

# Sugar and Future Trends in World Food Security

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International Sugar Organization

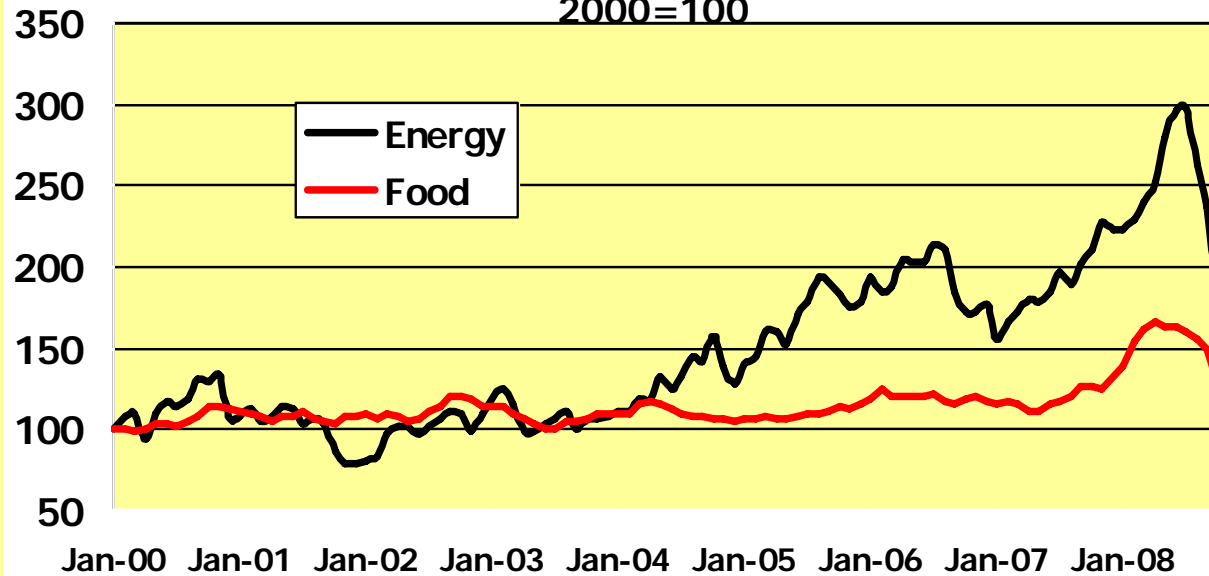


# World Food Security

## Food Prices

Real prices of internationally traded commodity prices in developing countries, CPI-deflated Indices, Jan.

2000=100

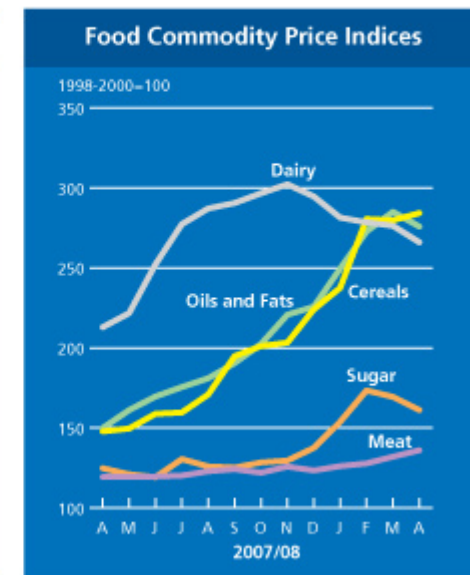
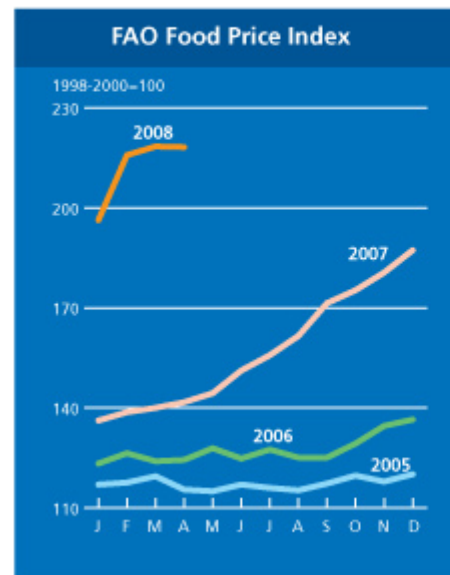


# World Food Security

## Food Prices

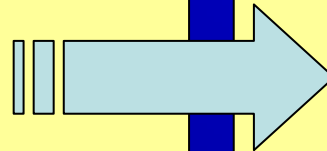
- Rising food prices cause severe hardship and suffering in low-income, net food importing countries.
- Social unrest in a number of countries.

### THE FAO PRICE INDEX

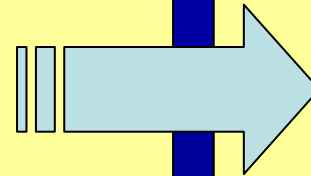


# Sugar and

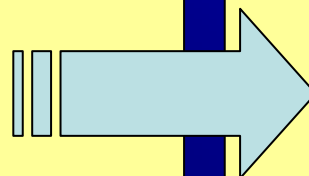
## Future Trends in World Food Security



**Food Price  
Rises**



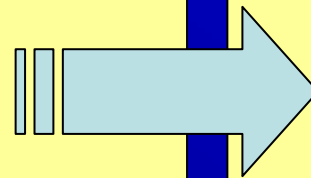
**Driving Factors**



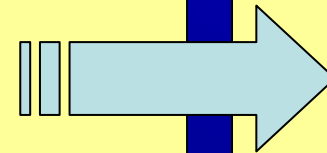
**Biofuels  
Impact**

# Sugar and

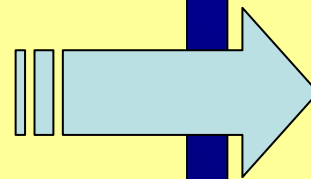
## Future Trends in World Food Security



**Impacts on  
Food Security**



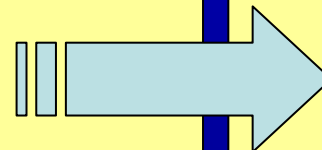
**Why have food  
prices fallen?**



**Have food  
security concerns  
evaporated?**

# Sugar and

## Future Trends in World Food Security



**Sugar and Food Security Trends?**

# Sugar and

## Future Trends in World Food Security



**Food Price Rises**

# World Food Security

## Food Prices

- **Food commodity prices rose to new highs - by more than 60% in the 2 years ending June 2008.**

Food commodity prices rose more than 60 percent in the last 2 years

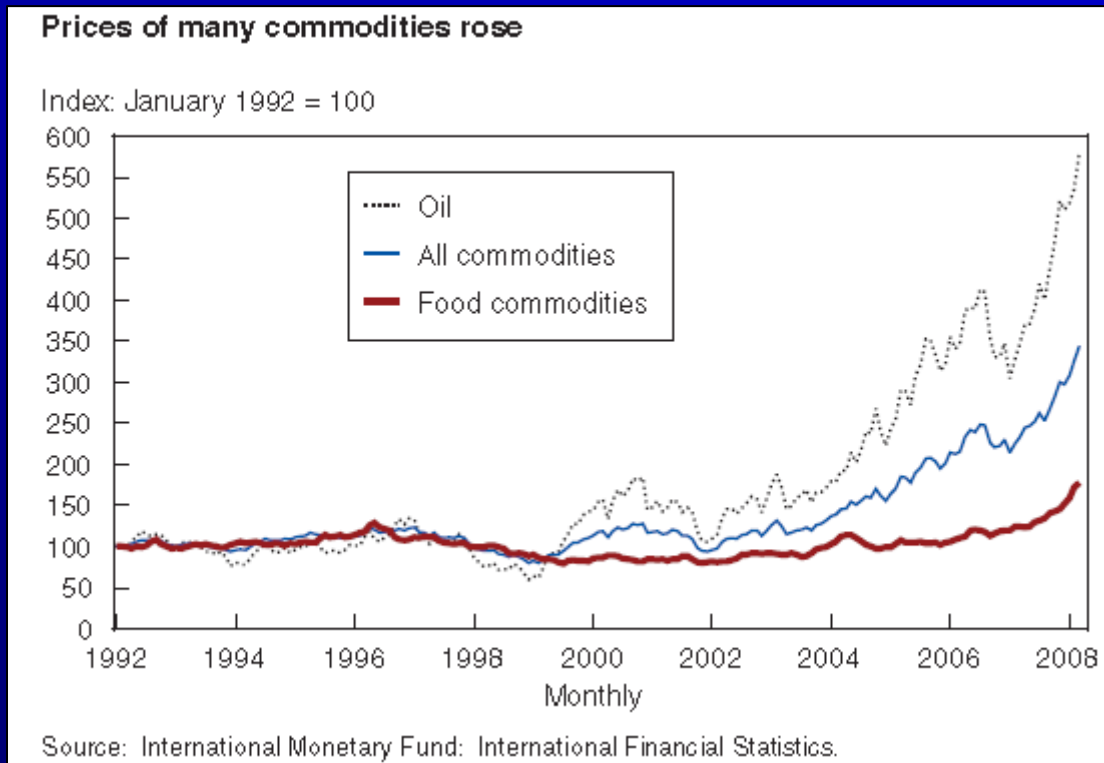
Index: January 1992 = 100



Source: International Monetary Fund: International Financial Statistics.

