Overview

Wageningen Seminar on Bioenergy

Wageningen University and Research Centre (WICC)

2 March 2007

Impact of an increased biomass use on agricultural prices, markets and food security

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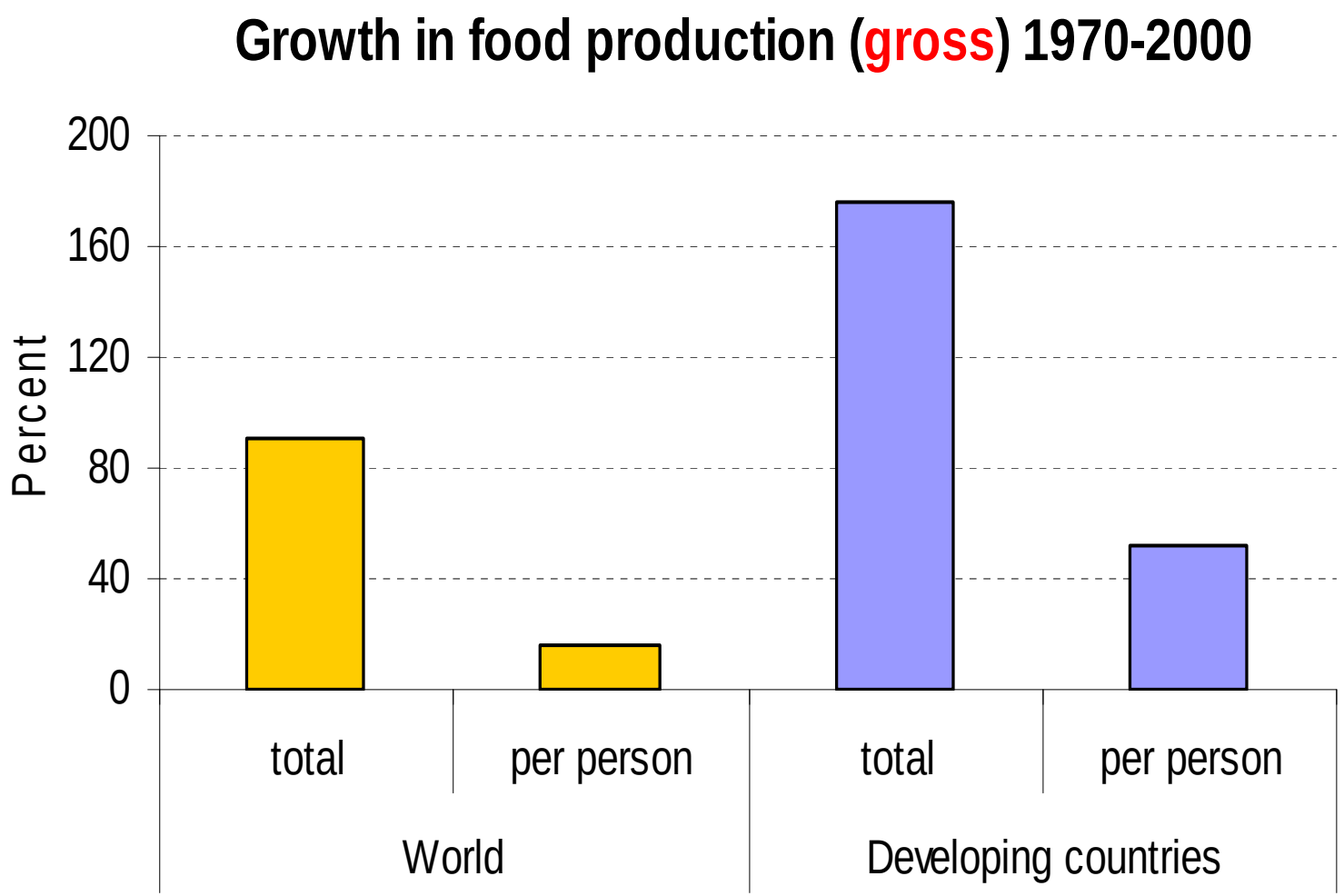
Overview

