

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



KD Communications
(Karen Daynard) and Terry Daynard

April 2011

Food Versus Fuel: The Debate is Over

**Ontario Biomass
Producers Group AGM**

**Toronto, Ontario
February 8, 2012**

Gord Surgeoner, Ph.D.
President
Ontario Agri-Food Technologies

The Conference Board of Canada
Insights You Can Count On



Report November 2011



Ethanol's Potential Contribution to Canada's Transportation Sector

ENERGY, ENVIRONMENT AND TRANSPORTATION POLICY



***The greatest risk to food
security***

***Farmers not getting fair
return for labour and
investment.***

Overview of study

1. Purpose: to gather, review and summarize publicly available information, coupled with some analyses of our own.
2. Support/input/advice provided by Don O'Connor ((S&T)² Consultants), Alfons Weersink, T.K. Warley and Gord Surgeoner.

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

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.

100 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.

Biofuel mandates

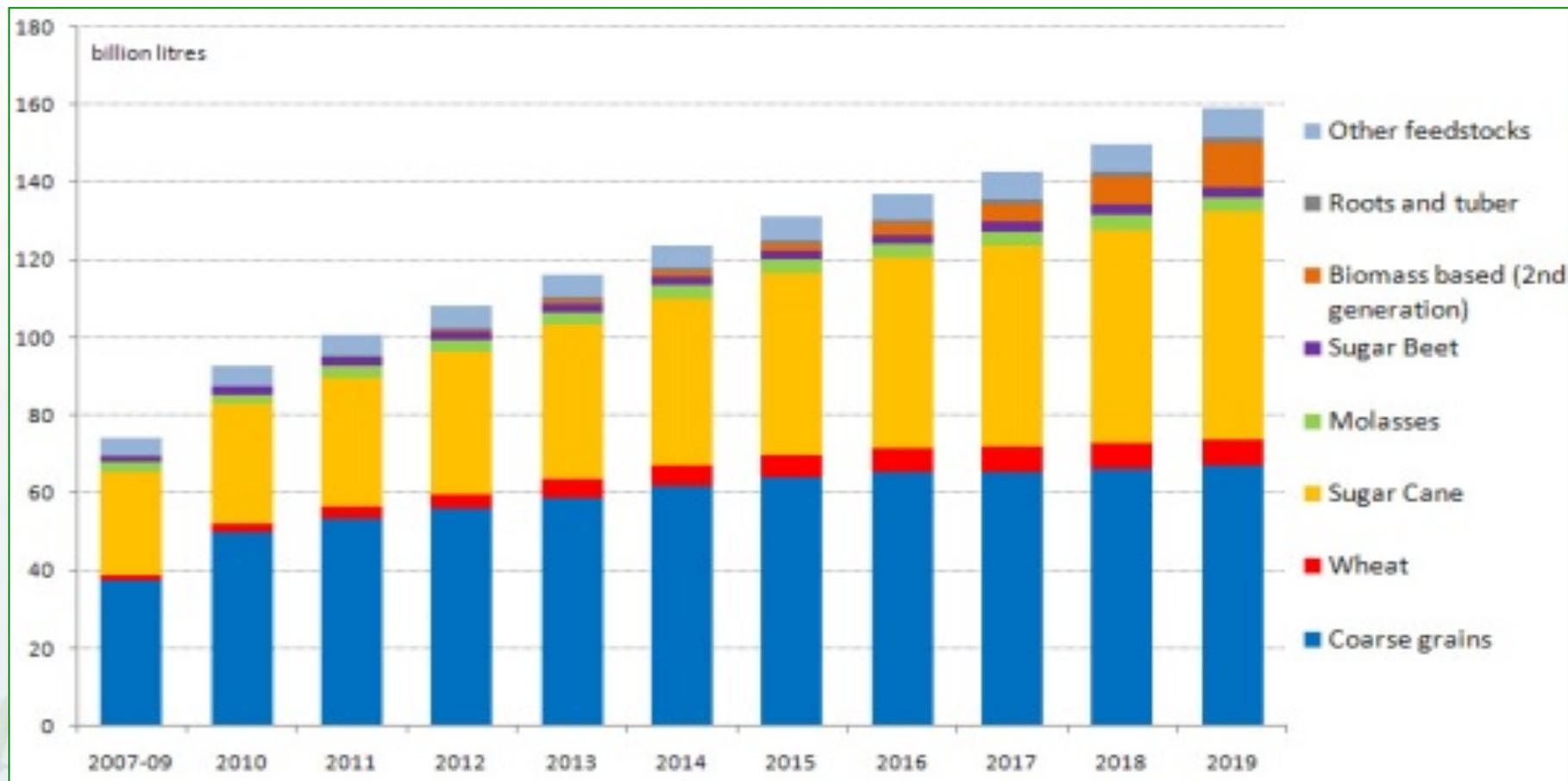
Canada

- 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.

World fuel ethanol projections



Source: OECD and FAO, 2010

Biofuels & 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).



Indirect land use change: landmark test of ILUC biofuels theory finds “negligible or no effect”

Biofuels Digest
July 28, 2011

Do biofuels encourage rainforest deforestation through indirect land use change? The effect is negligible or non-existent, concludes a landmark test of ILUC theory against hard data, as the biofuels hammer gets hammered.

In Michigan, Dr. Seungdo Kim and Dr. Bruce E. Dale of Michigan State University have published a study in the July 2011 issue of *Biomass and Bioenergy Journal*, that concludes that on indirect land use change (ILUC) due to biofuels production, domestically and international, is negligible or nonexistent....