# World Food Security

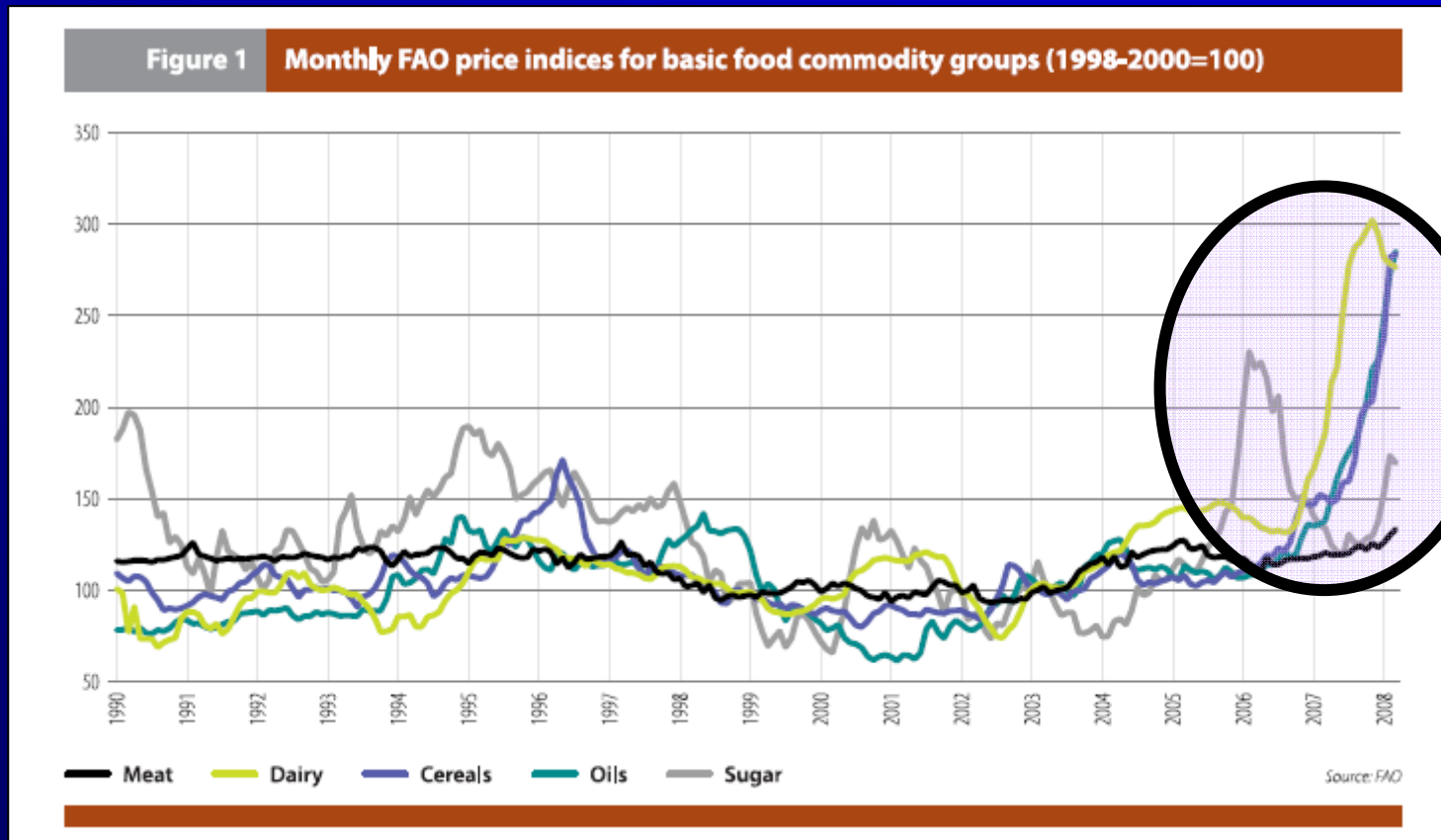
## Food Prices



- All three indices were around the same level during 1992-1999.
- Food commodity prices rose by 98% from mid-1999 to March 2008.
- All commodities rose by 286%.
- Crude oil price index rose by 547%.

# World Food Security

## Food Prices



- Monthly price indices for Cereals, Vegetable oils, Dairy products, Meat, and Sugar.

# Sugar and Future Trends in World Food Security

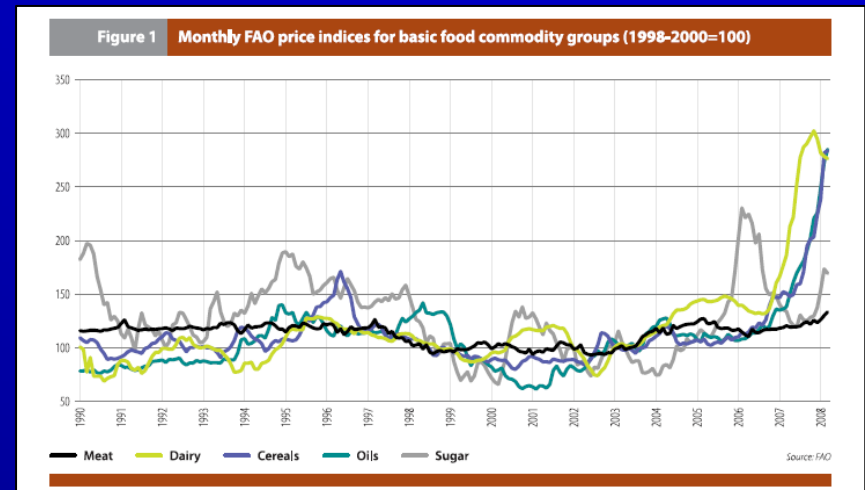


**Drivers of Higher  
Food Prices**

# World Food Security

## Price Drivers

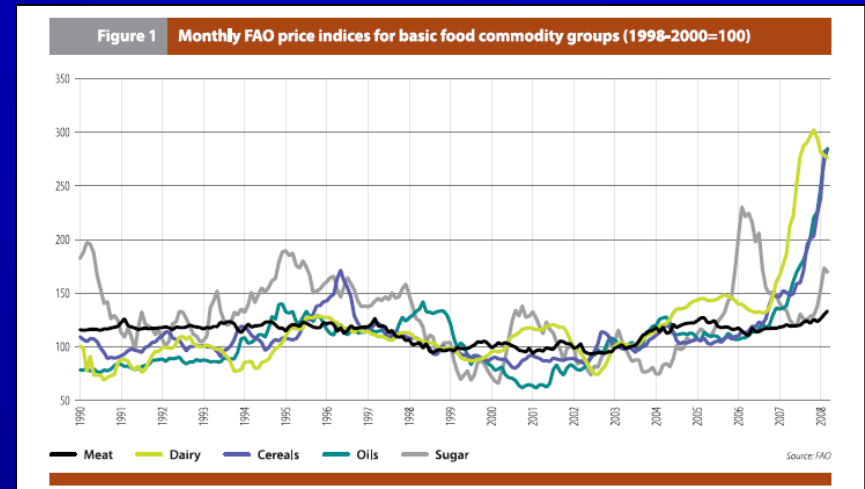
- No one factor was the cause of the surge in food commodity prices.
- Some factors reflect underlying trends in supply and demand that began more than a decade ago.



# World Food Security

## Price Drivers

- Other factors occurred more recently.
- Some reflected significant structural change in supply and demand relationships.
- Others were short-term shocks to global supply and demand for agricultural products.



# World Food Security

## Long Term Drivers: Supply

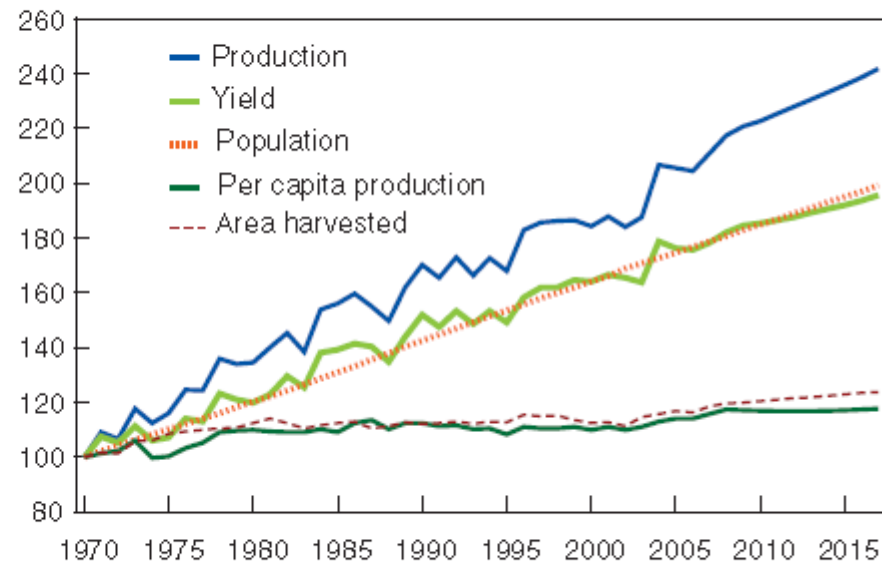
### Total world grain & oilseeds<sup>1</sup>

*Production, yield, area harvested, population & per capita production*

#### Exponential trend growth rates:

|                       | 1970-90 | 90-07 | 2009-17 |
|-----------------------|---------|-------|---------|
| Production            | 2.2     | 1.9   | 1.2     |
| Yields                | 2.0     | 1.1   | 0.8     |
| Area                  | 0.15    | 0.14  | 0.39    |
| Population            | 1.7     | 1.4   | 1.1     |
| Per capita production | 0.56    | 0.11  | 0.02    |