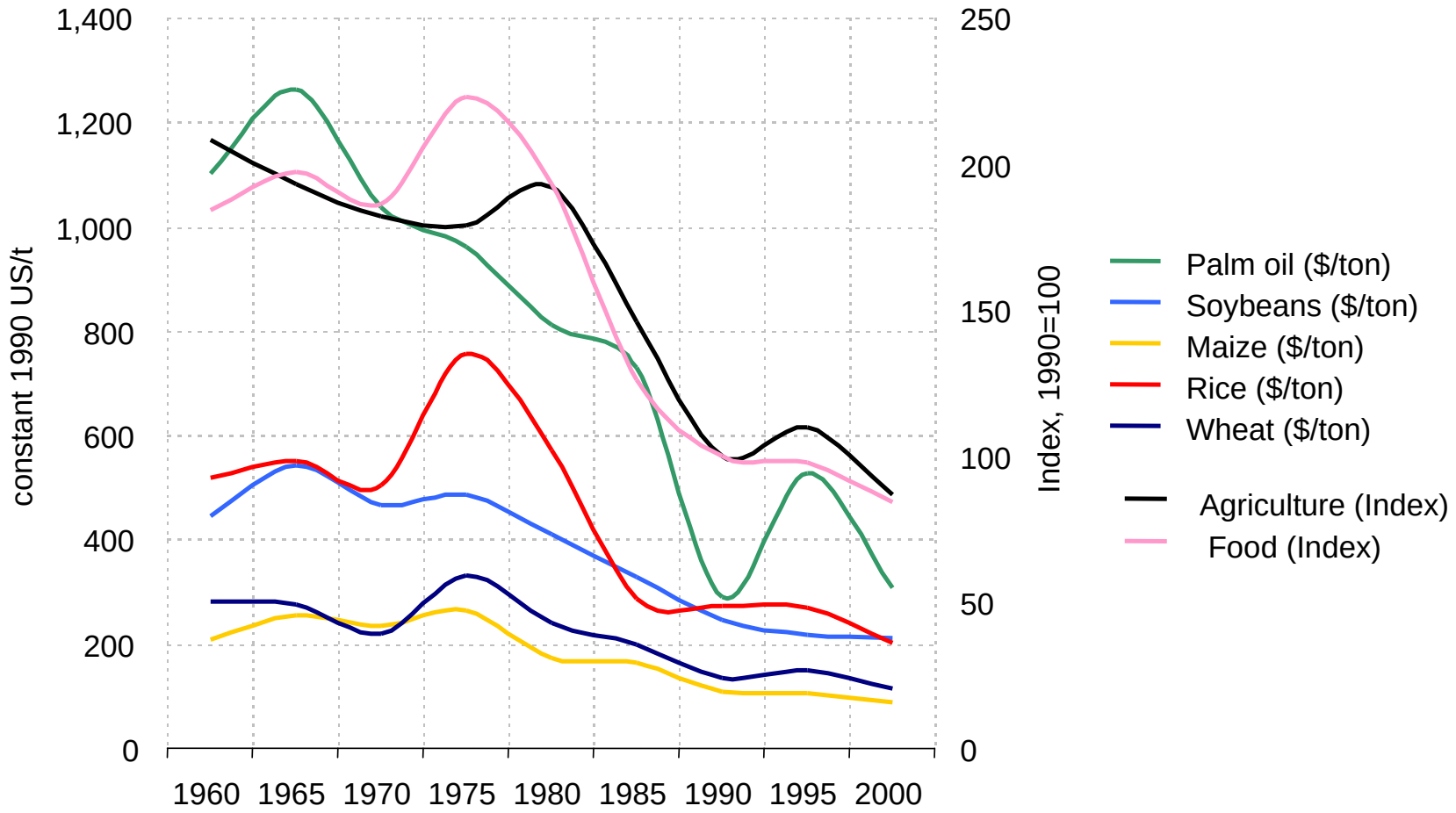
1. The traditional agricultural price paradigm: Cochran's treadmill and falling real prices.
2. How does bioenergy use affect international agricultural prices?
    1. A new paradigm for global agriculture?
    2. Floor price effects.
    3. Ceiling price effects.
    4. Differential, non-uniform price changes across agricultural commodity markets.
3. Impacts on food security
4. Summary and conclusions

