Trade-led Growth in Times of Crisis
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Advances in Use of CGE analysis for Trade Policy Making

Paper title:

Role of Technology-induced Productivity in Tackling Food and Fuel Trade-offs: Tale of Twin Crisis

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Plan of the presentation

- Motivation/Objective
- Issues: Macro Lens View
- Causes of high food Prices
- Food versus Fuel Debate
- Suggested Policy Reponses
- **Paper Focus**: Alternate Technology and N-S and S-S cooperation, also Domestic assimilation factors (insufficient dissemination, training, etc.. in the deficient economies)

- A Stylized model of Technology and Adoption Factors
- GTAP CGE model and its augmentation
- GTAP V7 Database, Parameters
- Simulations, Results
- Policy Insights
- Preliminary work: needs detail further work along Birur, Hertel et al. (2008). For example, Database pertains to 2004, lack several elements of prod & trade.
- Future, further extension needed

Issues and Primary objective

- Export bans, Surge in Demand, Supply slump, Climate and *Energy Crisis*, Oil prices
- Alternative Fuel, esp., DD for Biofuel, land-use changes, *Food – Fuel competition*,
- *Food self-sufficiency,* Balancing Food security and Energy Security
- Low yields and productivity due to underinvestment in agrl research, biotech…

- Policy responses for Tackling the Crisis –
- Trade reform and others..
- More Fundamental: from the perspective of sustainable growth and development under global integration.
- GTAP: Birur et al. (2008), Hertel (2008), Arndt et al (2009), Tyner and Taheripour (2008)...GTAP applications with extensions. Does not consider this aspect of Policy Response— see Patil, Tran, and Giselrød (p. 1189, 2008), FAO, 2008; UNEP, 2009; Riley, Tilman et al 2009.

Emerging trends: World Food Scenario [1]

Table 2. Basic facts of the world cereal situation (*million tonnes*)

	2007/08	2008/09	2009/10	Change: 2009/10 over 2008/09 (%)
PRODUCTION[1]				
Wheat	610.9	683.8	655.2	-4.2
Coarse grains	1 082.5	1 142.7	1 093.1	-4.3
Rice (milled)	441.0	459.1	460.2	0.2
All cereals	**2 134.5**	**2 285.5**	**2 208.5**	**-3.4**
Developing countries	1 206.9	1 240.1	1 239.9	0.0
Developed countries	927.5	1 045.5	968.6	-7.4
TRADE[2]				
Wheat	112.8	128.6	114.0	-11.3
Coarse grains	129.5	111.9	112.0	0.0
Rice	30.0	31.0	30.6	-1.4
All cereals	**272.3**	**271.5**	**256.6**	**-5.5**
Developing countries	84.4	68.8	64.7	-6.1
Developed countries	187.9	202.7	191.9	-5.3

Decline in production in food crops/ cereals

Source: GIEWS, FAO, July 2009

Emerging trends: World Food Scenario [2]

Year	Population (Billion)	Output (Million T)	Per capita availability (kg)
1950 - 1951	2.5	631	248
1960 - 1961	3.1	824	272
1970 - 1971	3.8	1079	286
1980 - 1981	4.5	1429	321
1990 - 1991	5.3	1768	334
2000 - 2001	6.1	1843	301
2007 - 2008	6.6	2075	314

Source: UN Population Division and FAO Statistics.2009.

Table 2. Trends in Yield of Cereals-Kg per Hectare in Major producing Nations in 2007.

Country	Yield of Rice	Yield of Wheat
US	7,694	2,825
China	6,265	4,455
India	3,124	2,619
Nigeria	1,440	1,127

Source: As in table I.