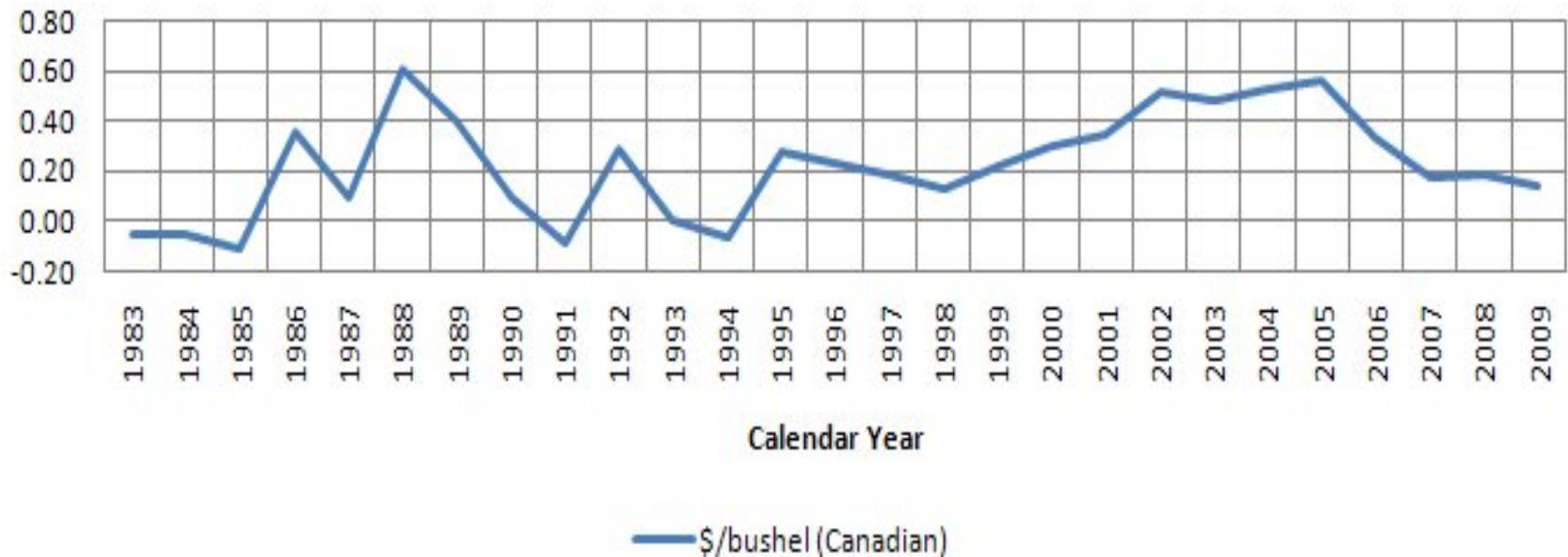


Canadian Analyses - Cheminfo & (S&T)² Consultants

- 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 (2.23 Conference Board of Canada 2011) 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



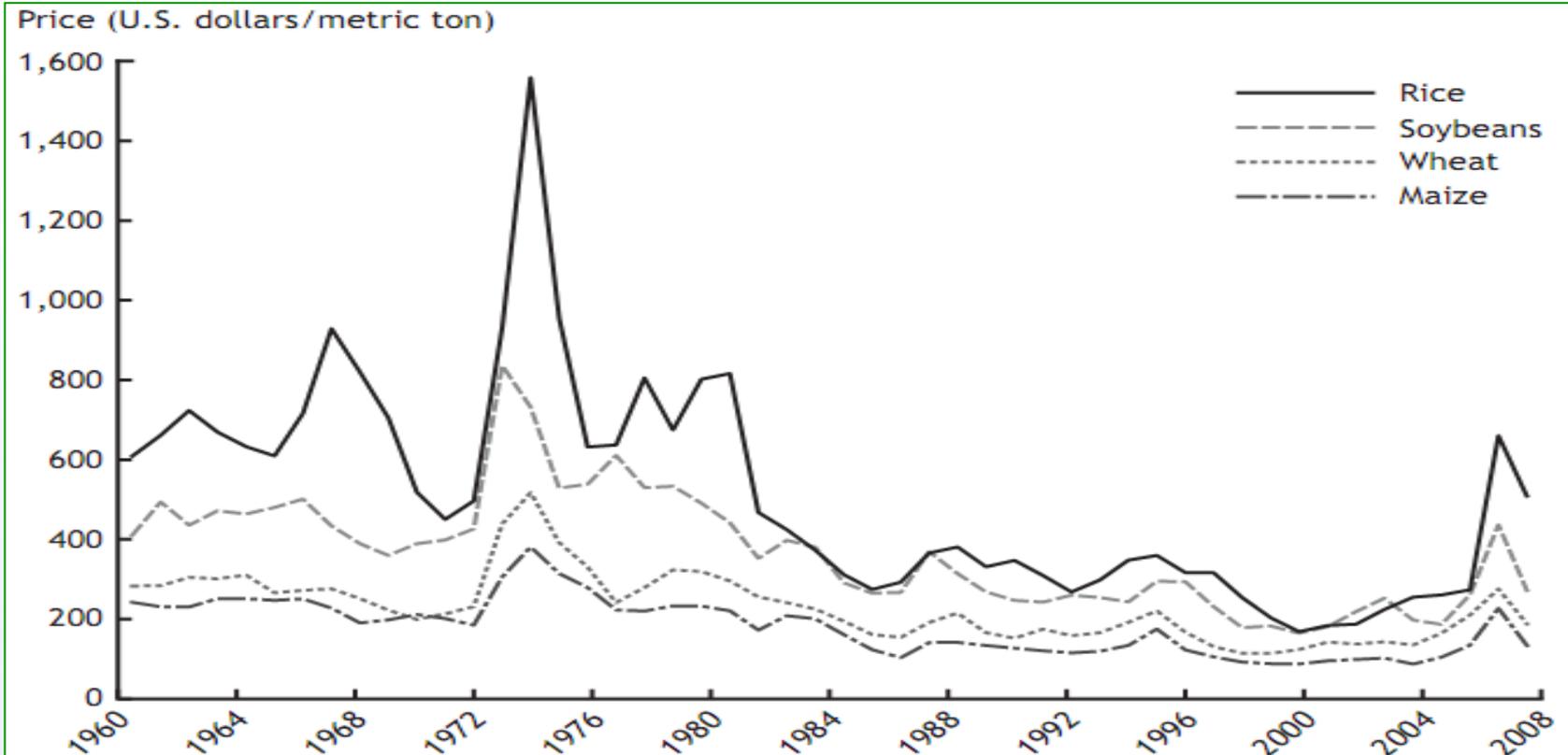


Effects on US corn price

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



Source: IMF (2009a).