The traditional market paradigm



The traditional market paradigm

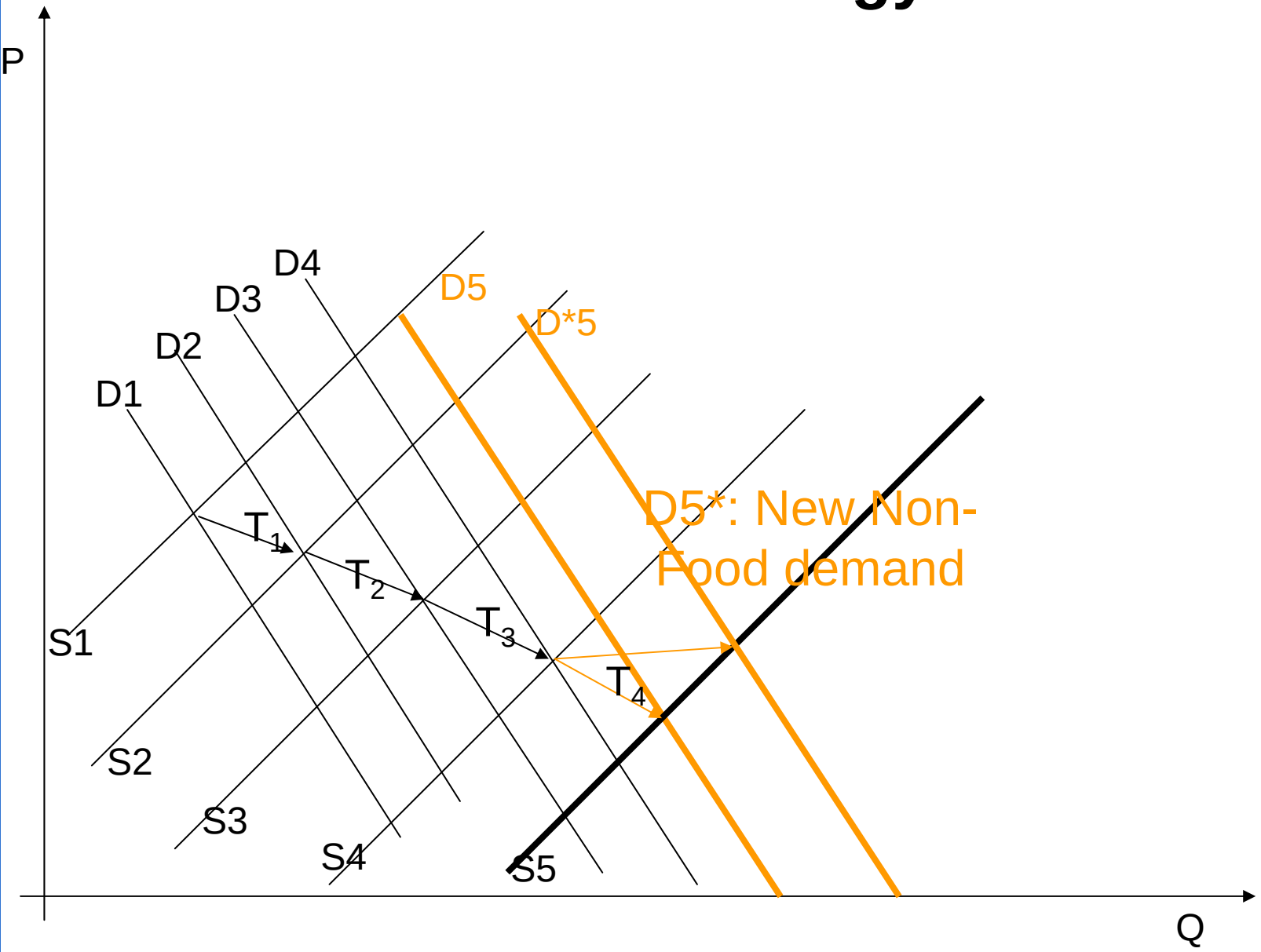
A drastic decline in real prices for food and agriculture



Source: World Bank, "Pink Sheets"

Stuck in the technology treadmill?