Index: 1970 = 100



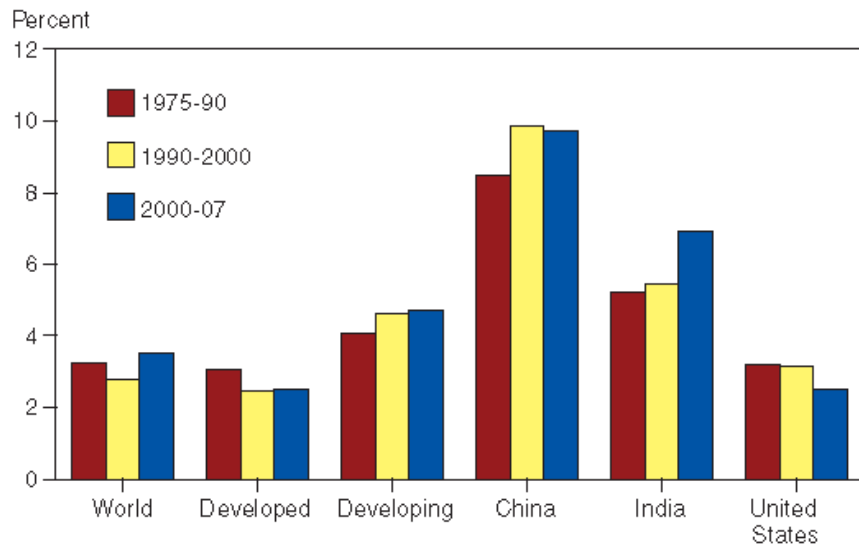
<sup>1</sup>Total oilseeds = soybeans + rapeseed + sunflowers.

Source: USDA Agricultural Projections to 2017.

# World Food Security

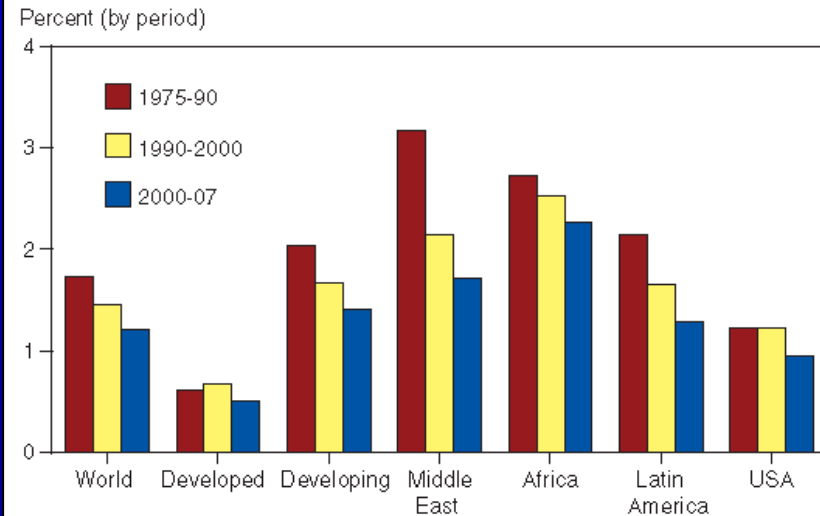
## Long Term Drivers: Demand

**Strong economic growth**  
*Average real GDP growth rates*



Source: USDA Agricultural Projections to 2017.

**Population growth rates decline**  
*But still high in developing countries*



Source: USDA Agricultural Projections to 2017.

# World Food Security

## Long Term Drivers: Demand

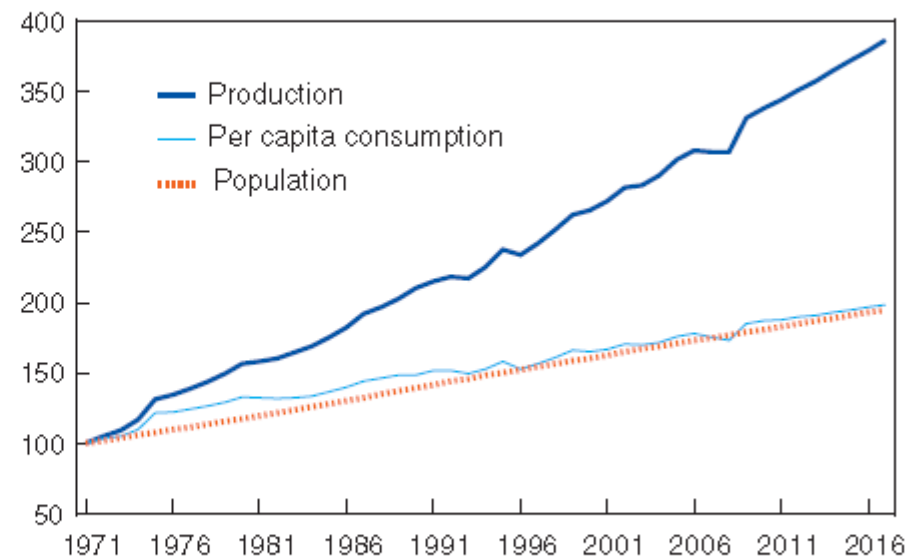
### Global meat<sup>1</sup>

Production, per capita consumption, and population

#### Exponential trend growth rates:

|                | 1975-90 | 90-07 | 2009-17 |
|----------------|---------|-------|---------|
| Production     | 2.2     | 2.5   | 2.1     |
| Population     | 1.7     | 1.4   | 1.1     |
| Per capita use | 1.4     | 1.1   | 1.0     |

Index: 1971 = 100



<sup>1</sup>Total meat = beef + pork + chickens & turkeys.

Source: USDA Agricultural Projections to 2017.

- **Global consumption of meat has been rising much more rapidly than consumption of grains and oilseeds;**
- **As demand for meat rises, the demand for grains and protein feeds used to produce that meat grows proportionally more quickly.**

# World Food Security

## Long Term Drivers: Demand

- Illustrative feed-to-meat conversion rates.

### Feed-to-meat conversion rates

| Class of animal | Pounds of feed needed to produce 1 pound of meat |
|-----------------|--|
| Chicken         | 2.6  |
| Pork            | 6.5  |
| Beef            | 7.0  |

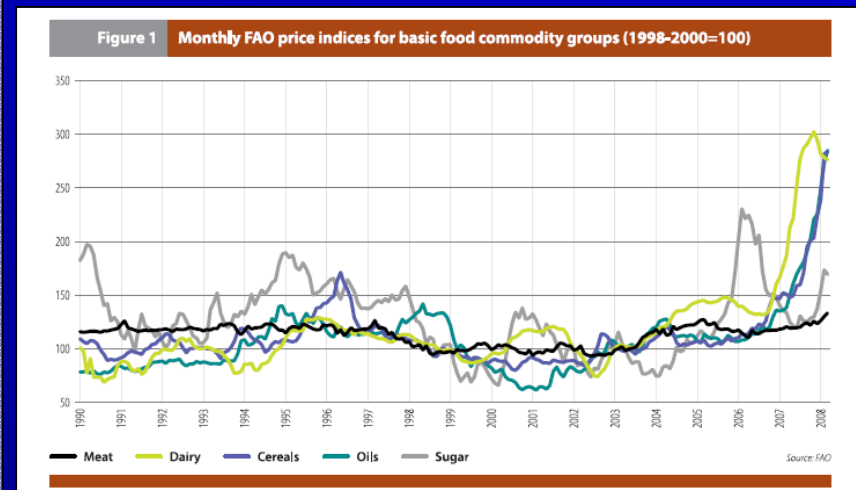
Source: Ephraim Leibtag, "Corn Prices Near Record High, But What About Food Costs?" In *Amber Waves*, February 2008.

<http://www.ers.usda.gov/AmberWaves/February08/Features/CornPrices.htm>

# World Food Security

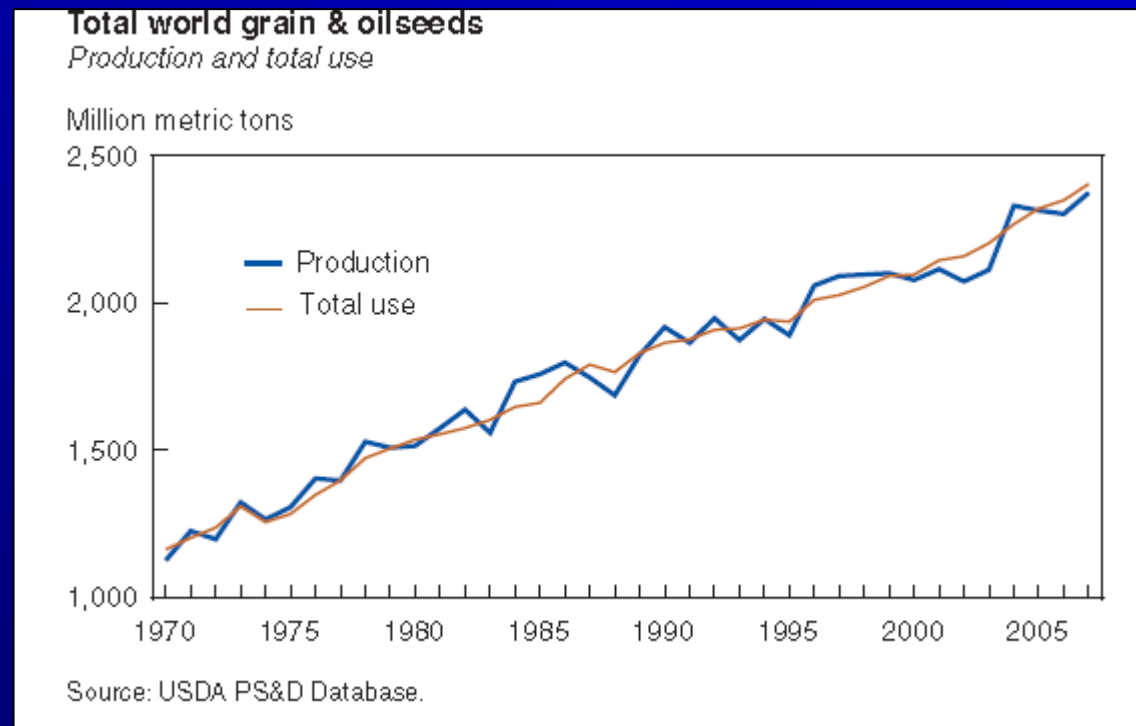
## Long term drivers

- Long term drivers acted to slow growth in production but...
- ...increase growth in demand.
- Long-term trends were exacerbated by more recent developments which put more upward pressure on world prices.