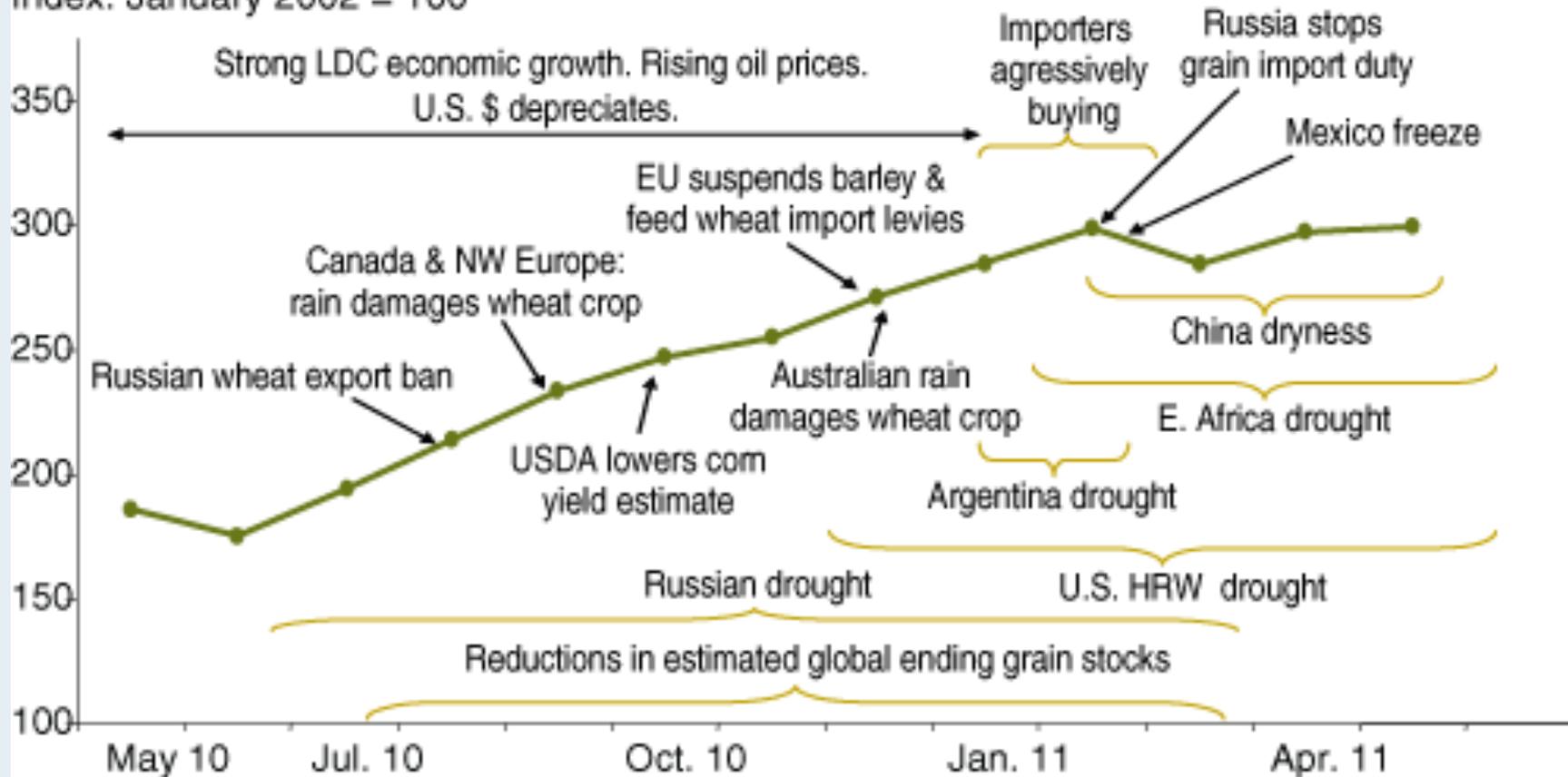
Notes: Data are deflated using the U.S. Bureau of Economic Analysis gross domestic product deflator. The 2008 data are for July.

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).

Adverse weather events were a major factor contributing to crop price increases

Index: January 2002 = 100*



Notes: LDC=Least developed country. HRW=Hard red winter wheat. * = Four-crop price index: Monthly wheat, rice, corn, and soybean prices, weighted by global trade shares.

Source: USDA, Economic Research Service using International Monetary Fund, International Financial Statistics.



Ethanol production sets new record

Hoosier Ag Today
January 2, 2012

In its latest weekly report, the Energy Information Administration says ethanol production averaged 962-thousand barrels per day – or 40.4 million gallons daily. That is up 19-thousand barrels per day from the record set the previous week. The 4-week average for ethanol production stood at 949-thousand barrels per day for an annualized rate of 14.55-billion gallons. With one week remaining, ethanol production has averaged 898-thousand barrels per day in 2011 for a total of 13.7-billion gallons. Stocks of ethanol stood at 17.7-million barrels.

Gasoline demand for the week averaged 374.8-million gallons daily. Expressed as a percentage of daily gasoline demand, daily ethanol production was 10.78 percent.....

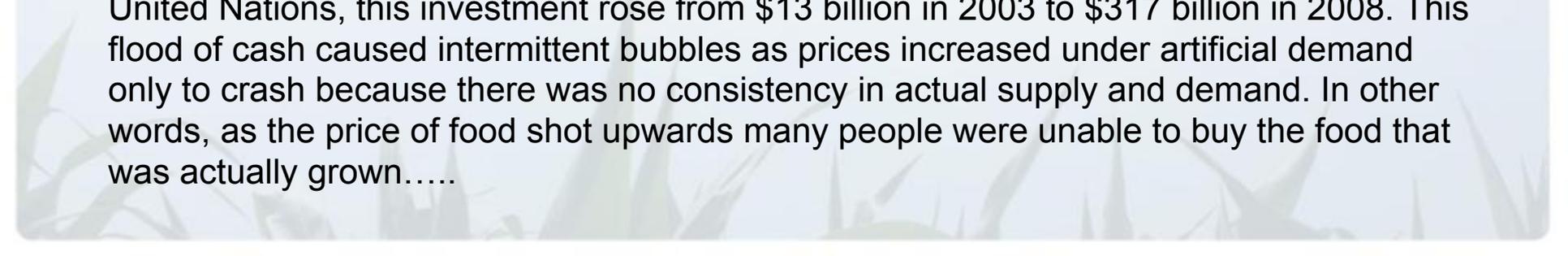


Commodity traitors: financial speculation on commodities fuels global insecurity

Scientific American
September 22, 2011

.....“This analysis,” conclude the authors, “connects the bursting of the US real estate market bubble and the financial crisis of 2007-2008 to the global food price increases.”

