

KD Communications


June 16, 2011



What are the Effects of Biofuels and Bioproducts on Environment, Crop and Food Prices and World Hunger?




Overview of Study

1. Purpose: to gather, review and summarize publicly available information, coupled with some analyses of our own
 2. Few details and no opinions provided on government biofuel support programs
 3. Support/input/advice provided by Don O'Connor ((S&T)² Consultants), Alfons Weersink, T.K. Warley and Gord Surgeoner
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Outline

- Overview of Biofuel/Bioprodukt industry
 - Environmental Effects
 - Effects on Grain Prices
 - Local
 - Global
 - Effects on Food and Gasoline Prices, and World Hunger
 - Longer-term Implications
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Canadian Biofuels Production

Ethanol

- 1.8 billion litres in 2010
- 3.5 million tonnes of corn and 1 million of wheat
- 2/3 in Ontario - 2.8 million tonnes of corn (110 million bushels).

Biodiesel

- Capacity for 210 million litres
 - Production about 110 million litres in 2010
 - Mainly from used cooking oil, animal fat.
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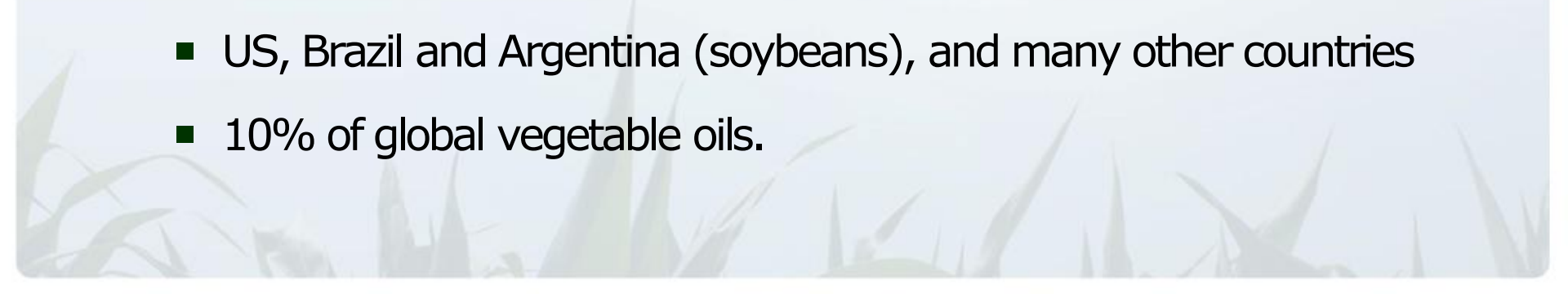


Global Biofuels

85 billion litres of ethanol

- 60+% in US (125 million tonnes, 5 billion bu corn)
- Brazil (sugar cane) and EU (wheat and sugar beets) and also in China, India, many other countries
- 15% of world's corn; 5.7% of grain (3.7% with byproduct credit).

11 billion litres of biodiesel

- 75% in EU (rapeseed)
 - US, Brazil and Argentina (soybeans), and many other countries
 - 10% of global vegetable oils.
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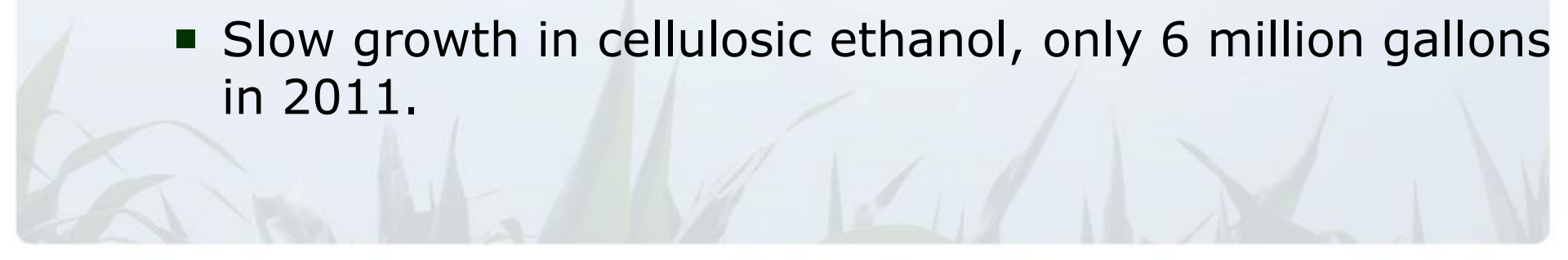


Biofuel Mandates

Canada

- 5% ethanol in 40 billion litres gasoline = 2 billion litres
- 2% biodiesel in 30 billion litres of diesel and heating oil = 600 million litres.

USA

- Minimum of 15 billion gallons (58 billion litres) corn ethanol in 2015 and years to follow
 - 36 billion gallons, all biofuels, by 2022
 - Slow growth in cellulosic ethanol, only 6 million gallons in 2011.
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World Fuel Ethanol Projections




Source: OECD and FAO, 2010


Bioproducts

- Bioplastics/composites, coatings, adhesives, lubricants, related materials
- Total global production ~ \$1-2 billion/year
- Less than 5% of current feedstock is used for biofuels, but large potential
- Estimated \$6 billion by 2010, \$20 billion by 2020
- World plastic market is 500,000 tonnes per year (~\$1 trillion).