# World Food Security

## Short Term Price Drivers



- **Reduced stock holding a key driver.**
- **Global consumption of grains and oilseeds exceeded production in 7 out of 8 years since 2000.**

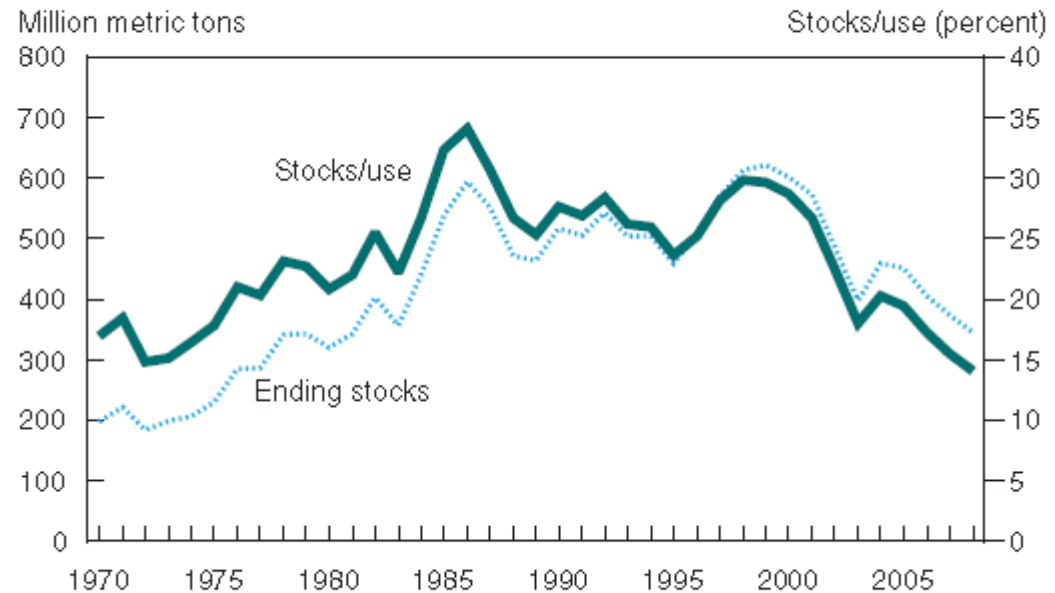
# World Food Security

## Short Term Price Drivers

- **Global stocks-to-use ratio has halved to around 15%.**

### Total world grain & oilseeds

*Stocks and stocks-to-use ratio*

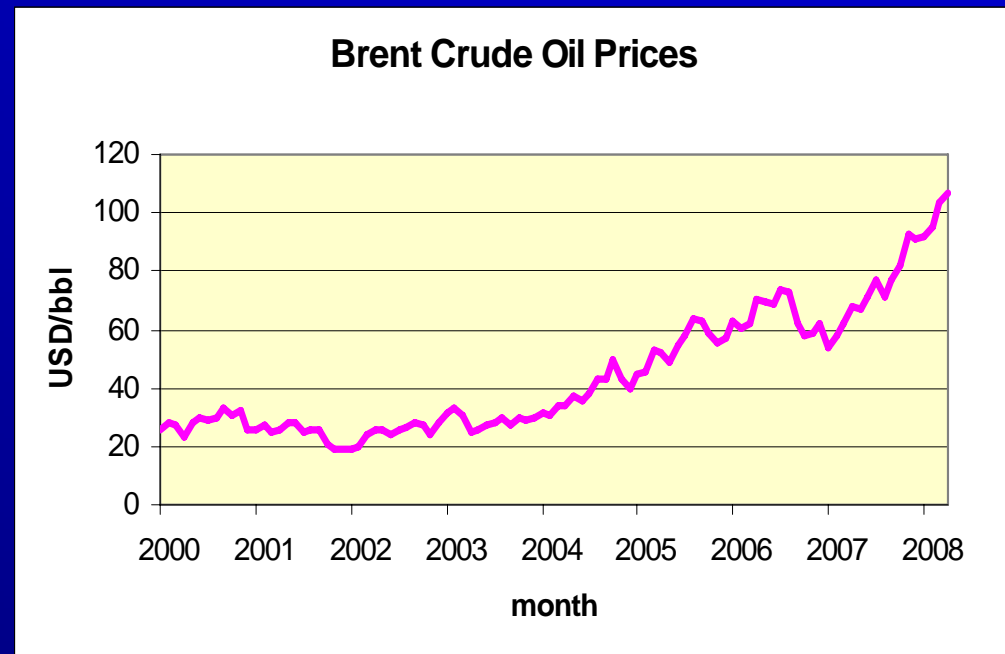


Source: USDA PS&D Database.

# World Food Security

## Short Term Price Drivers

- In 2000, the price of crude oil began to rise.
- Underlying trends of rapid economic growth and demand for energy led to rapidly rising use of crude oil in developing countries.



# Sugar and Future Trends in World Food Security

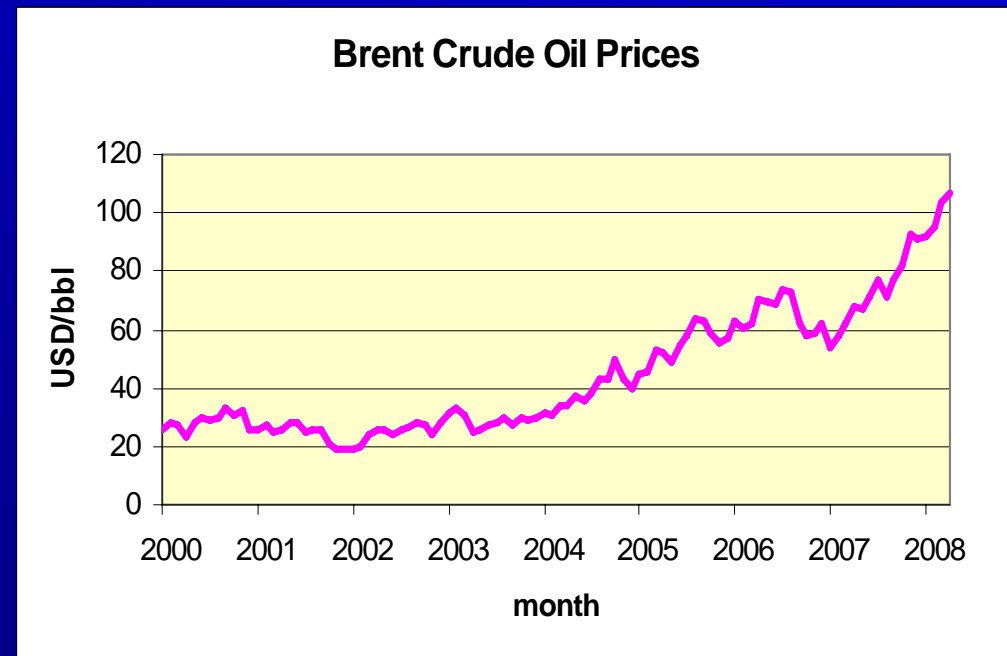
Figure 4 Reuters-CRB Energy and FAO Food Price Indices 1998-2000=100



# World Food Security

## Short Term Price Drivers

- In 2004 agricultural production costs began to rise, especially for energy related inputs such as fertilizer, fuel and pesticides.

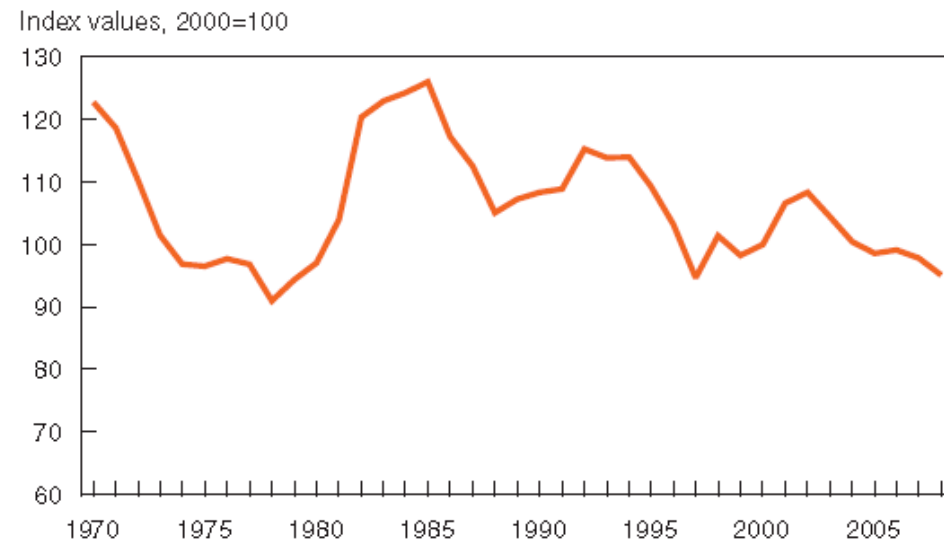


# World Food Security

## Short Term Price Drivers

- **Beginning 2002 the US dollar began to depreciate.**
- **Cheaper food imports from the US as the dollar loses value relative to the currency of key importing countries.**