The traditional paradigm



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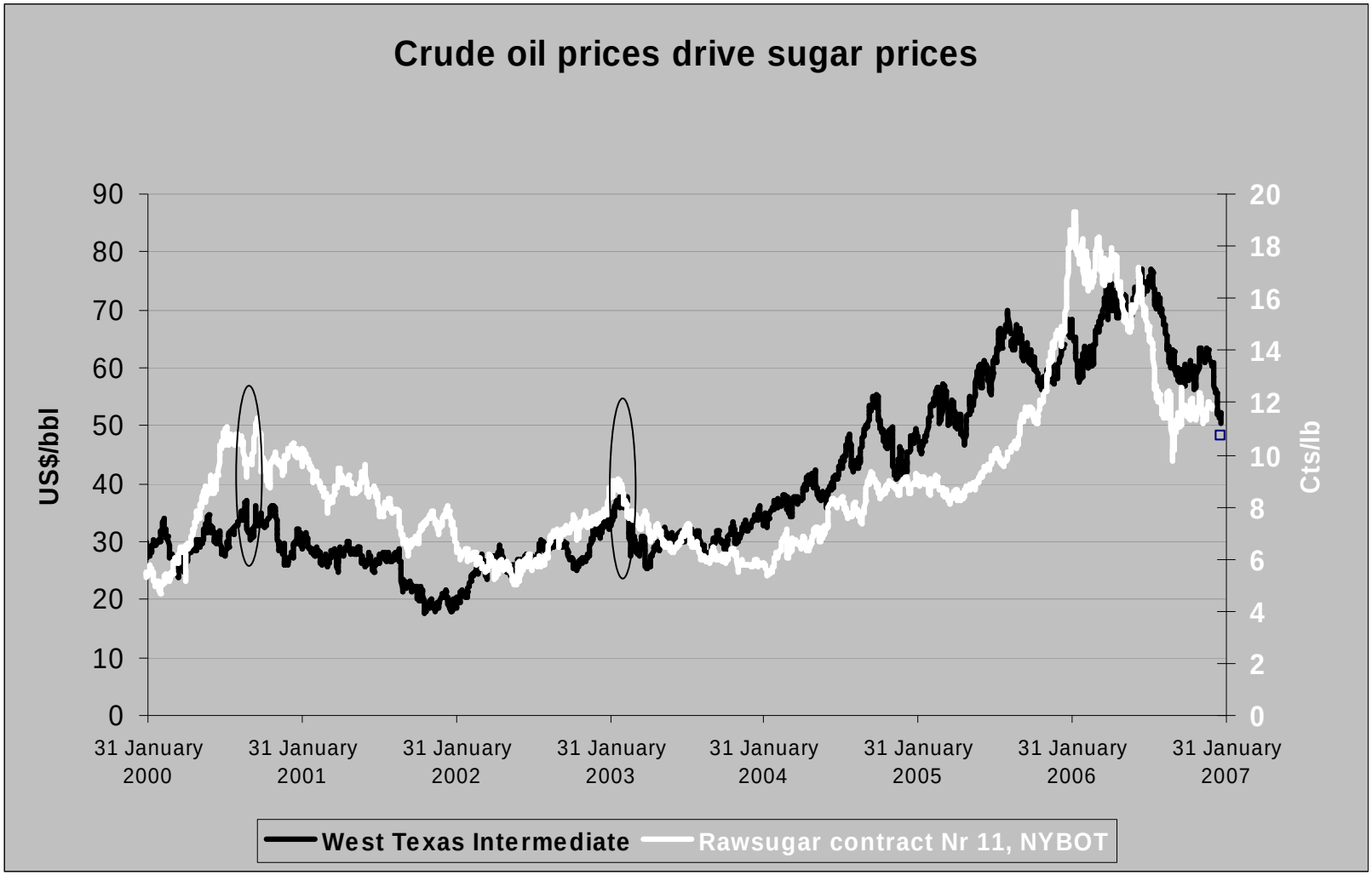
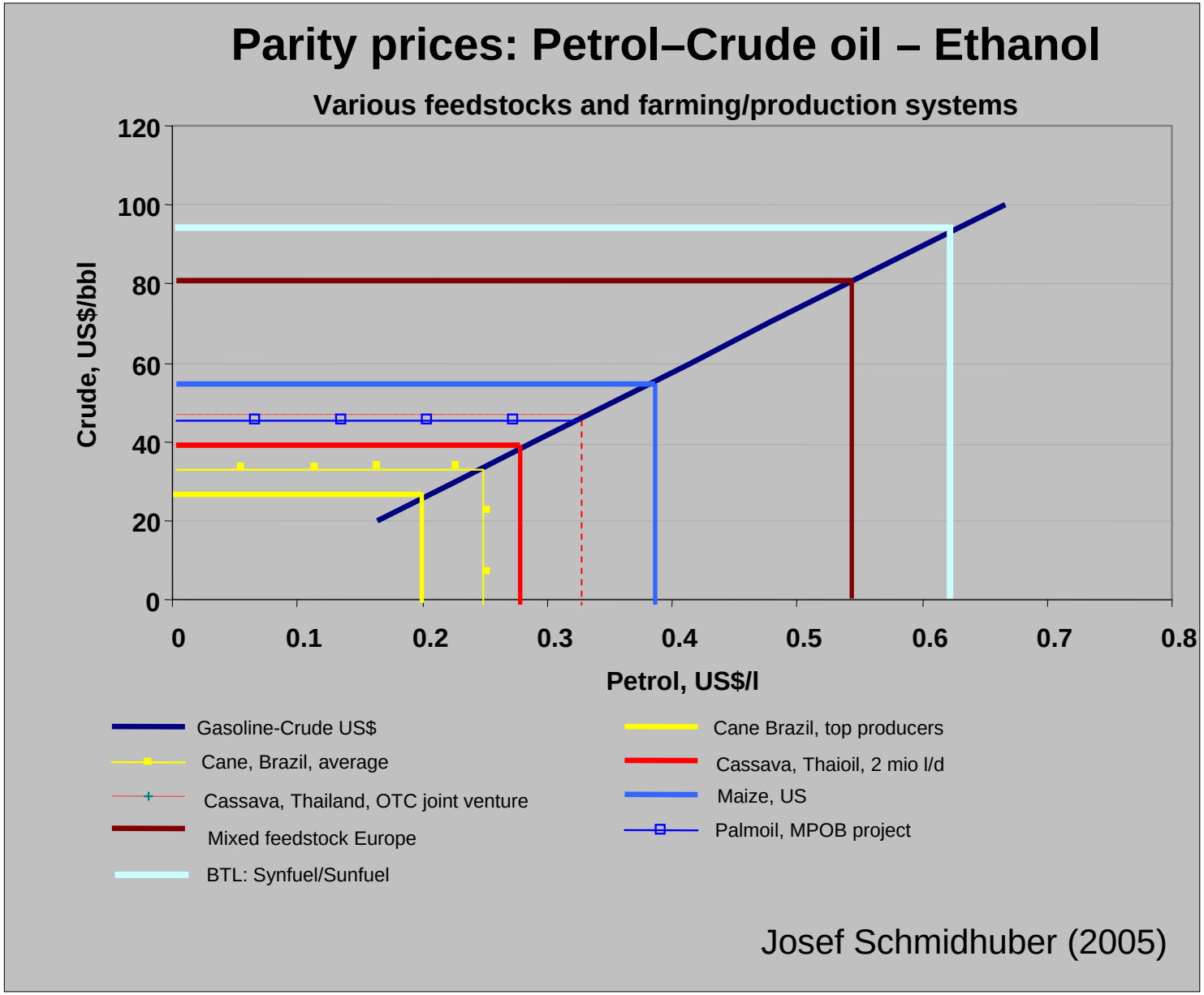
Floor and ceiling price effect in the sugar markets