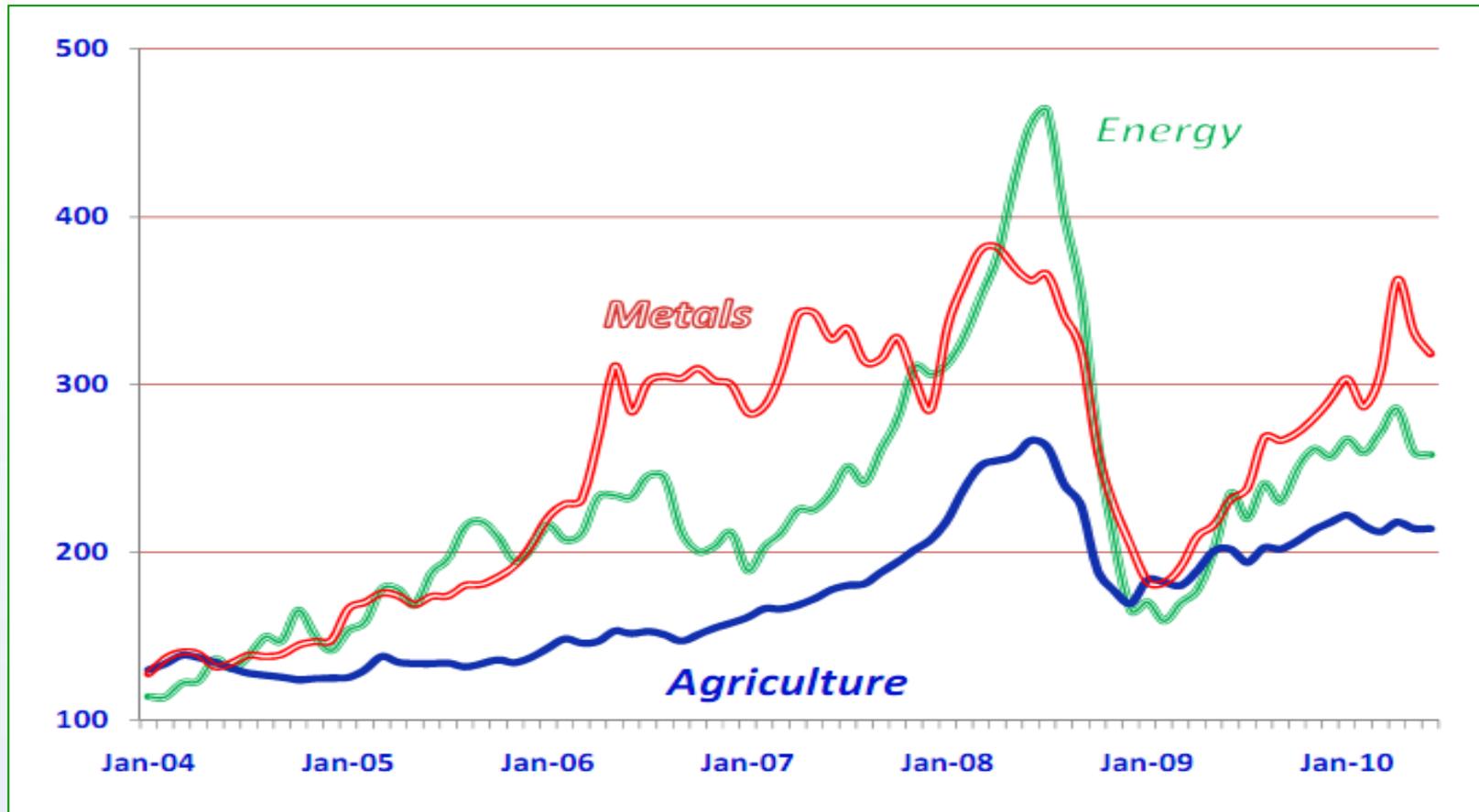
Following this collapse many investors shifted their assets into “index funds” that allowed them to bet on the likelihood that commodity futures would increase. These index funds would be purchased by commodity traders and then repackaged as derivatives to be resold for twice or three times the initial purchase price. According to data from the United Nations, this investment rose from \$13 billion in 2003 to \$317 billion in 2008. This flood of cash caused intermittent bubbles as prices increased under artificial demand only to crash because there was no consistency in actual supply and demand. In other words, as the price of food shot upwards many people were unable to buy the food that was actually grown.....



Source: IMF – Primary Commodity Prices



Commodity price spikes in 2007-2008



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.

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

Farm Value, \$0.19

Labor, \$0.38

Packaging, \$0.08

Transportation,

Energy, \$0.04

Profits, \$0.05

Depreciation, \$0.04

Advertising, \$0.04

Rent, \$0.04

Interest, \$0.04

Repairs, \$0.03

Business Taxes, \$0.02

Other Costs, \$0.04



Farm Value

Marketing Bill

Source: USDA's Economic Research Service

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, and 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