Biofuels and Environment

- Analyses of greenhouse gas (GHG) and energy ratios (combustible energy in product vs. used for manufacture), include crop production, soil changes, inputs, transport and byproduct credits
 - Major differences among analyses caused by different assumptions about cropping, soils, byproducts and energy efficiency of ethanol plants
 - Canadian estimates generally exceed those for the United States – fewer corn inputs, natural gas for ethanol plants, no indirect land use change (ILUC)
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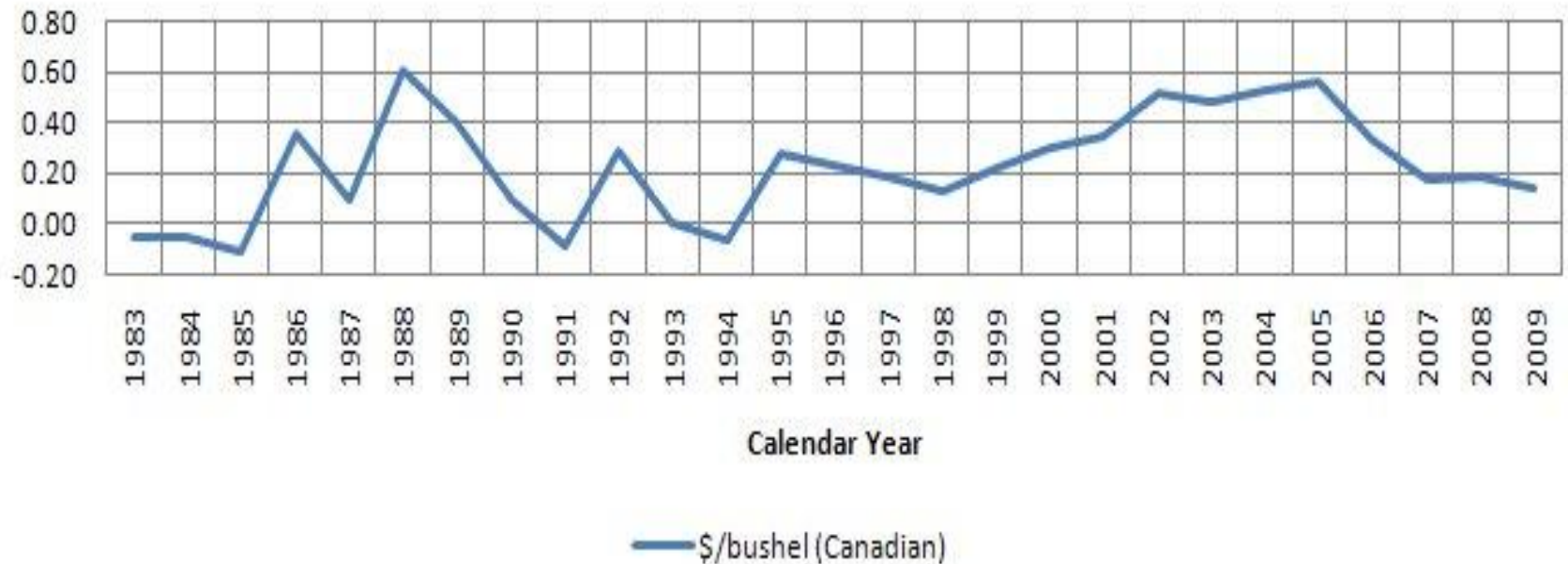


Canadian Analyses - Cheminfo and (S&T)² Consultants

- The addition of 10% ethanol to gasoline means a 62% reduction in net GHG emissions on a per litre of ethanol basis, adjusted for energy content
- Ethanol has 1.6 times as much combustible energy as is used in its production – projected to exceed 2.0 by 2015
- Biodiesel is substantially higher in both ratios
- Canadian fuel ethanol usage equivalent to removing 440,000 cars from the road.

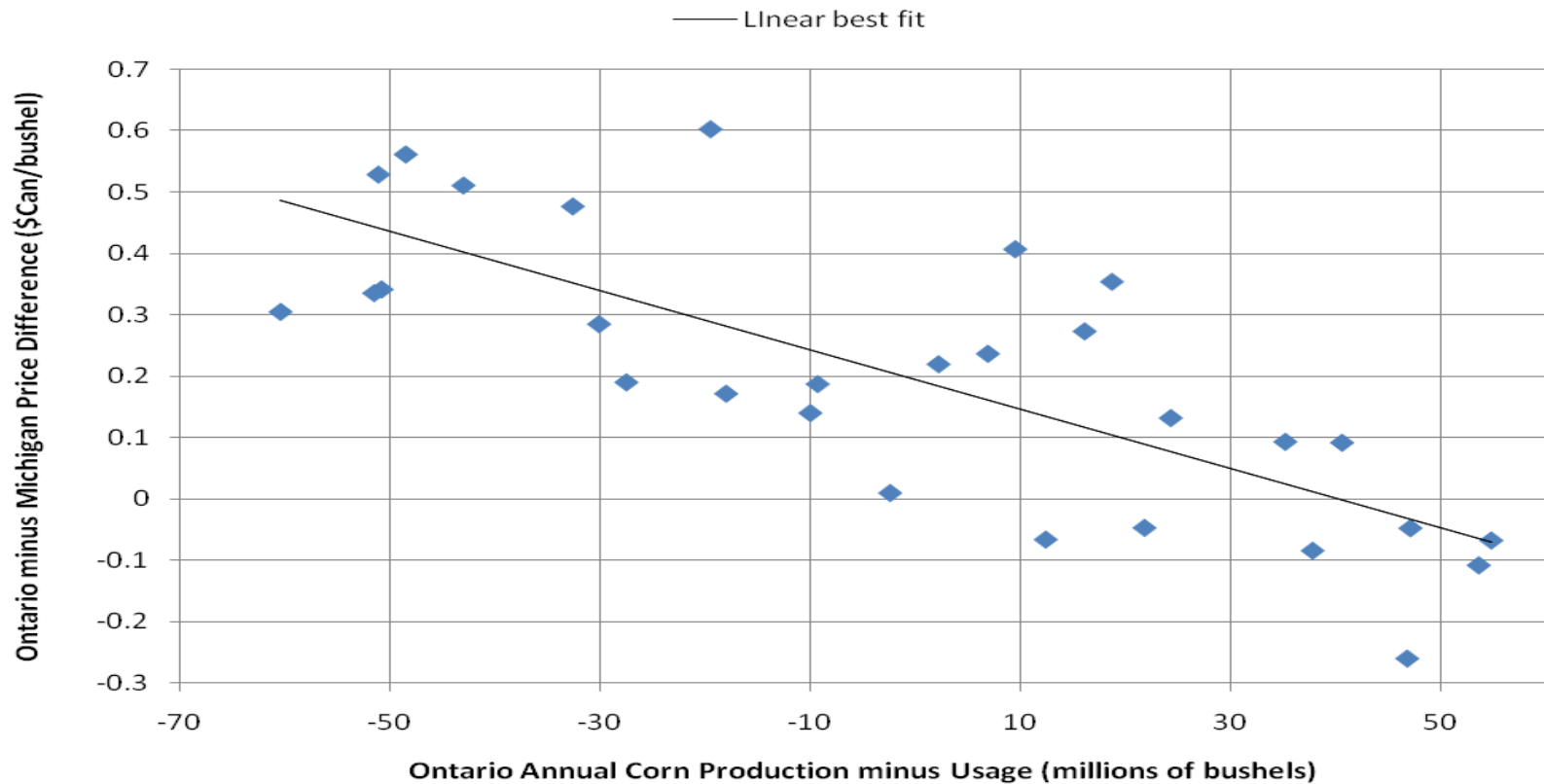
Ontario-Michigan Corn Price Differential