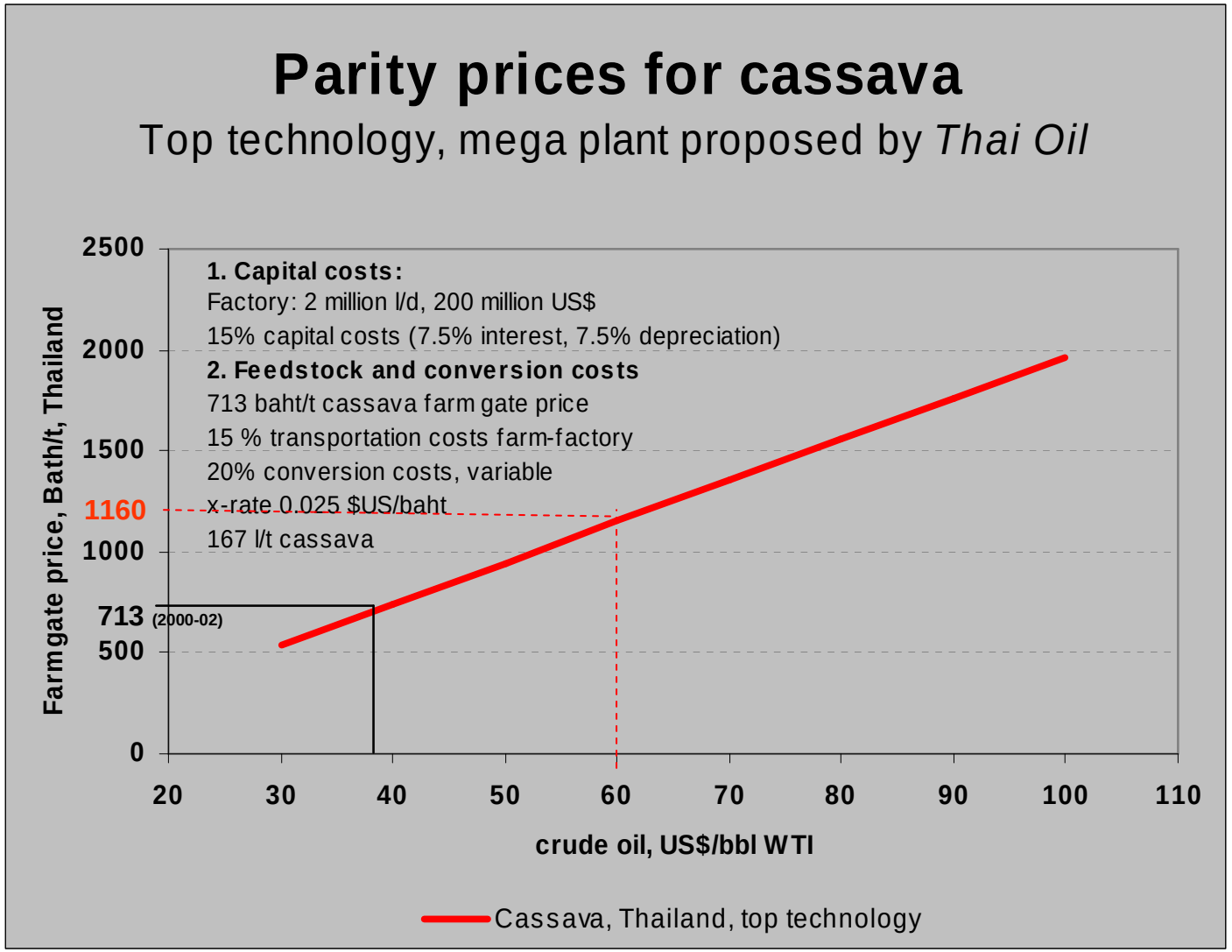
Data: Nymex and EIA, J. Schmidhuber (2007)

The competitiveness

Competitiveness by feedstock



Cassava, mega plant, top technology



Source: own calculations based on EIA, IEA, FAO data. J. Schmidhuber (2005)