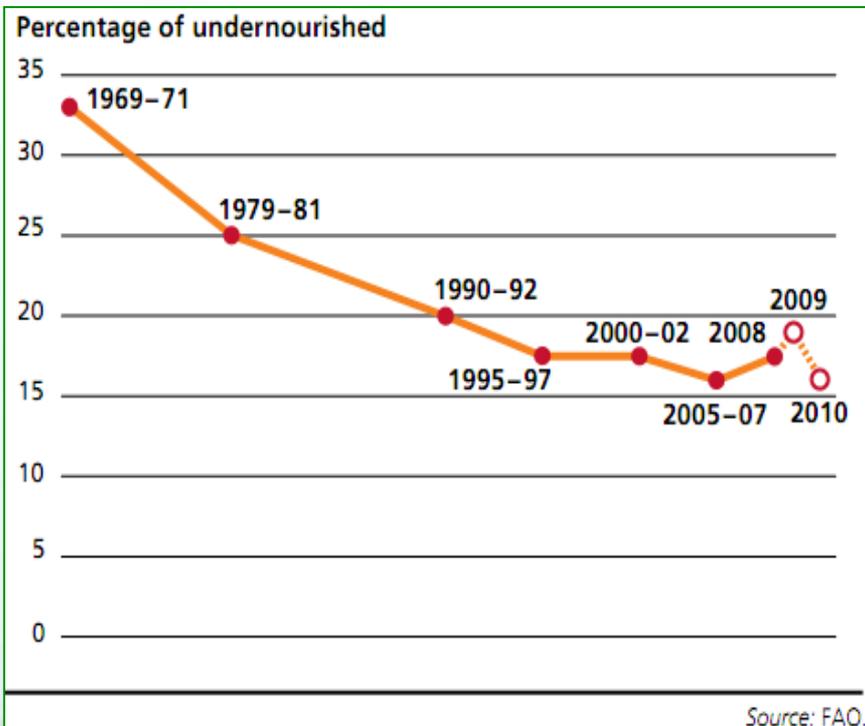


Effects of fuel ethanol on Canadian families

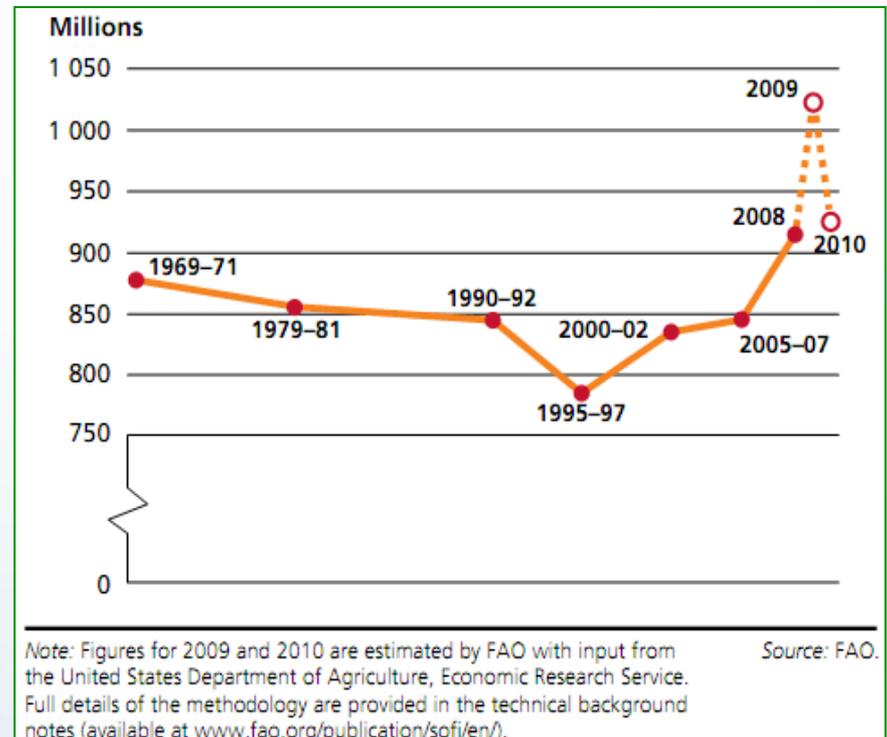
- 0.5-0.8% increase in food prices means about \$35-60 more per year
 - 6-10 cents/litre reduction in gasoline price means about \$100 to 180 less per year.
- 