Value of U.S. dollar declines after 2002<sup>1</sup>



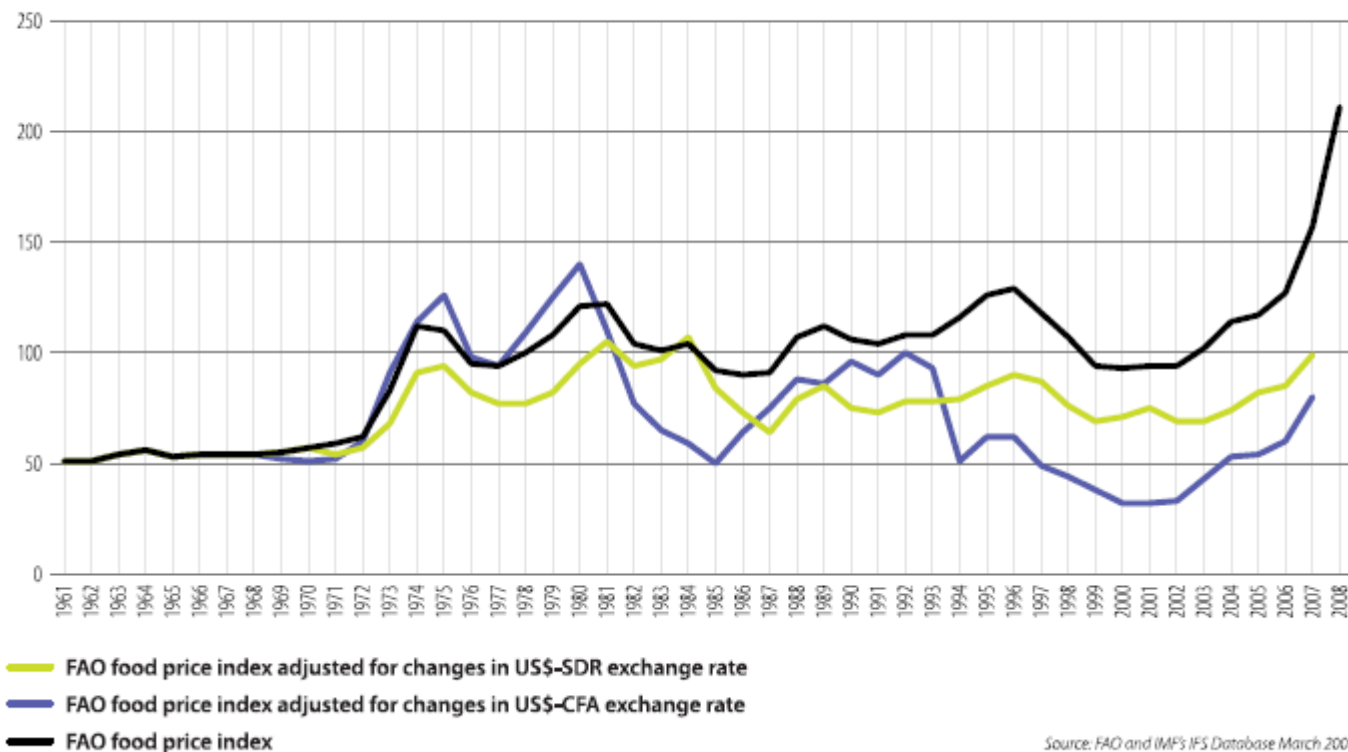
<sup>1</sup>Real U.S. agricultural trade-weighted dollar exchange rate, using U.S. agricultural export weights, based on 192 countries.

Source: ERS International Macroeconomics Dataset.

# World Food Security

## Short Term Price Drivers

**Figure 5** FAO Food Price Index adjusted for changes in the exchange rates between US dollar and SDR and CFA



# World Food Security

## Short Term Price Drivers

Hedge Funds

Index Funds

Private equity funds

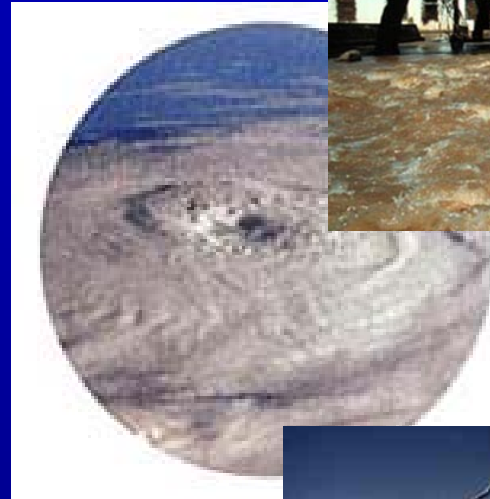


# World Food Security

## Short Term Price Drivers

2006 and 2007

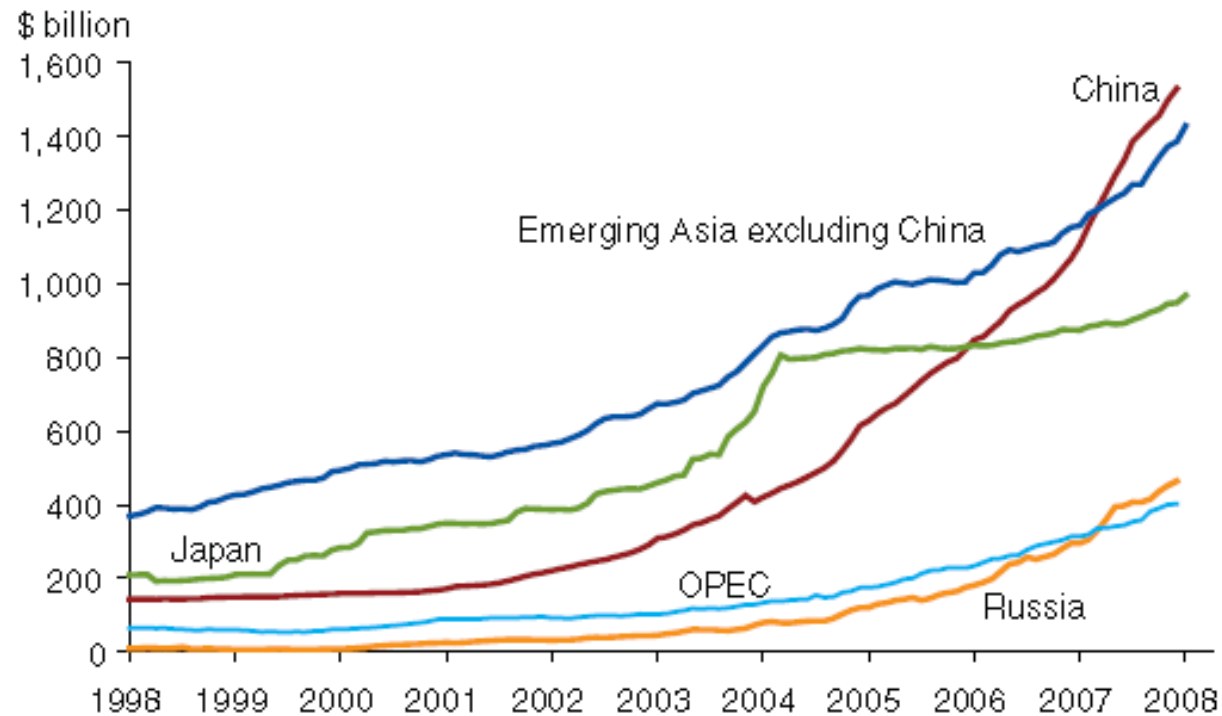
- Adverse Weather
- Lowered yields
- Contributed to shrinking stocks to consumption ratios.
- Heightened importer concern about future supplies.