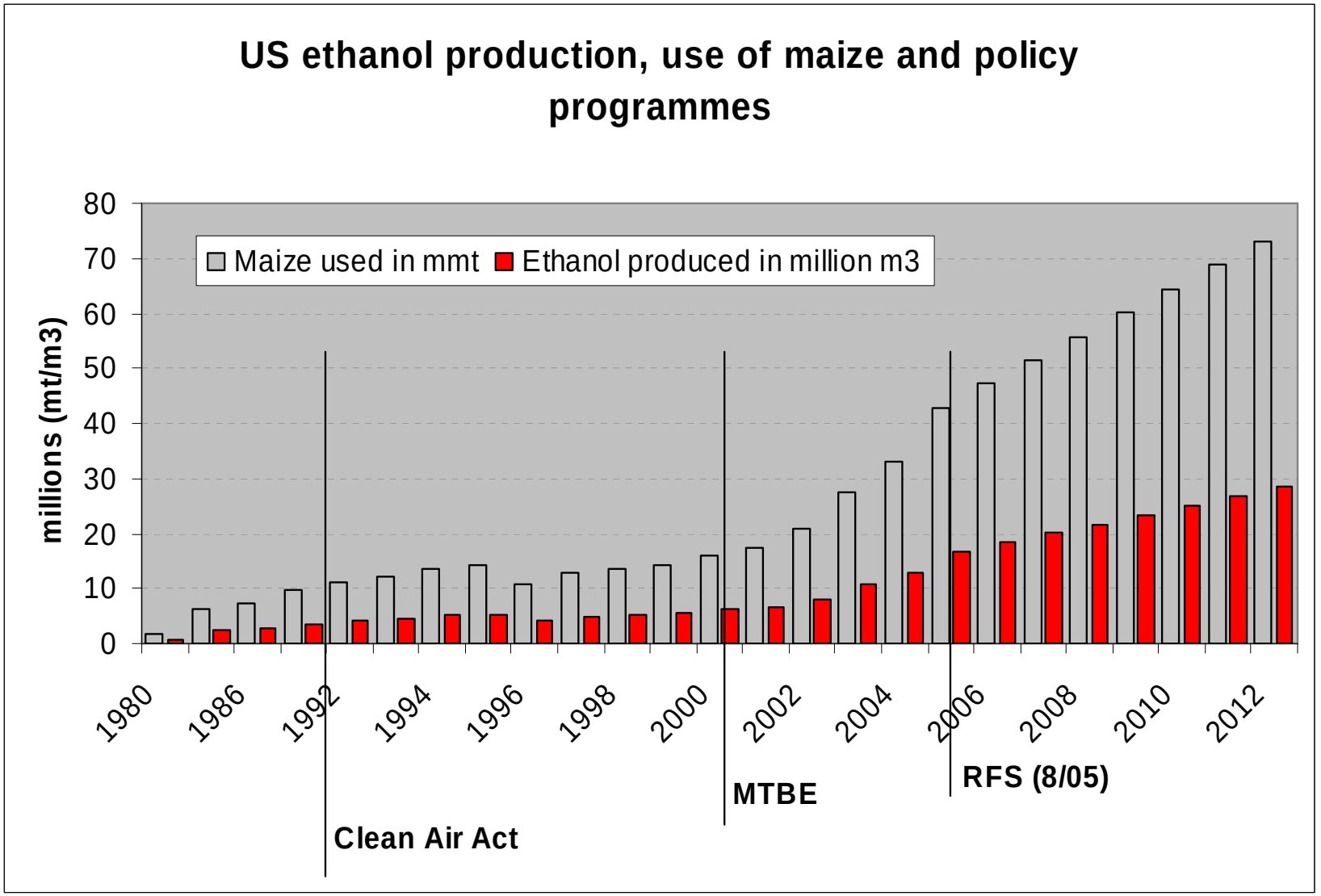
Capital costs v feedstock costs: large scale

Feedstock price for cassava In baht/t farm gate	Ethanol plant capacity	
	200,000[1] l/d (1,300t cassava/d)	2,000,000[2] l/d (12,800 t cassava/d)
	share of capital costs %	
713	29	21
1000	23	17
1500	17	12

1.) This plant will be located in the Chok Chai district of Nakhon Ratchasima, Thailand's main cassava-producing province. It is a joint venture of the Agricultural Co-operative Federation of Thailand and O.C.T. Land & Energy L.C., USA. The former is 4000 member farm co-operative and will hold 60% of the registered capital, the latter is an affiliate of O.C.T. Fiberglass Products, based in Wichita, Kansas and will hold 40% of the capital.

2.) A feasibility study endorsed by Thai Oil and "strategic partners" found an ethanol plant of this size appropriate and necessary to match the company's fossil fuel refinery capacity and its blending needs for gasohol production. The investment needs have been pegged at US$150-250 million, daily output would be about 1.5-2 million l. It should be noted that the plant would consume, at an extraction rate of 167 l ethanol/ cassava a total amount of about 4.3 million tonnes of cassava per annum. This is about 25% of total cassava production (2000-04 average) and equivalent to the entire output of the Nakhon Ratchasima district, Thailand's main cassava producing area.

US ethanol-some market impacts



Cross links: Impacts on international commodity prices

	An additional 10 million tonnes of …				
	Sugar	**Maize**	**Sugar and Maize**	**Soybeans and Maize**	**Sugar, Maize and Soybeans**
Corresponding energy [biofuels]	**0.195 EJ**	**0.087 EJ**	**0.282 EJ**	**0.167 EJ**	**0.349 EJ**
Commodity	**… used for biofuels would change international prices (percent) in the long-run by :**				
Sugar	**+9.8**	**+1.1**	**+11.3**	**+2.3**	**+13.8**
Maize	**+0.4**	**+2.8**	**+3.4**	**+4.0**	**+4.2**
Vegetable oils	**+0.3**	**+0.2**	**+0.2**	**+7.6**	**+7.8**
Protein	**+0.4**	**-1.2**	**-1.2**	**-8.1**	**-7.6**
Wheat	**+0.4**	**+0.6**	**+0.9**	**+1.8**	**+2.0**
Rice	**+0.5**	**+1.0**	**+1.2**	**+1.1**	**+1.4**
Beef	**+0.0**	**+0.2**	**+0.2**	**+0.4**	**+0.4**
Poultry	**+0.0**	**-0.4**	**-0.4**	**-2.1**	**-2.0**