Ontario minus Michigan Average
Corn Price Differential



Effect of 110 Bushel Ethanol Demand on Corn Price

ON-minus-MI Corn Price Difference versus Ontario Production-minus-Usage (1983-2009)




110 million bushels ~ 50 cents/bu

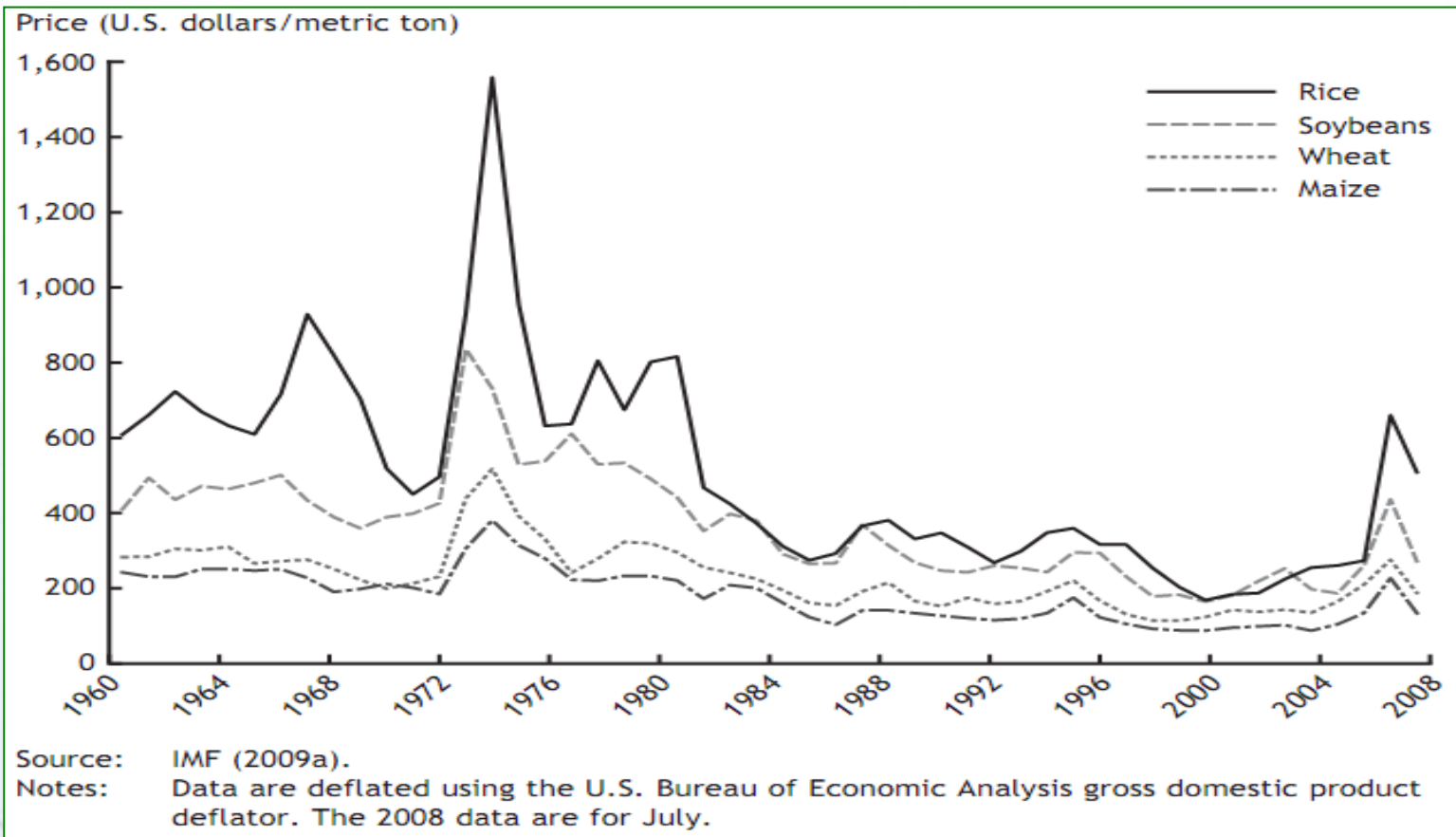


Effects on US Corn Price

Long-term effect (by 2015) of US ethanol support policies is about 15% (i.e. \$0.60/bu on \$4/bu corn)