# World Food Security

## Short Term Price Drivers

Foreign exchange reserves



Source: Oxford Economics / Haver Analytics

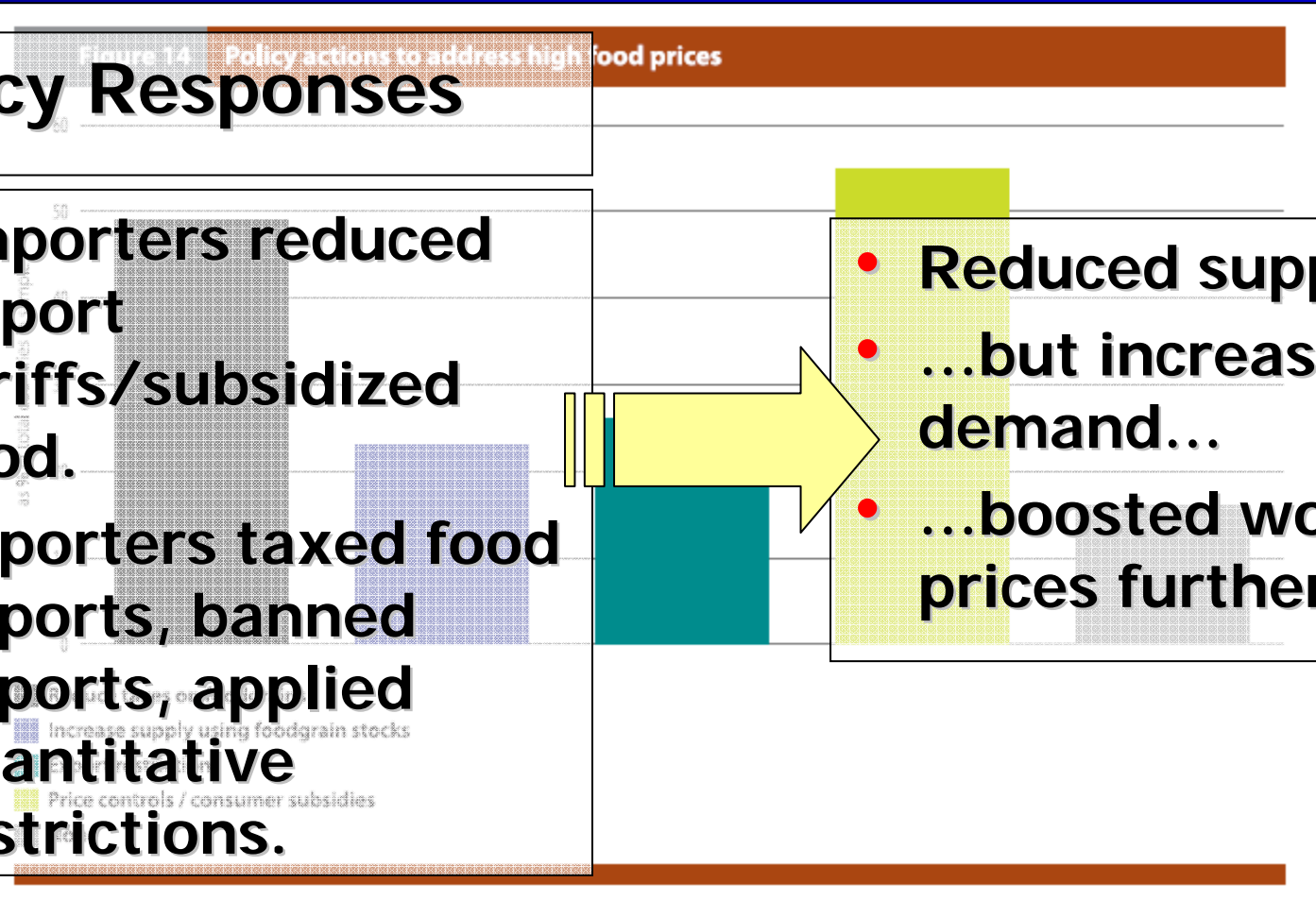
# World Food Security

## Short Term Price Drivers

### Policy Responses

- Importers reduced import tariffs/subsidized food.
- Exporters taxed food exports, banned exports, applied quantitative restrictions.

- Reduced supplies ...
- ...but increased demand...
- ...boosted world food prices further.



# Sugar and

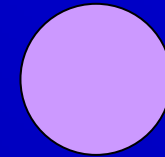
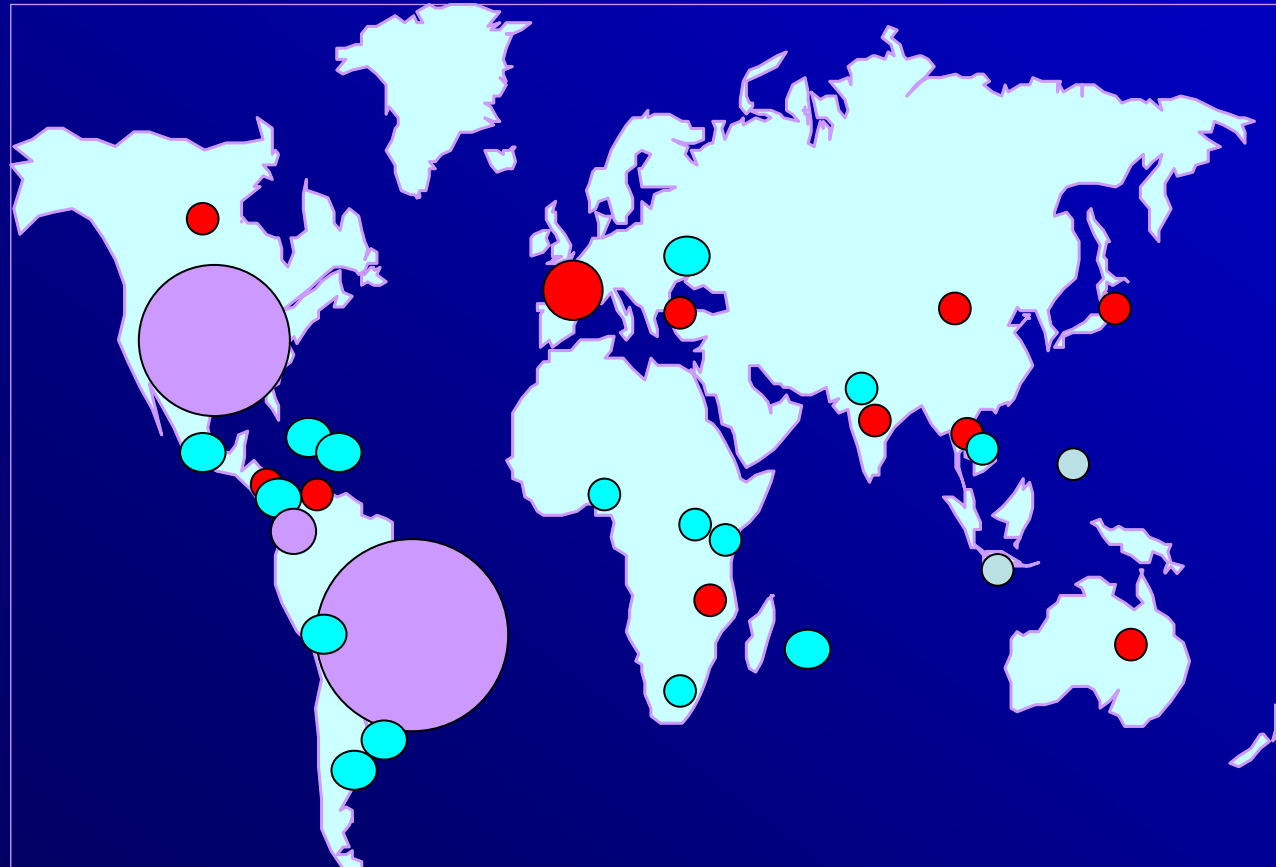
## Future Trends in World Food Security