Source: @2030 simulation results

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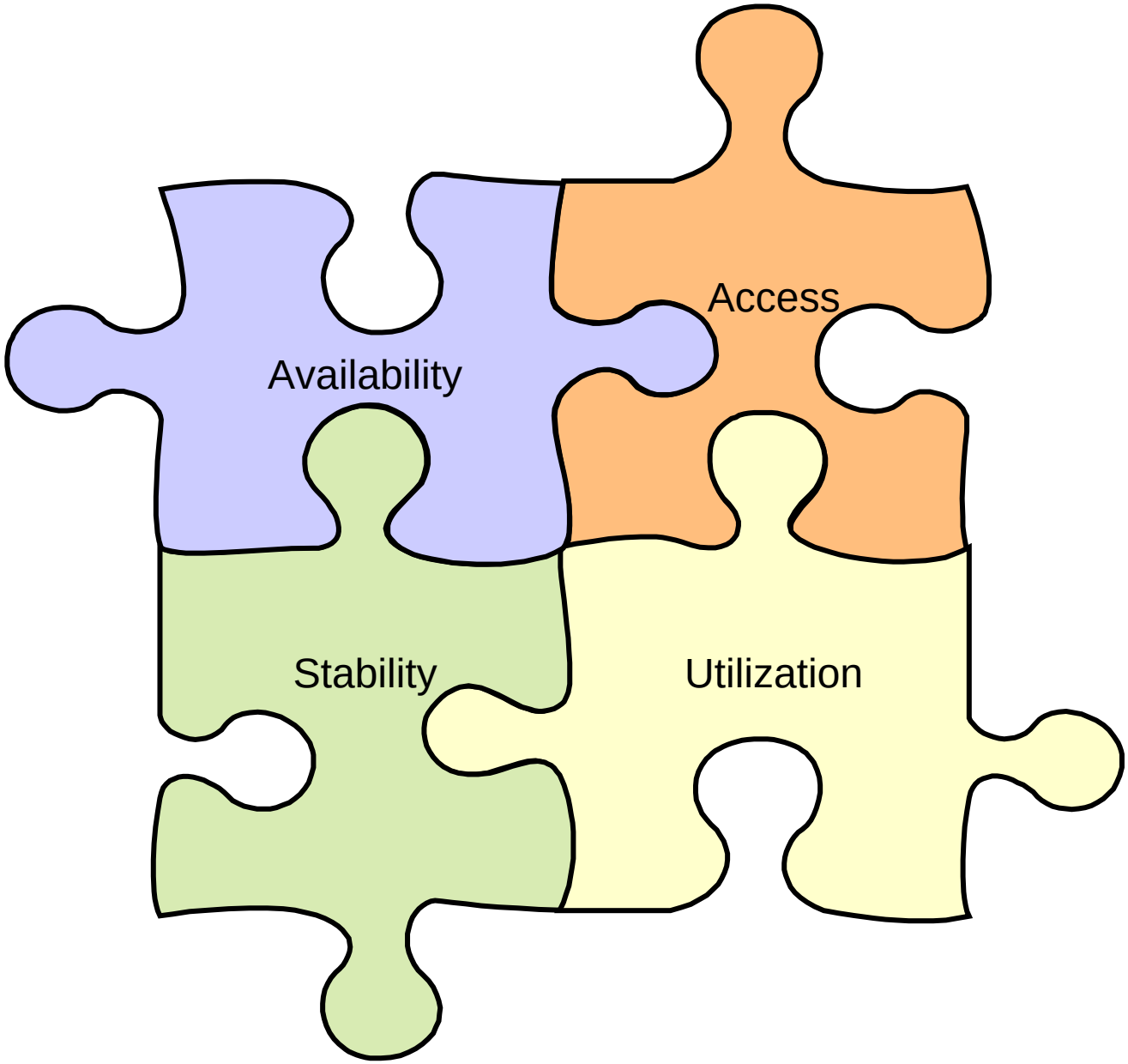
Bioenergy can affect all four dimensions of food security