Changes in Real Grain Prices since 1960

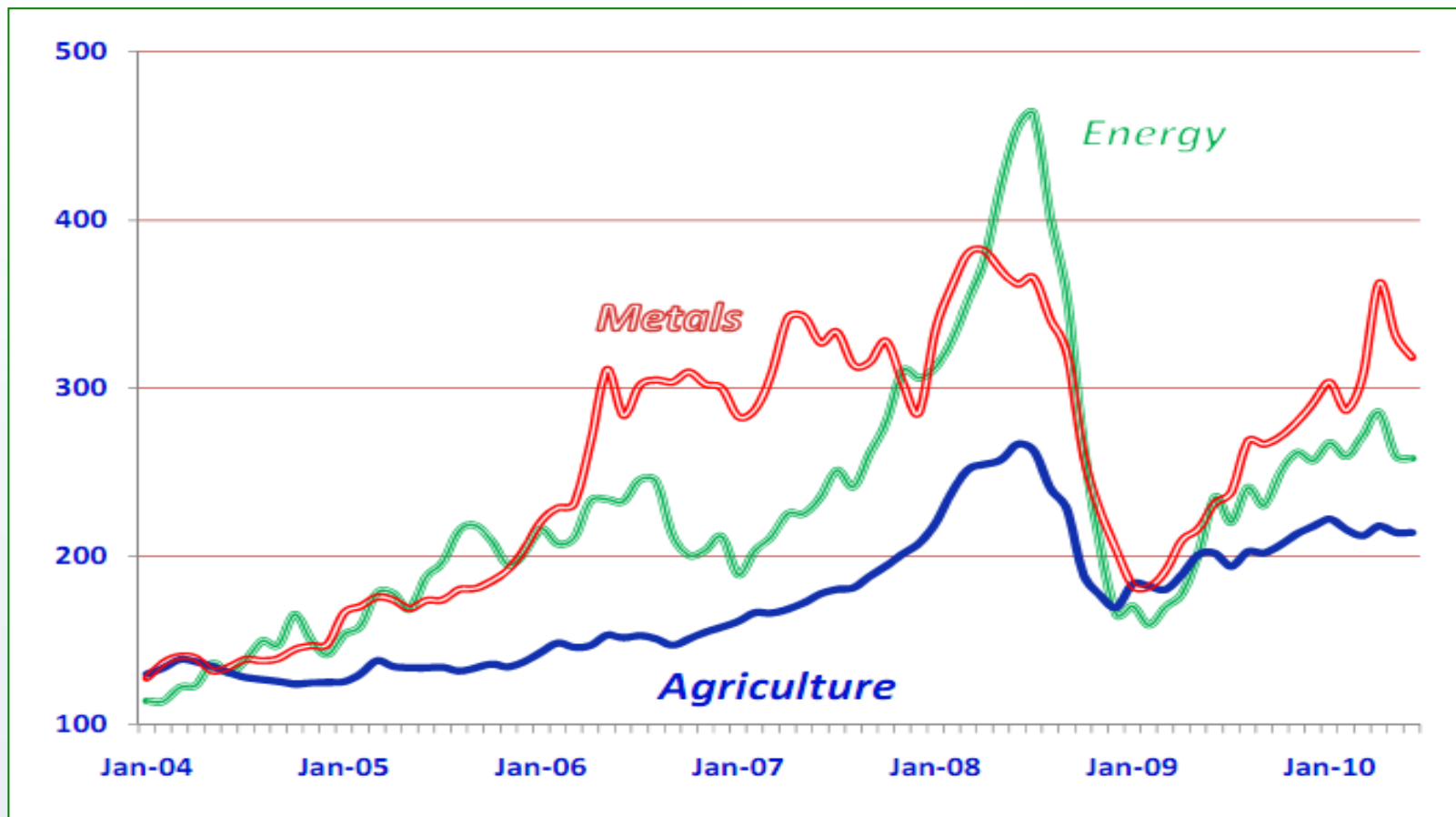




Causes of 2007-2008 Price Spike

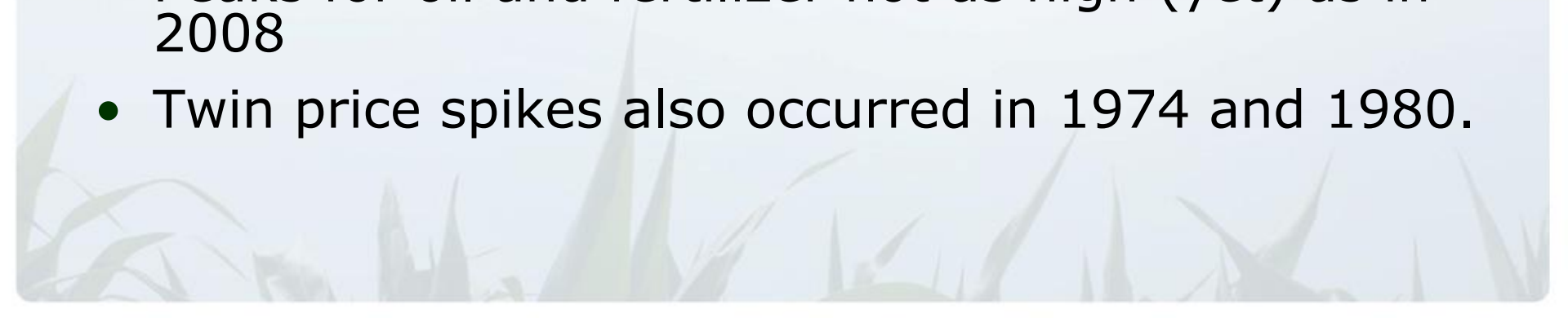
- Poor wheat crops in Australia, parts of Europe (though total global production was up)
- Export restrictions for wheat and rice
- Panic buying/hoarding
- Thin rice export market, world price up 225%
- Possible effect of commodity futures traders
- Possible low-stock effect
- High oil prices – cost of production and transport
- Shrinking US dollar (spikes less in other currencies).

Commodity Price Spikes in 2007-2008






2010-2011 Price Spikes

- Small wheat crops in some countries, especially Eastern Europe
 - Export restrictions and increased buying by North African countries
 - Small or no rice price spike this time
 - Spikes for most other grain crops still below 2008 peaks
 - Low estimated wheat, soybean and corn stocks
 - Peaks for oil and fertilizer not as high (yet) as in 2008
 - Twin price spikes also occurred in 1974 and 1980.
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Effect of Biofuels

- Greatest effect on corn price but minor or no effect on other crops (yet spikes larger for wheat and rice than corn in 2008)
 - Estimates of percent biofuel effect on corn price spike range from near zero to over 70%
 - Best estimate is 20-40% of \$US corn price spike
 - Some effect on soybean prices.
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Effects on Food Prices

- US Congressional Budget Office: Biofuels responsible for 0.5 to 0.8% of 5.1% food price increase in 2008
- Energy price increase far more important
- Food company profits high in 2008-2009 (George Morris Centre)
- 40% of food wasted in Canada (George Morris Centre)
- Nearly 50% of Canadians over-weight or obese

Canadian Food Expenditures

- “Food Freedom Day” is February 12 (Canadian Federation of Agriculture)
- Twenty percent (or less) of food dollars go to farmers
- “Farmer Food Freedom Time” is January 9 at about noon
- When corn prices peaked in June 2008, “ethanol effect” might have delayed Farmer Food Freedom Time to January 9 at 4 PM.

Ethanol & Gasoline Prices

- Gasoline supply-price elasticity is about minus 0.50, & ethanol presents about 5% of world gasoline supply (higher in N. America)
- 5% increased supply should mean 10% price reduction
- Retail effect may be minus 6-10 cents/litre
- CARD-Iowa State University analyses:
 - 2008 report – 6 ¢/litre average US reduction, 10¢ in Midwest
 - 2010 report – 23 ¢/litre average US reduction