**Biofuels Impact**

# Spotlight on World Fuel Ethanol

## Fuel Ethanol Programmes



Established programmes



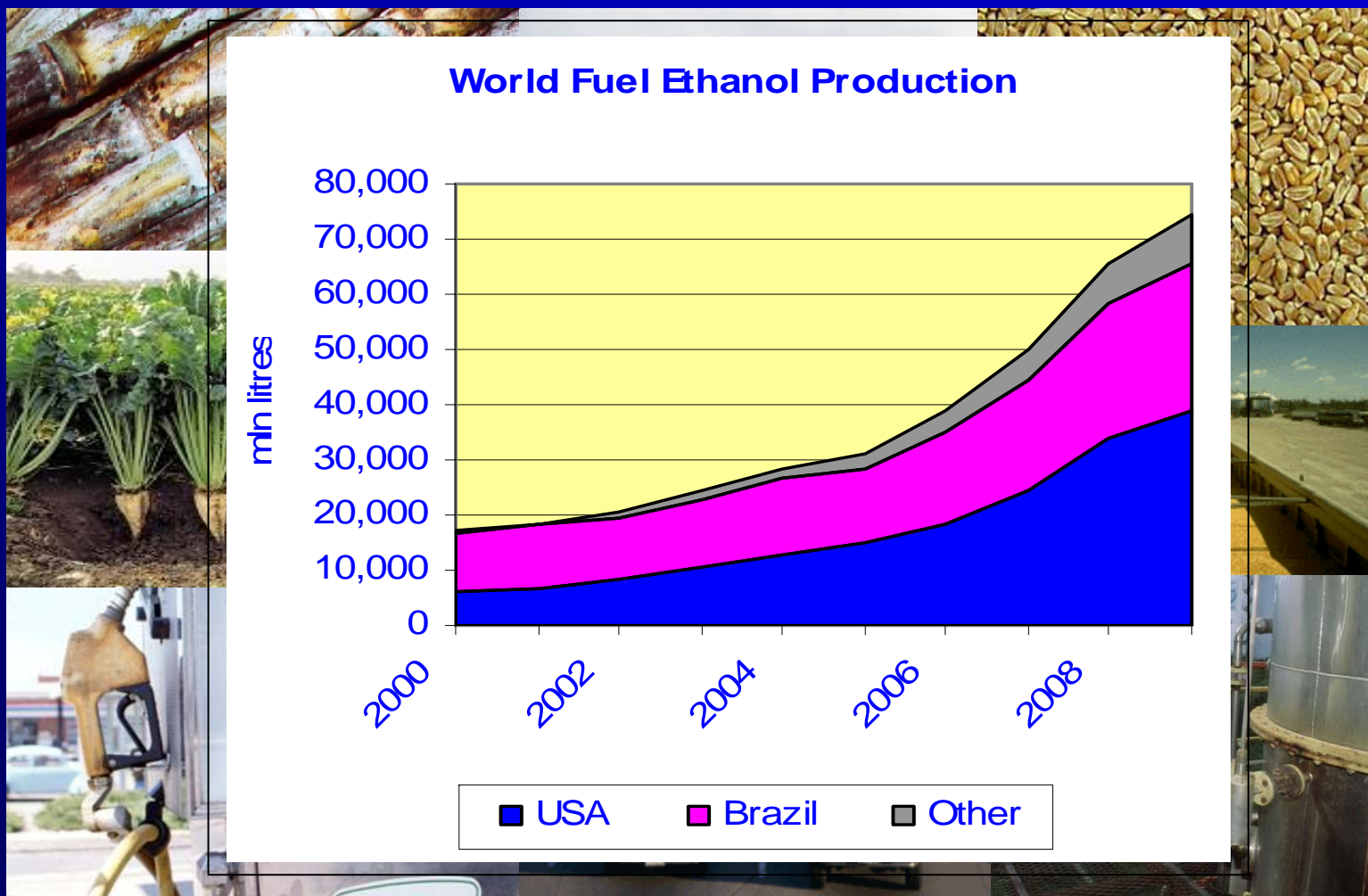
Fledgling programmes



Planned programmes

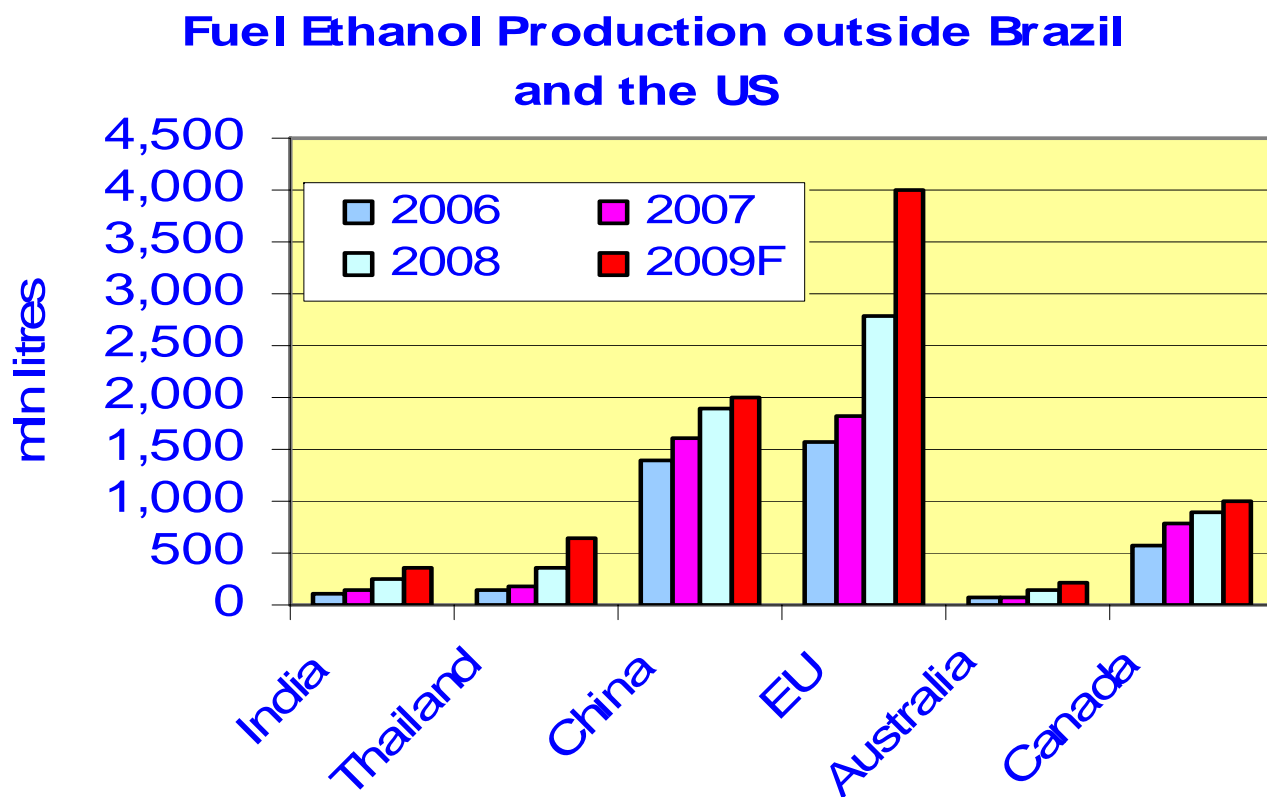
# World Food Security

## The Role of Biofuels



# World Food Security

## The Role of Biofuels

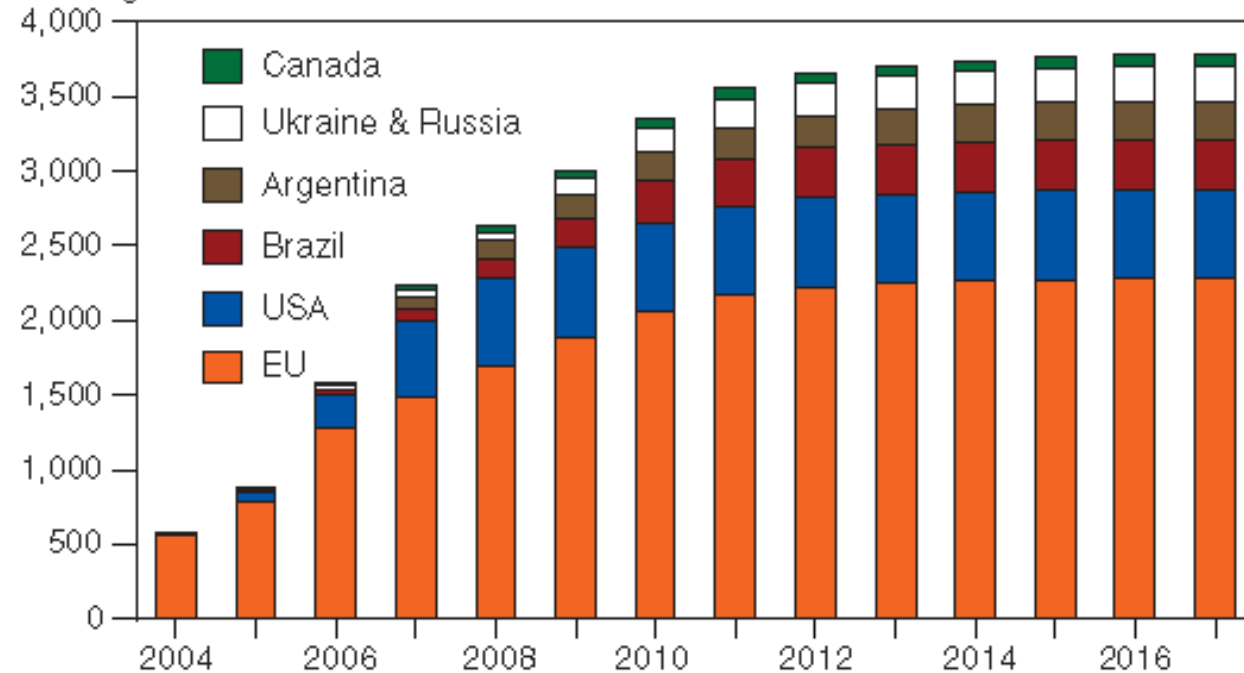


# World Food Security

## The role of biofuels

### Biodiesel production

Million gallons

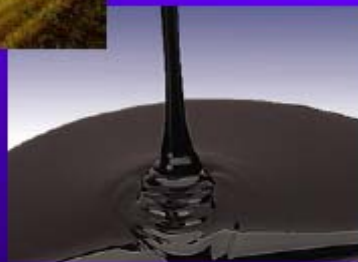


Source: USDA Agricultural Projections to 2017.

# Spotlight on World Fuel Ethanol

## Ethanol Feedstocks

Abundant supply  
of feedstock for ethanol



# World Food Security

## The role of biofuels

FEATURE

### Growing Crops for Biofuels Has Spillover Effects

Scott Malcolm  
smalcolm@ers.usda.gov

Marcel Aillery  
maillery@ers.usda.gov

AMERICAN WIVES  
VOLUME 1 • ISSUE 1

- Federal mandates for biofuel production promote expanded crop acreage and shifts in cropping patterns and livestock production due to higher prices for corn and other grain crops.
- An increase in the extent of agricultural land in production and intensity of input use increases the potential for environmental degradation.
- Research that improves crop productivity and conversion efficiency, as well as conservation practices like no-till and buffer strips, could lessen the environmental impacts of biofuels.

An interview with the authors is featured online at [www.ers.usda.gov/am/wives/](http://www.ers.usda.gov/am/wives/)

What do petroleum prices, along with federal policies aimed at reducing U.S. dependency on oil imports and mitigating climate change, have spilt? Rapid growth in biofuel demand. In response, production of agricultural commodities that serve as feedstocks for biofuels has increased. Federal policy initiatives and private-sector investment point to continued growth in biofuel production and, consequently, increased demand for agricultural products.

The Energy Independence and Security Act (EISA) of 2007 includes provisions for a Renewable Fuel Standard (RFS) to increase the supply of alternative fuel sources by requiring fuel pool users to use at least 36 billion gallons of biofuel by 2012. The RFS provision establishes a level of 15 billion gallons of conventional ethanol by 2015 and at least 21 billion gallons of cellulosic (noncornstarch) ethanol and advanced biofuels (including ethanol from sugarcane and biodiesel) by 2022.