Global hunger

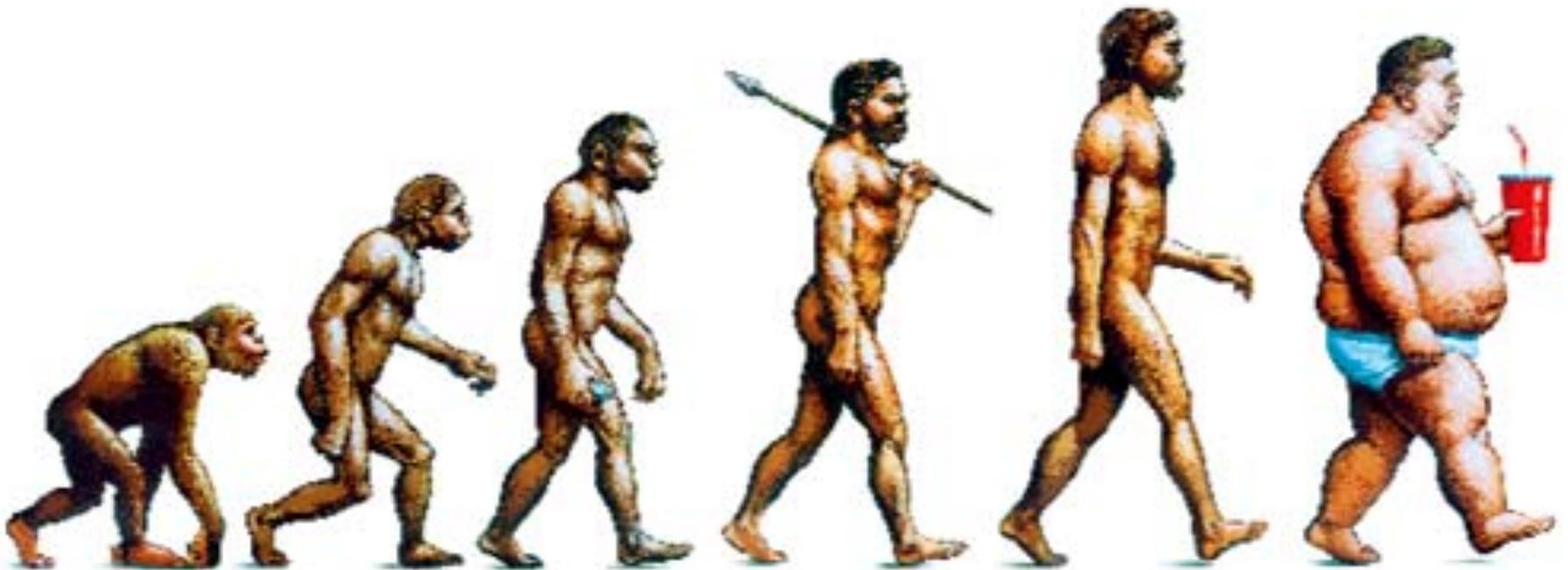
Percent Under-Nourished



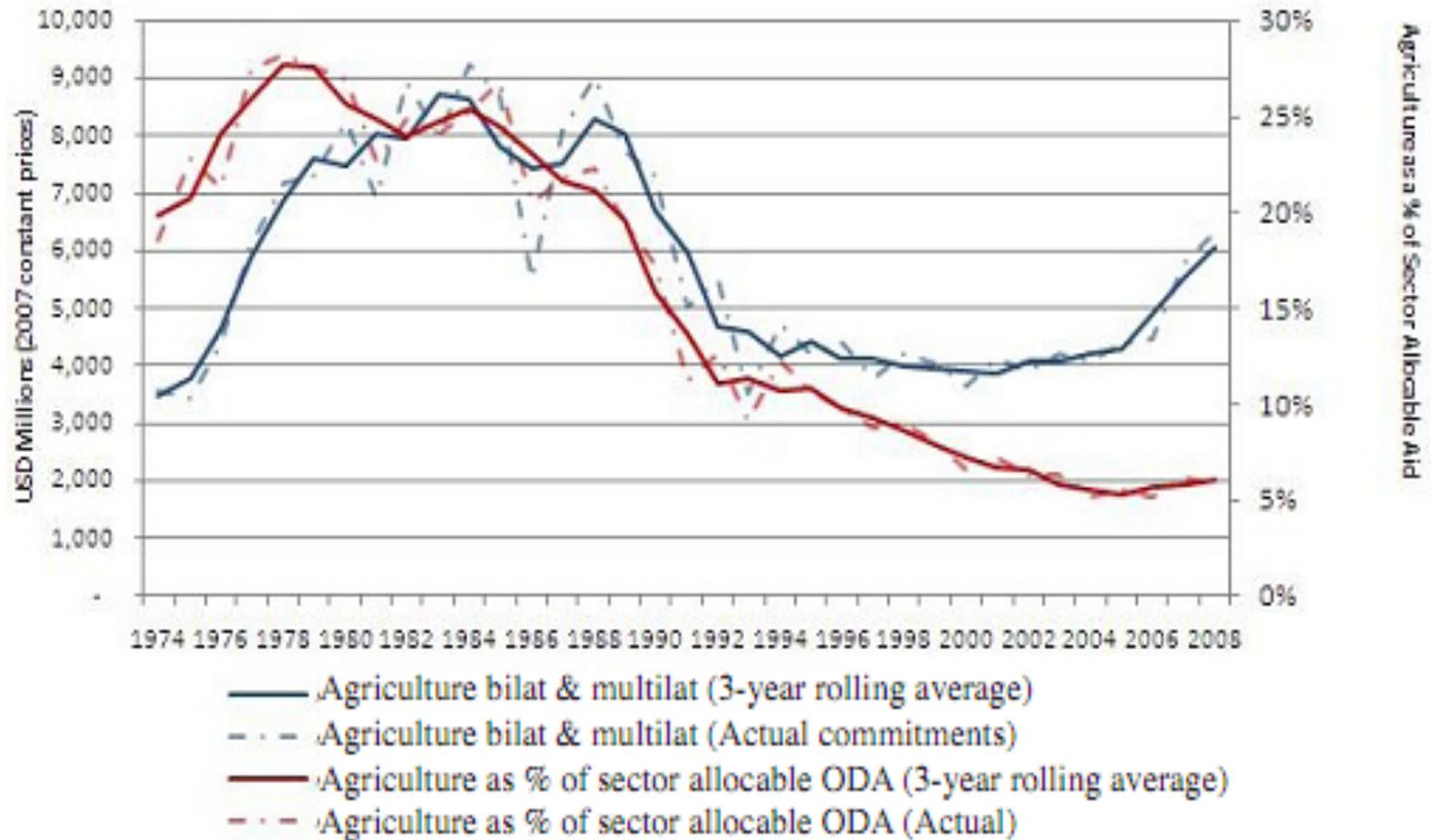
Number of Under-Nourished



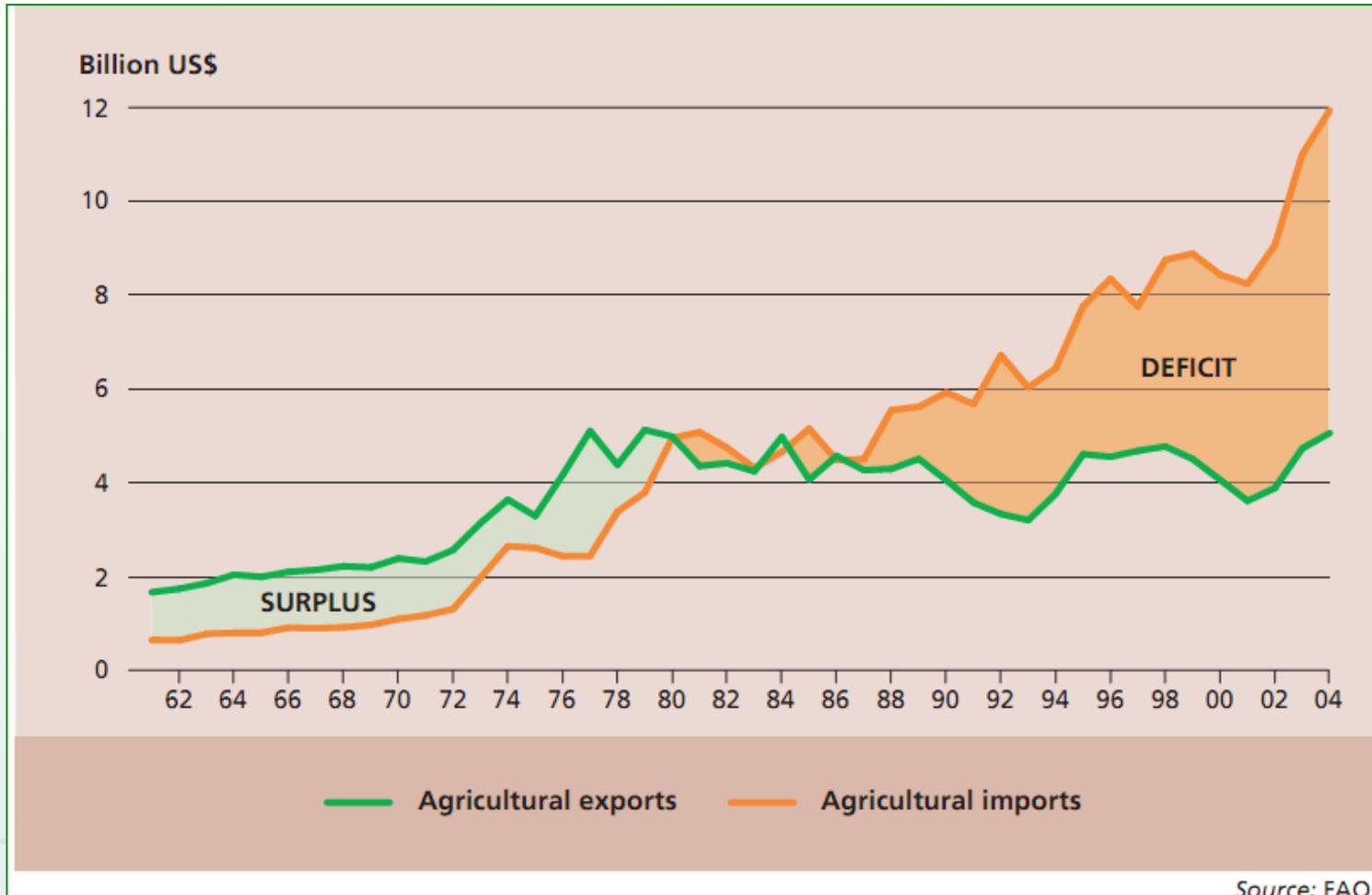
Evolution



Decline in funding for international development

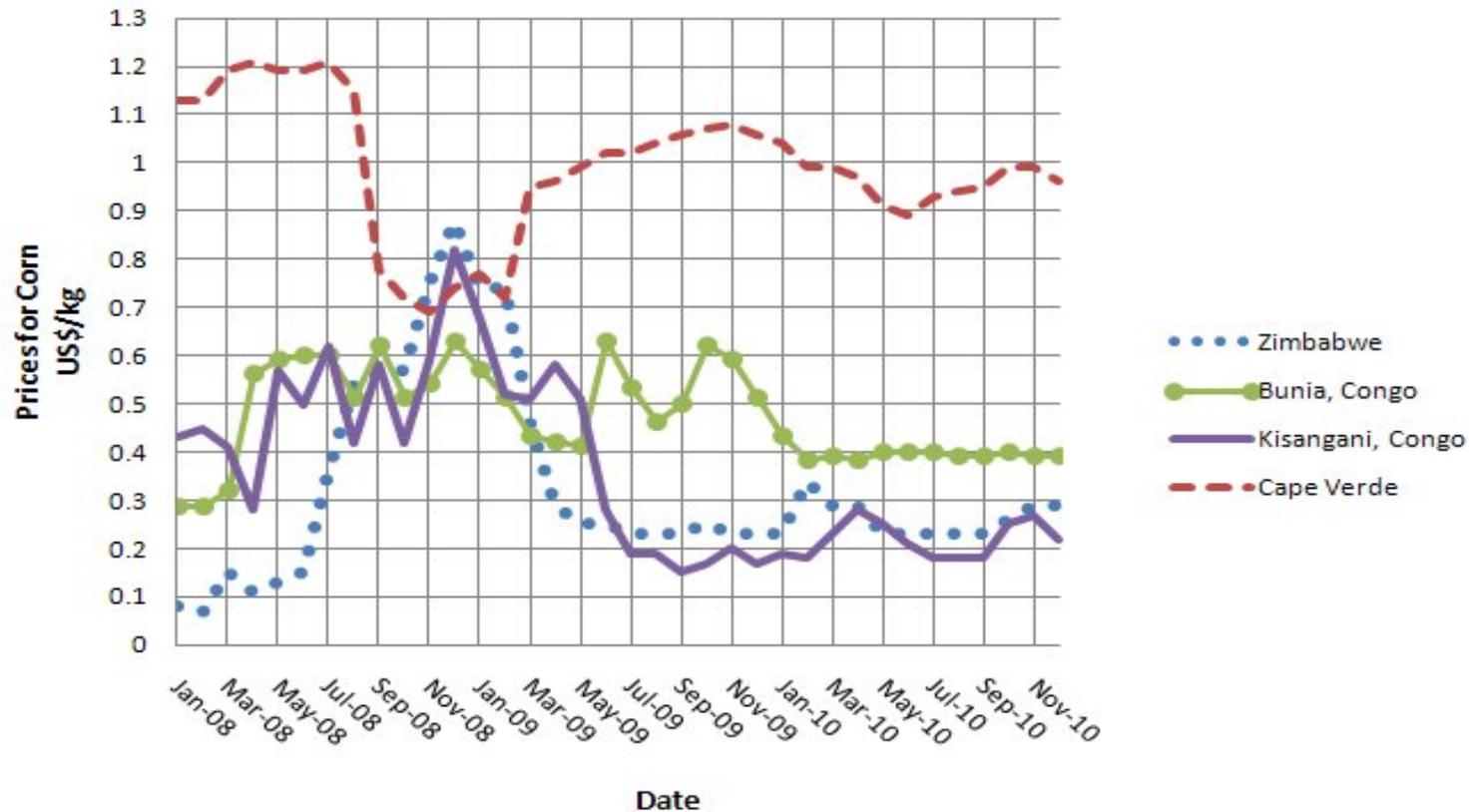


Agricultural trade balance - least developed countries