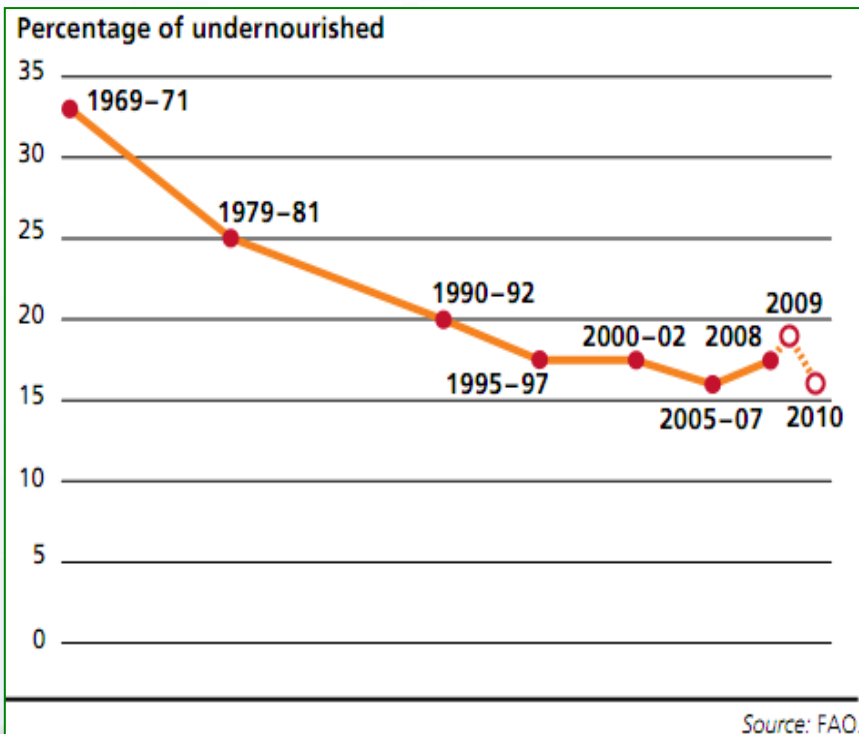
The background of the slide features a light blue sky with a soft gradient. At the top and bottom, there are silhouettes of green corn plants. A decorative wavy line in shades of green and black separates the header from the main content area.

Effects of fuel ethanol on Canadian Families

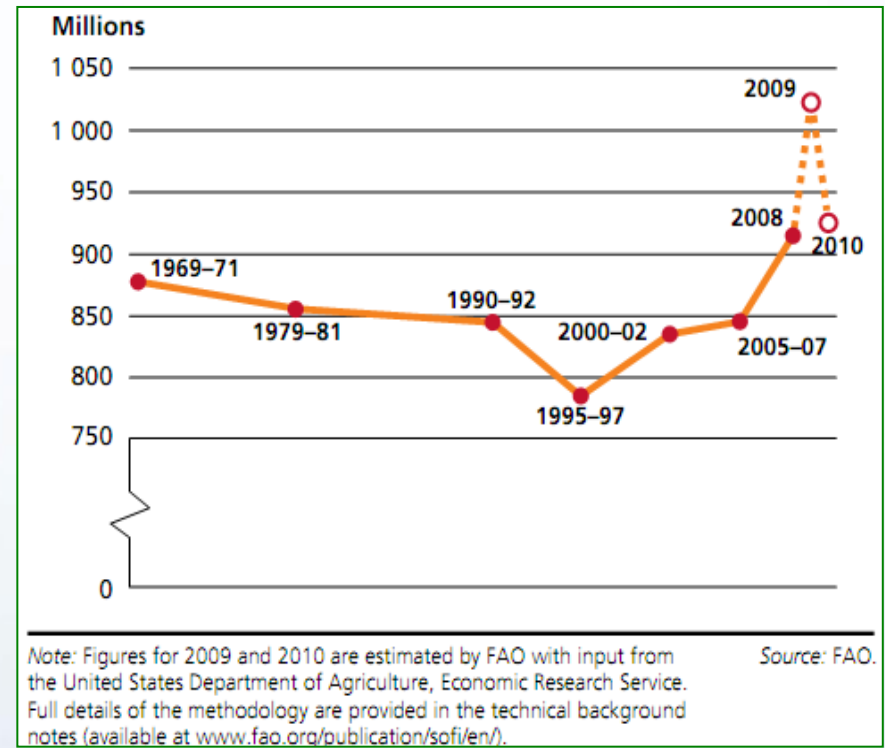
- 0.5-0.8% increase in food prices means about \$35-60 more per year
- 6-10 cents/litre reduction in gasoline price means about \$100 to 180 less per year.