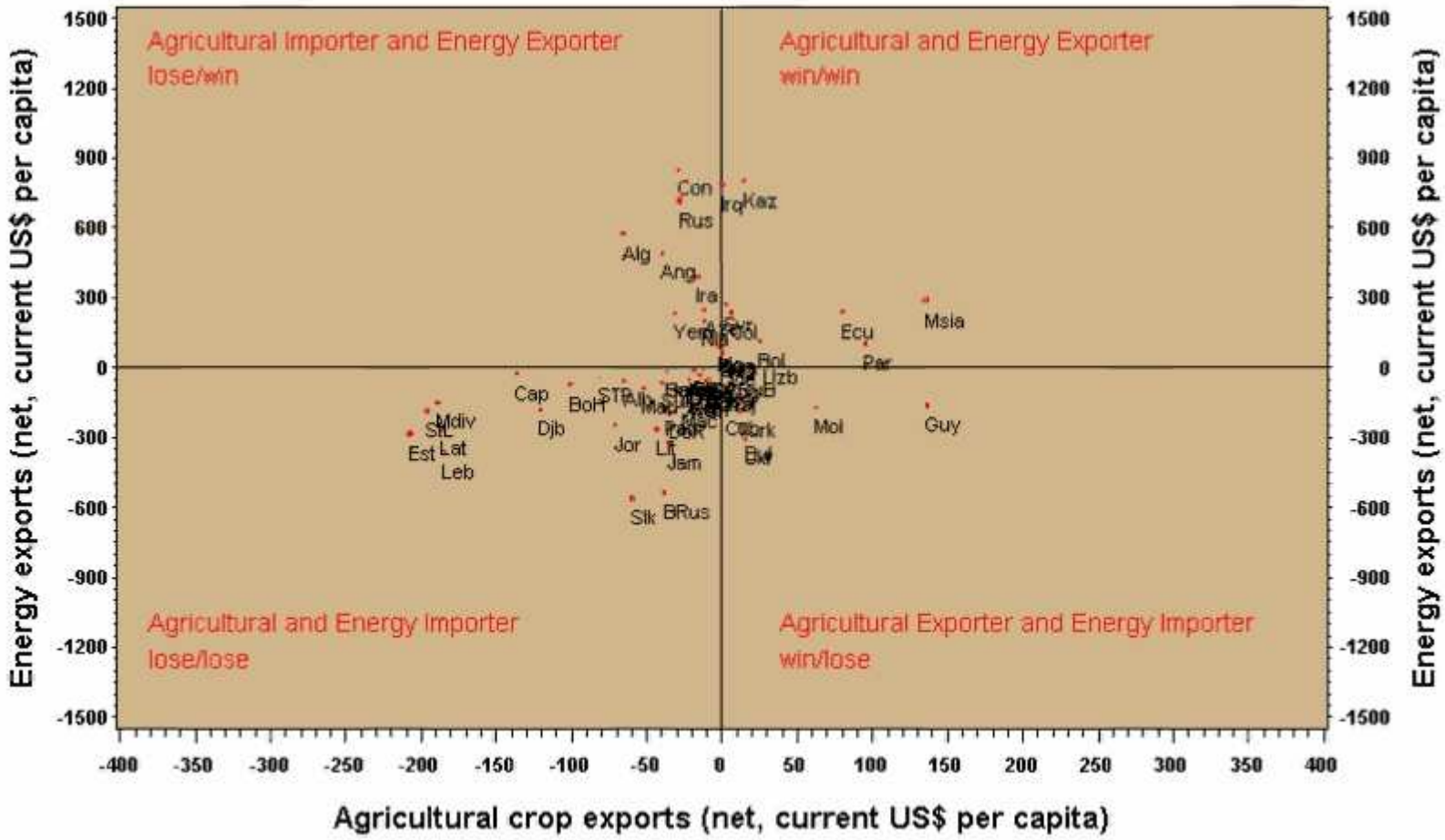


International food security: Boom or bust for trade balances through an increased link between energy and food prices

Poor countries: Winners and losers from high energy and agricultural prices (2001-03)

Only countries with less than US$5000 GDP (in constant 95 US$)

The assumed energy price is: **US$30/bbl**



Data: FAO, OECD-IEA and US-EIA

Agriculture crops without coffee, cocoa, tea, cotton, and other fibres

Summary, Conclusions, Outlook

Summary and Conclusions

1. Potential: differentiate between theoretical, technical and economic potential
   - Energy markets are “large” compared with agricultural markets; create (perfectly) elastic demand for competitive agricultural produce.
   - Energy markets *drive* agricultural markets but not vice versa.

2. Price effects
   - Rising fossil fuel prices have made a number of agricultural feedstocks economically viable sources of energy; demand from the energy sector has created a *floor price* for agricultural produce; bioenergy demand as a new intervention system;
   - The price links between agriculture and energy markets rises with rising energy prices, as more feedstocks become competitive energy sources.
   - However, agricultural prices will not rise faster than energy prices. *Ceiling price* effect
   - Not all commodities are affected in the same way and to the same extent:
     - Protein/energy differential
     - Differences for the same feedstock across countries (sugar from Brazil to Japan)
     - Differences for the same country across feedstocks (Thailand cassava vs. sugar vs. palm oil)
   - Paradigm shift possible with an end to falling real prices, but neo-Malthusian scenarios are unwarranted.

3. Impacts on food security
   - Winners and losers depending on the trade balance and net effects on energy and food prices; lose-lose situation for food and energy importers, impacts rise more than linearly with rising energy prices.
   - Food availability likely to decline, access to food to improve; rural-urban shift in food security
   - Improvements depend on land ownership, institutional support, creation of rural employment, land and labour intensity of bioenergy use and technologies.
   - Policy challenge: harness benefits for agriculture (renaissance) without harming food security.

Thank you!