2008-2010 corn prices in Africa

Variation in African Corn Prices





Zimbabwe's Grain Market Board owes farmers U.S. \$40 million

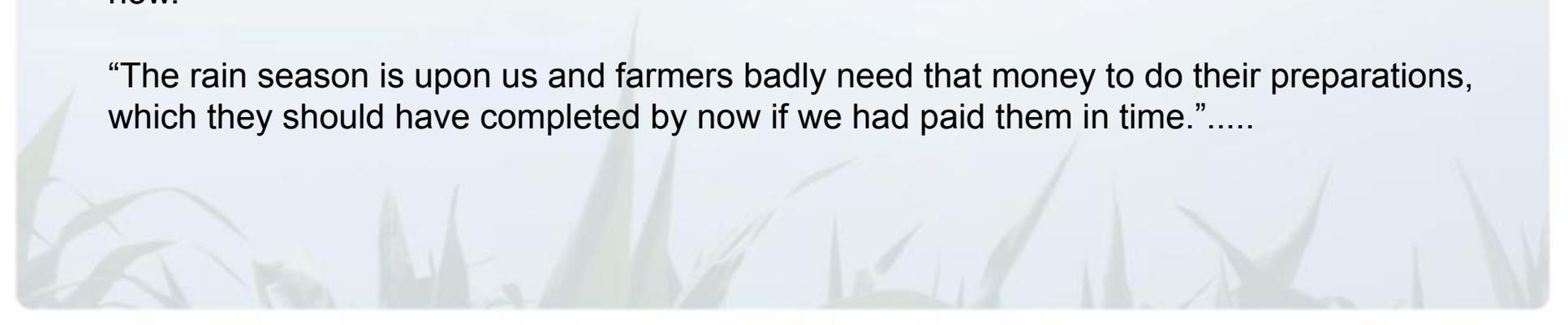
Soyatech.com

October 14, 2011

The Grain Marketing board still owes farmers US\$40 million for maize delivered to its depots in the 2010/11 marketing season.