Global Hunger

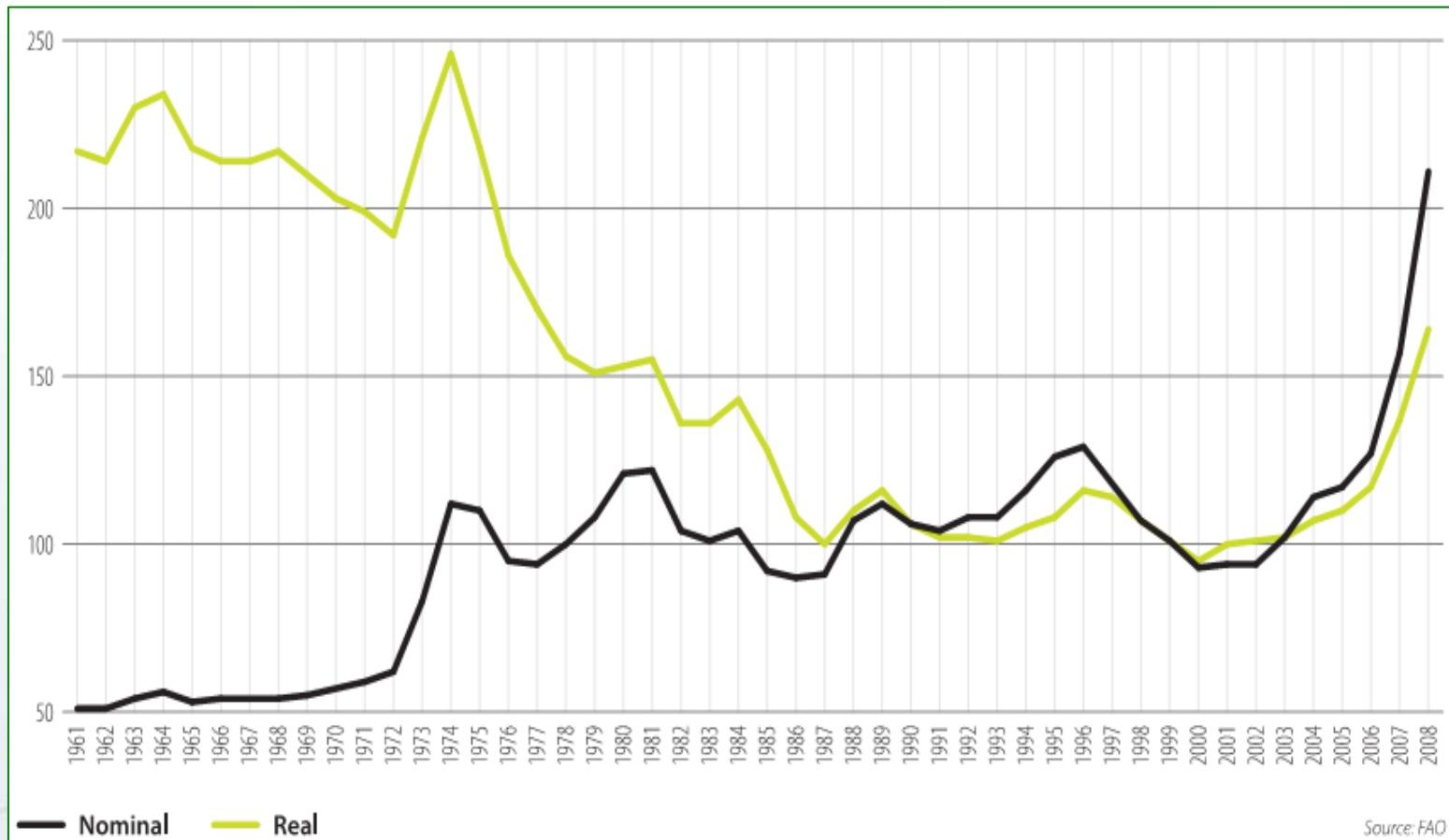
Percent Under-Nourished



Number of Under-Nourished



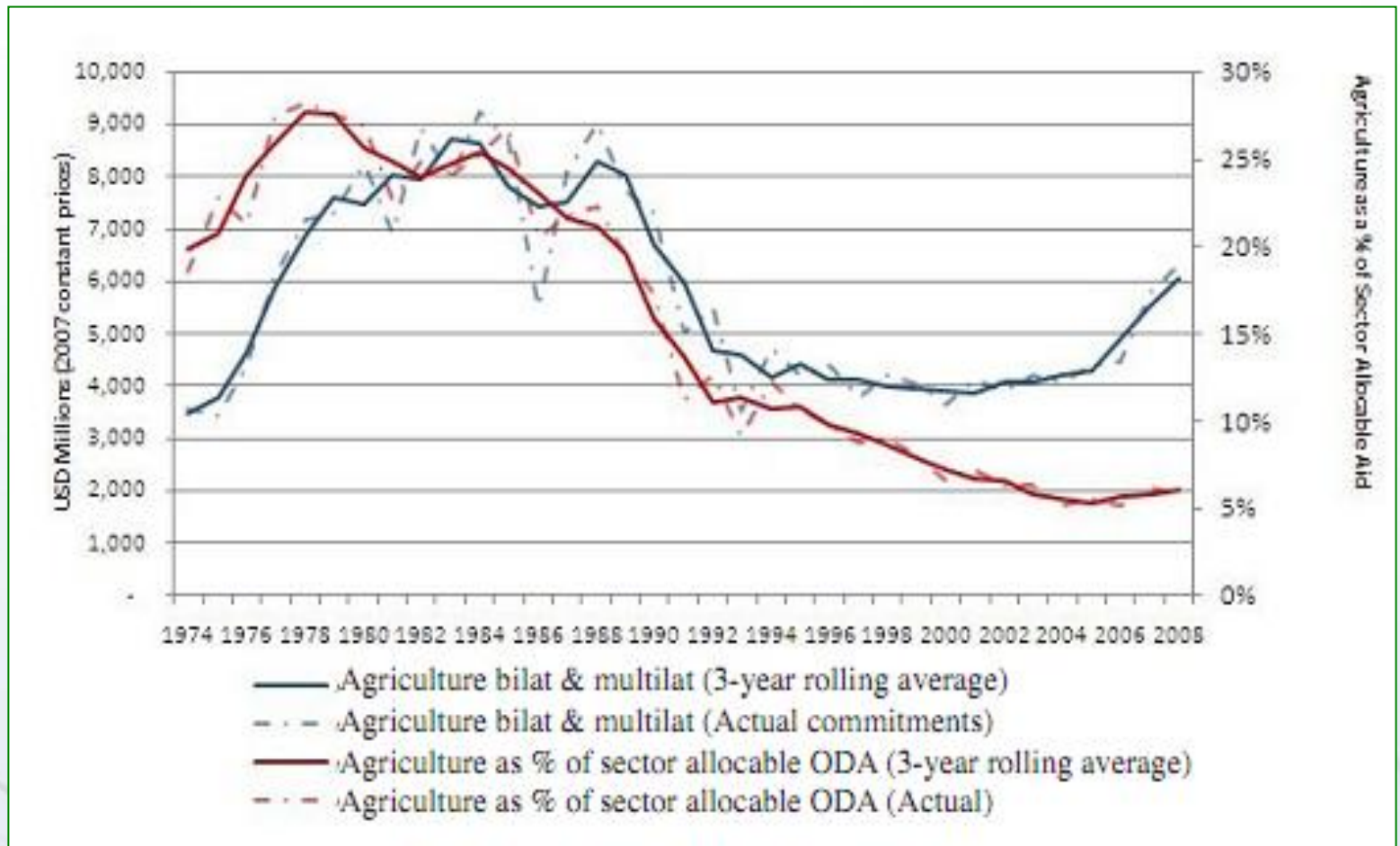
World Food Price Index



