofuels: strong barriers still existing (WTO discussions)
- Need for new approaches and policies:
 - Trade liberalization efforts
 - Kyoto Protocol implementation policies
 - Reduction on GHG emissions.
- International pressure for certification but Brazilian legislation is enough if correctly enforced (São Paulo)

Possibility of CDM Projects

- Use of cogeneration based on sugarcane bagasse – replacement of fossil fuels (both Brazil and other developing countries)
- Use of ethanol (blended or pure) in vehicle engines – other developing countries; not Brazil (baseline).



Conclusions

- Biofuels are, in first place, energy sources produced in rural areas to fulfill energy needs of cities that can afford it.
- The main barrier to ethanol production in developing countries is the lack of funding and adequate policies.
- Investments in basic infrastructure of production, distribution and exporting are fundamental.
- Feasibility studies for other developing countries are necessary.

**A SUSTAINABLE FUTURE IS POSSIBLE
THROUGH BIOFUELS!**

Thank You !

Obrigada !

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