In an interview yesterday, GMB general manager Mr. Albert Mandizha said despite the parastatal having paid US\$27.4 million to farmers so far, there was need for treasury to urgently mobilize more funding to pay farmers for grain that was delivered after July to now.

“The rain season is upon us and farmers badly need that money to do their preparations, which they should have completed by now if we had paid them in time.”





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).

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.



Wheat plunging as decade-high stockpiles ease world shortages: commodities

Bloomberg

November 4, 2011

Wheat is heading for the biggest slump in three years as the second-largest harvest on record swells stockpiles, easing shortages that drove global food costs to an all-time high.

Prices that plunged 20 percent to \$6.375 a bushel this year in Chicago will probably drop as low as \$5.90 before the end of December, according to the median estimate of nine analysts and traders surveyed by Bloomberg. Supply in the 12 months ending June 30 will expand 5 percent to 684 million metric tons, boosting inventories to the highest in a decade, the London-based International Grains Council estimates.....



DDGS replaces 7.6 million acres corn, 5.86 million acres soy

Ethanol Producer Magazine

December 29, 2011

Projected DDGS production for the current marketing year will come in slightly lower than the 2010-'11 marketing year just closed, according to a distillers grain balance sheet regularly updated by the Agricultural Marketing Resource Center at Iowa State University.

Using on USDA's corn production numbers and projections, and assuming 17 pounds of DDGS produced per bushel of corn, the AgMRC shows DDGS production for the 2011-'12 marketing year could range from 42.29 million tons, on the low side of estimates, to a high of 42.50 million tons, as compared to the preliminary 2010-'11 figure of 42.67 tons. If realized, the slight decrease will follow several years of supply expansion. DDGS production of 25.92 million tons in 2007-'08 jumped 5.6 million tons to 31.53 million tons in 2008-'09 and 7.3 million tons to 38.83 for 2009-'10. The increase the following year was narrower, at 3.8 million tons.



Food prices could fall slightly in 2012, says USDA

FoodNavigator-USA.com

July 27, 2011

....Although rising food prices undoubtedly impact Americans, particularly in the current economic climate, recent USDA figures show that US household expenditure on food as a share of disposable income has hit an all-time low, falling to just 9.4 percent last year. This is down from 11.4 percent in 1990 and 13.2 percent in 1980.

In addition, market research organization the Nielsen Company points out that food accounts for a much smaller proportion of total household spending in the United States than it does elsewhere. Food spending accounts for 11 percent of the average Austrian household's expenditure, 15 percent in South Korea, and 45 percent in Pakistan. Per capita, that translates as \$2,208 in the United States, \$2,860 in Austria, but just \$309 in Pakistan, the market researcher said.

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?
- 

Solutions for hunger

Third World

- Provide education (women), infrastructure, “stable” government, financing, agriculture research.
- Give food - destroys markets for their farmers - wrong.

Developed World

- Figure out what to do with our surpluses (solutions for society)
- Number one risk from food - overconsumption.



Campaign to vilify ethanol revealed

Ethanol Producer Magazine's Ethanol Week

May 16, 2008

The “food-versus-fuel” debate being waged in the United States has been nothing more than a cleverly planned public relations campaign. A request for a public relations proposal put forth by the Grocery Manufacturers Association and the media campaign response by Glover Park Group prove that there has been a concerted effort to attack the ethanol industry. Both documents were recently made public by long-time ethanol advocate Sen. Chuck Grassley, R-Iowa....





New bioproducts market to outgrow biofuels

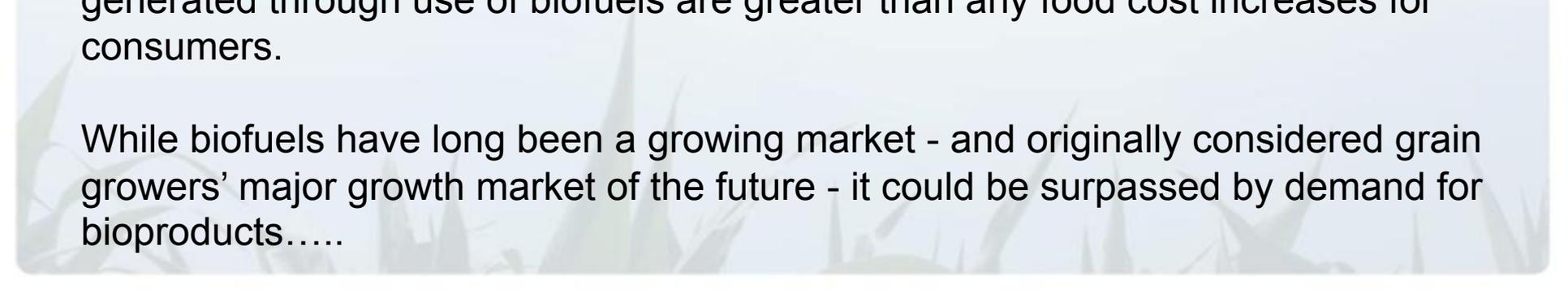
Farmsonline.com

October 19, 2011

Increasing production of biofuels has long been attributed to higher grain prices that cause global food shortages and price spikes and push up livestock feed costs.

But research by Canadian commodity group The Grain Farmers of Ontario has found biofuels are not the prime reason for grain price spikes, and the savings generated through use of biofuels are greater than any food cost increases for consumers.

While biofuels have long been a growing market - and originally considered grain growers' major growth market of the future - it could be surpassed by demand for bioproducts.....





Investing in tax revenue, not subsidies - the IGPC story

Construction Phase Net Revenue

- Municipal \$7.83 million
- Provincial \$44.17 million
- Federal \$70.08 million

Operating Annual Net Revenue

- Municipal \$628,000
 - Provincial \$5.1 million
 - Federal \$5.1 million
- 



“The stone age didn’t end because we ran out of stone, nor will the oil age end because we ran out of oil.”



Thank you

(Thanks to the Grain Farmers of Ontario
for project funding)