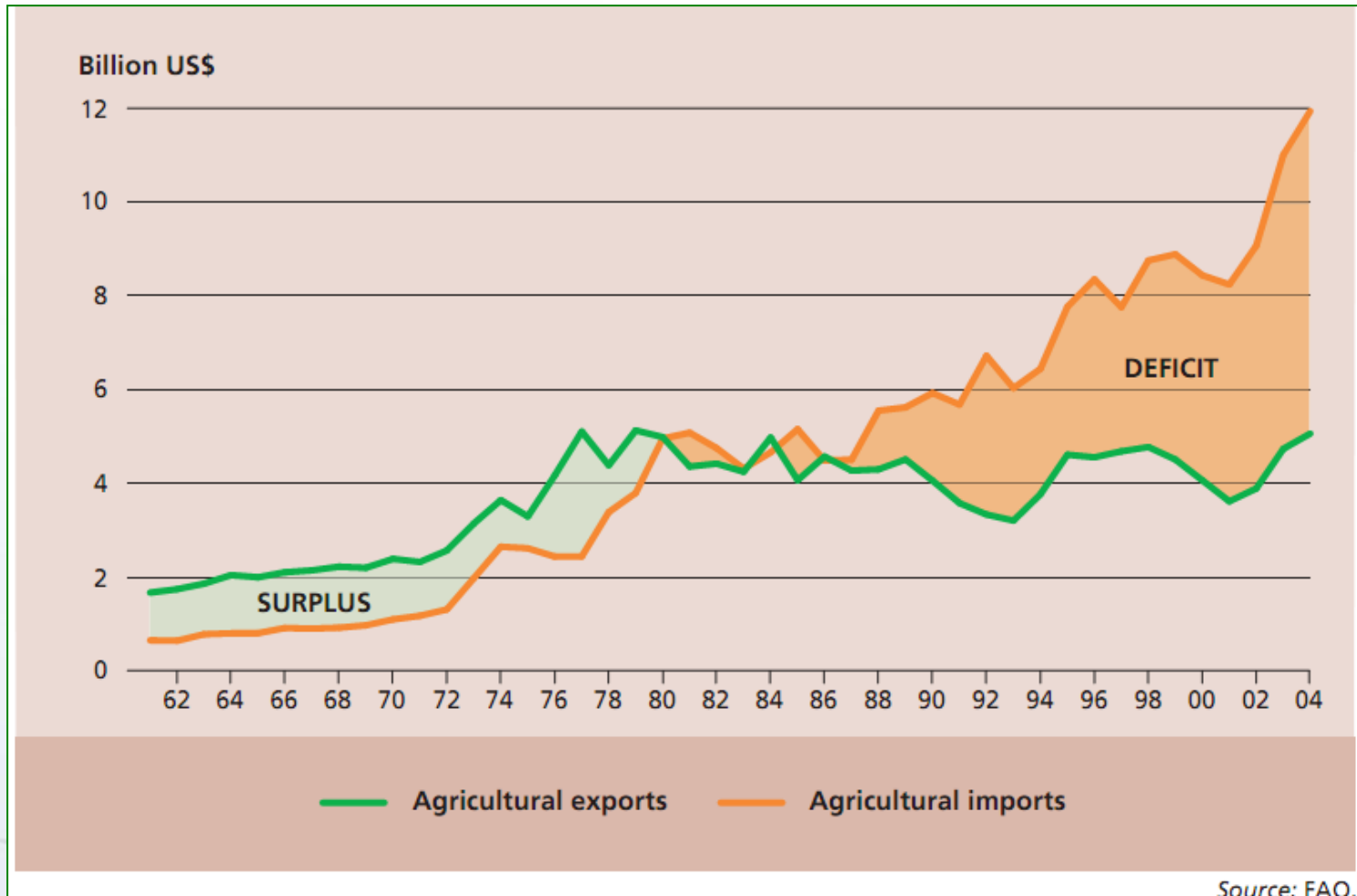
Source: FAO

Source, FAO, 2008

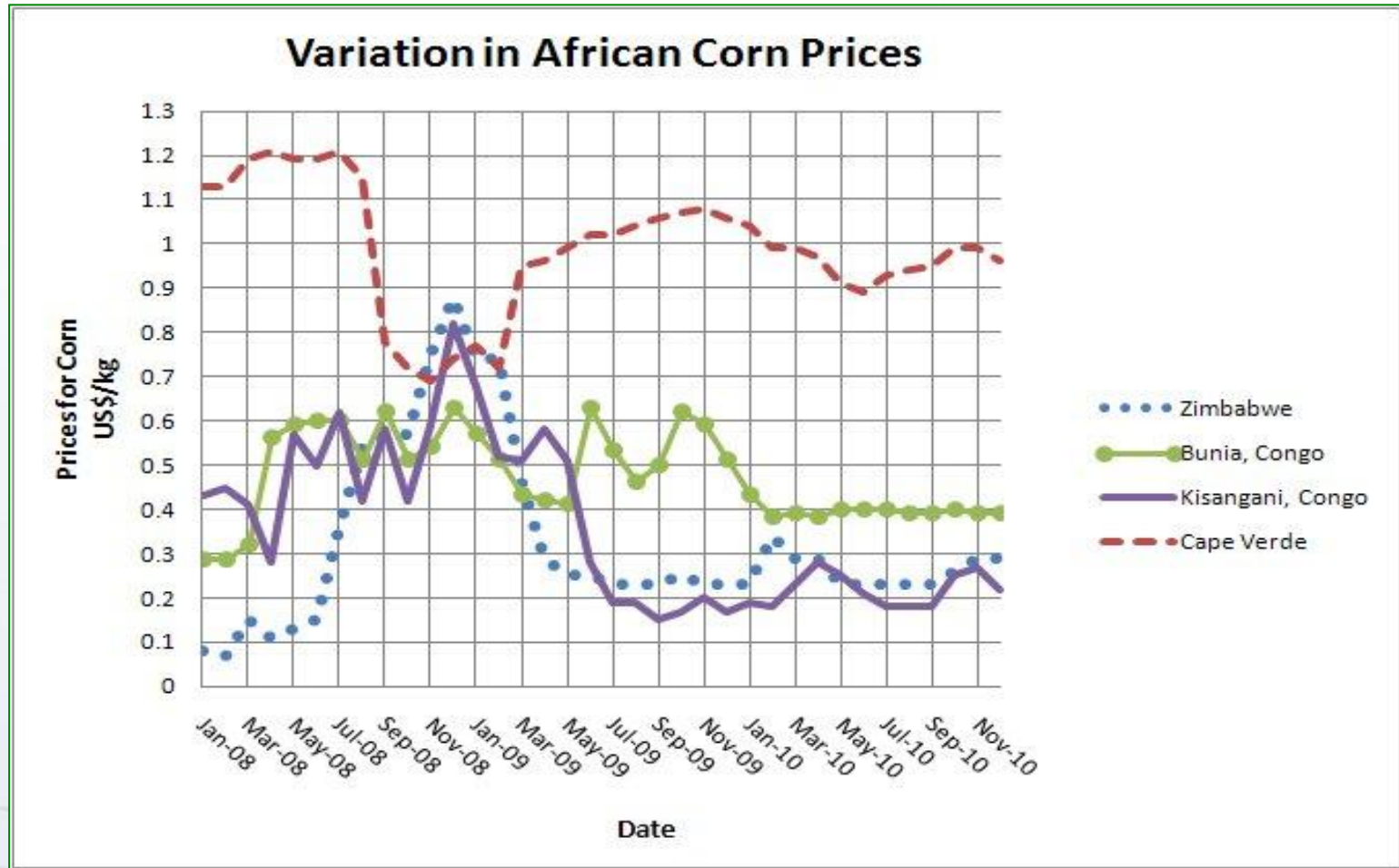
Decline in Funding for International Development