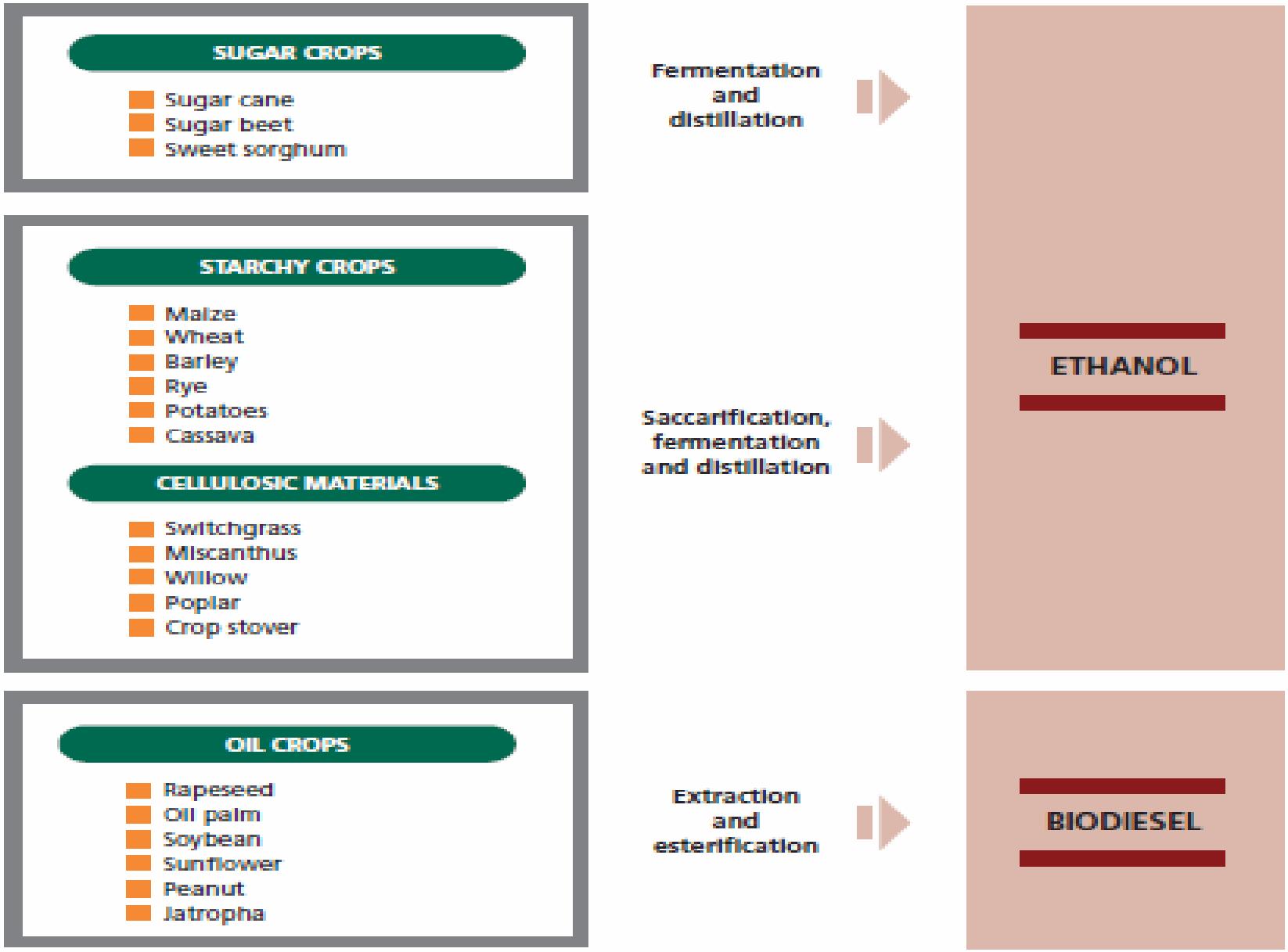
Yields differ across DCs and LDCs

UN (2006) projects world population to increase to 8.3 billion in 2030 and it will grow about as fast as cereal yields

Rising commodity prices, hike in import costs and food import bills FAO, 2008. Globally, 29% increase in spending on food imports in 2007. due to rising prices of imported cereals, veg oils—major biofuel feedstocks

22 African countries are identified as most vulnerable due to high fuel, cereal prices, and undernourishment.

Conversion of agricultural feedstocks to liquid biofuels. Source: Figure 6 (FAO, 2008).



Source: FAO.

Trade-offs: Fuels and Food

- Reshaping the nature of linkages between agriculture and energy output markets as crops provide feedstocks
- Competing use of finite resources. Increasing competition for natural resources, such as, land, esp in the Short-run
- Price incentives: Crops redirected to biofuel production, or, food-oriented land converted into bioenergy production
- **IFPRI Rosegrant et al (2008), GTAP: Tyner and Taheripour (2008).**

- Biofuel yields per hectare vary across feedstocks, land, countries
- Differences in conversion efficiency, production technology, crops yields.
- Different land requirement
- Debatable effect on commodity markets, land use changes and environment
- **GTAP:** Birur, Hertel, Tyner (2007, 2008), Hertel, Taheripour et al..(2007, 2008)

n Bioenergy: Brief Taxonomy

ntl .Panel for Sustainable Res. Mgmt (Oct 2009) Towards
ainable production: Assessing Biofuels and
AO (2008): State of Food and Agriculture,
ofuels: prospects, risks and opportunities

derived
edstocks)
ops, fibres,
energy
transport,
eating
ioethanol
Biogas,
charcoal)
rocessed

- First generation based on conventional technology: ethanol and biodiesel from--grains, sugar cane, sugarbeet, maize, corn, wheat, soybean, sunflower, jatropha, etc
- Second generation biomethanol, mixed alchohol from non-food: lignocellulose, switchgrass, Miscanthus
- **Next generation sophisticated tech. (Algae and others !)" UNEP (2009), Science (2008, 2009), Stern (2009), The Economist (July, Aug 2009)—Oilgae from Algae, Bio-propanol, butanol**