Agricultural Trade Balance - Least Developed Countries



2008-2010 Corn Prices in Africa






Minimal Biofuel Effect on Third-World Food Prices & Hunger

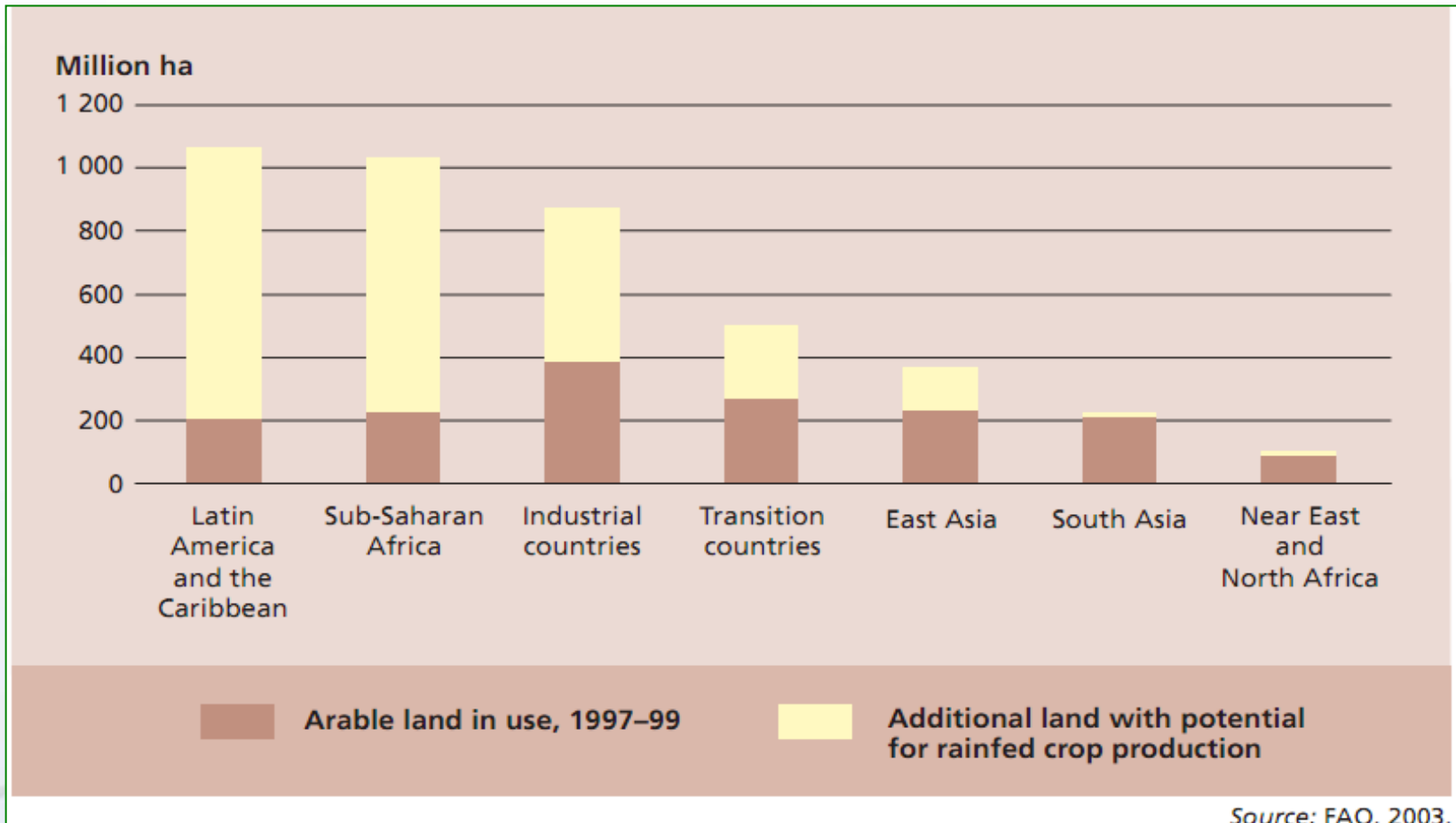
- Rice and wheat far more important (50% of Third-World caloric intake), and with higher spikes than for corn and soybeans in 2008
 - Prices in local currencies differ largely from those in \$US
 - Local food prices well insulated from global prices; most hunger is in isolate rural communities
 - Export restrictions, panic buying & hoarding, oil prices far more important
 - In Mexico, white corn pricing is distinct from that for imported yellow corn
 - Mexico (and Egypt) have higher % obesity than Canada
 - 25-50% grain/food spoilage/wastage (global average).
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Future Expectations

- Are higher prices here to stay? Or is there something different?
 - Learn from 1970s' experience – higher prices and concern about future food supply, followed by ample production and low prices
 - 1.1% annual increment needed to increase world food supply by 70% from 2000-2050 (vs. average grain yield increase of 1.5%/year since 1980)
 - Potential to increase world agricultural production is high – even with climate change.
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Potential for Cropland Expansion



Source: FAO, 2003.



Addressing World Hunger

- USDA-ERS analysis: food caloric deficit in 70 hungriest countries equates to 1.1% of annual world grain production
- Three decades of shipping cheap, subsidized North American grain to the Third World, while also ignoring and under-mining third-world agriculture, has provided no solution to global hunger.
- “We need to produce where the poor and hungry live,” Dr. Jacques Diouff, director-general, Food and Agricultural Organization


Implications for Ontario Grain Farmers


We could see:

- Much greater food productivity/self-sufficiency in developing countries
- Slow or no growth in food consumption in developed world
- Slower expansion in ethanol production from grain, though greater percent increase in biodiesel
- Continuous increases in Canadian/US farm productivity
- Concerns about use of food crops for non-food uses, regardless of local over-supply
- Depressed grain prices. History repeats itself.



Solutions for Grain Farmers?

- Return to major dependence on government income support?
 - Restrictions on production - reduce supply to match local demand?
 - New bioproduct markets coupled with aggressive communication plan to explain benefits to the rest of society?
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That's it
Thank you

(Thanks to the Grain Farmers of
Ontario for project funding, and Karen
Daynard for graphics and design)