The share of total domestic corn production supplying the ethanol market grew from 7.5 percent in 2001 to 22.6 percent in

ECONOMIC RESEARCH SERVICE/USDA

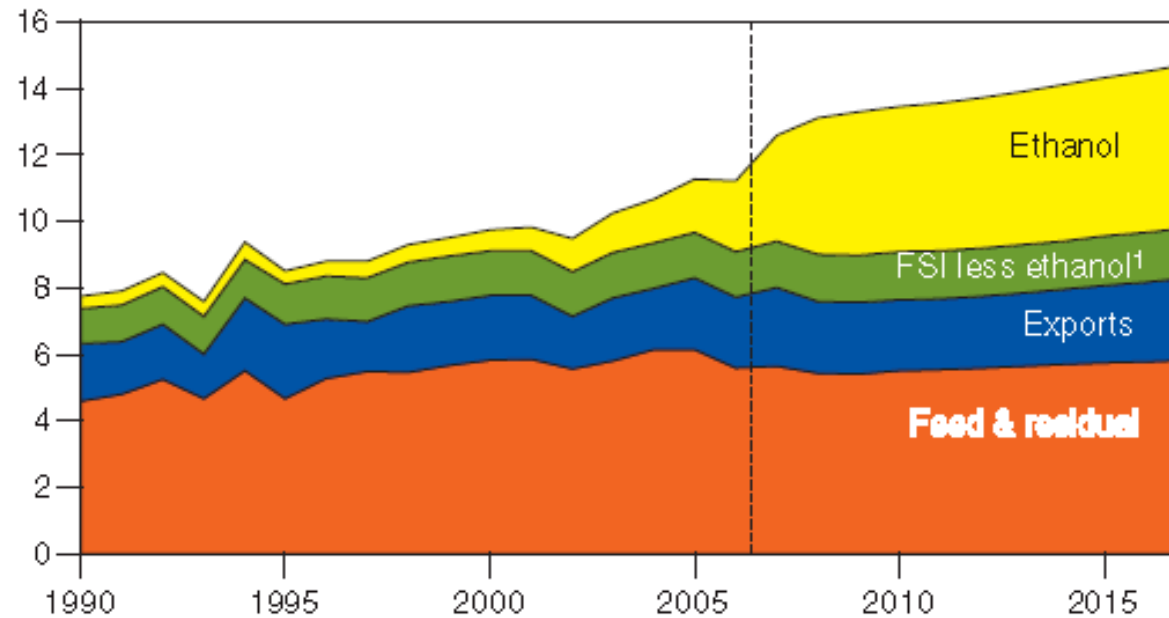
- Federal mandates for biofuel production promote expanded areas under crops and shifts in cropping patterns and livestock production due to higher prices for corn and other grain crops.

# World Food Security

## The role of biofuels

### U.S. corn use

Billion bushels



¹Food, seed, and industrial less ethanol.

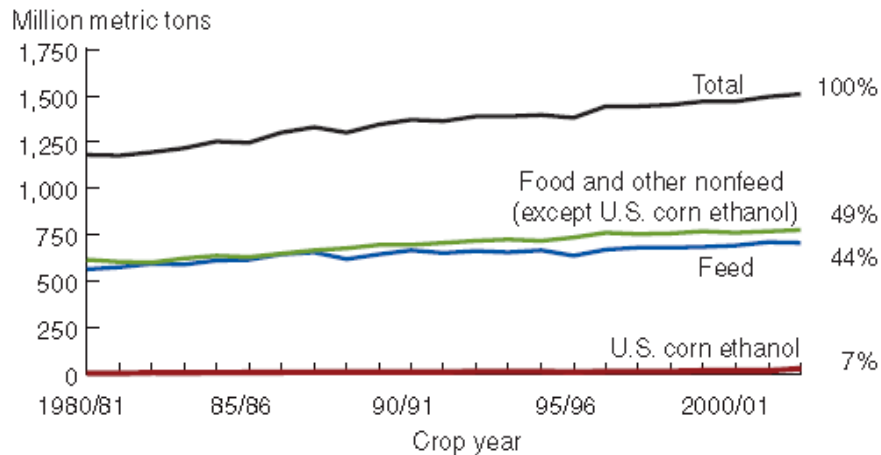
Source: USDA Agricultural Projections to 2017.

# World Food Security

## The Role of Biofuels

**Global wheat and coarse grains use, 1980/81– 2002/03**

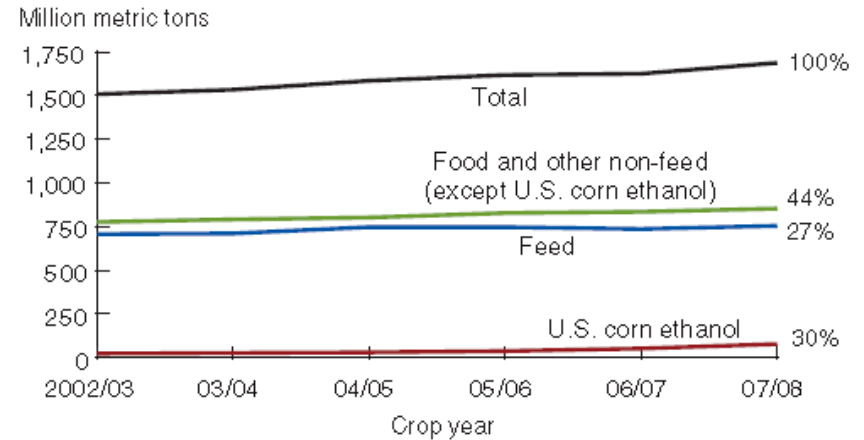
*U.S. ethanol accounted for 7 percent of historical global growth*



Note: Category's share of the change in total use from 1980/81 to 2002/03 shown at the right.  
Source: USDA PS&D Database.

**Global wheat and coarse grains use, 2002/03 – 2007/08**

*U.S. ethanol has accounted for 30 percent of recent global growth*



Note: Category's share of the change in total use from 2002/03 to 2007/08 shown at the right.  
Source: USDA PS&D Database.

# Sugar and Future Trends in World Food Security



**Impacts**



# World Food Security

## Impacts on Food Security

### Impact of Higher Food Commodity Prices On Consumers' Food Budgets\*

|   | High-income countries | Low-income food-deficit countries |
|---|-----------------------|-----------------------------------|
| <b>I. Base scenario</b>   |                       |                                   |
| Income  | \$40,000              | \$800                             |
| Food expenditure  | \$4,000               | \$400                             |
| Food costs as % of income   | <b>10.0%</b>          | <b>50%</b>                        |
| <b>Disaggregate retail food spending (staples vs. non-staples)</b>                  |                       |                                   |
| Staples as % of total food spending   | 20%                   | 70%                               |
| Expenditures on staples   | \$800                 | \$280                             |
| Expenditures on non-staples   | \$3,200               | \$120                             |
| <b>II. Scenario: 50% price increase in staples, partial pass through on staples</b> |                       |                                   |
| Assumed % pass through  | 60%                   | 60%                               |
| Increase in cost of staples   | \$240                 | \$84                              |
| New cost of staples   | \$1040                | \$364                             |
| New total food costs  | \$4,240               | \$484                             |
| Food costs as % of income   | <b>10.6%</b>          | <b>60.5%</b>                      |

\*These are illustrative food budgets that characterize the situations for consumers in high- and low-income countries.

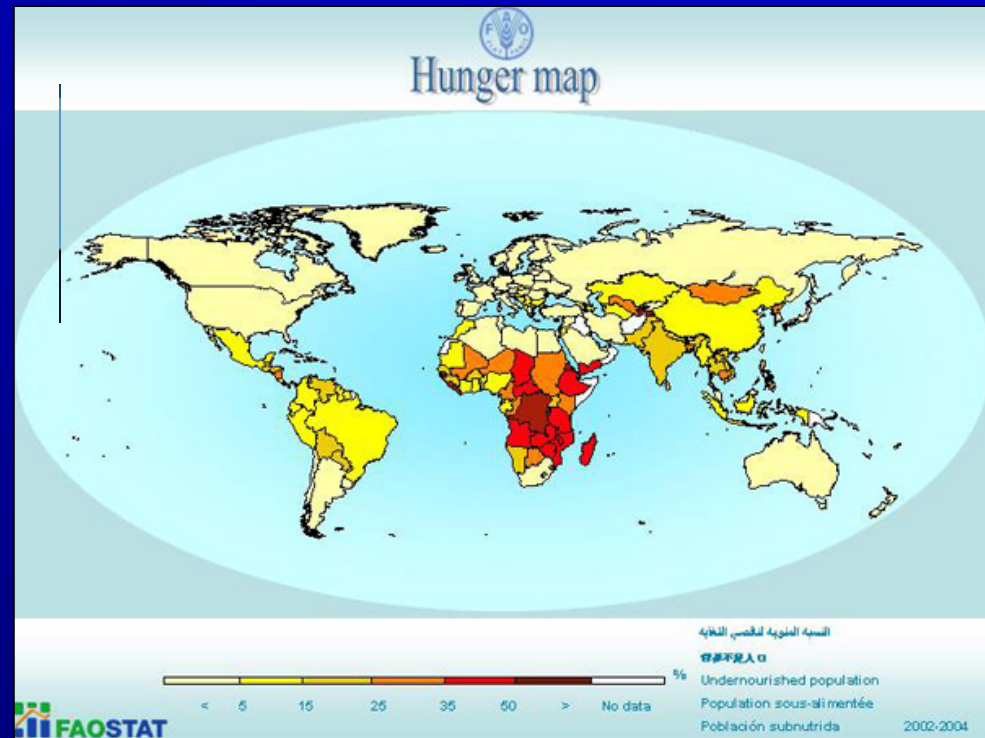
Source: As compiled by ERS.

# World Food Security

## Impacts on Food Security

- The FAO noted that rising food prices were causing severe hardship and suffering. For many of the 800 mln people who are already affected by chronic hunger higher food prices can be devastating.

- HLC/08/I.NF/1

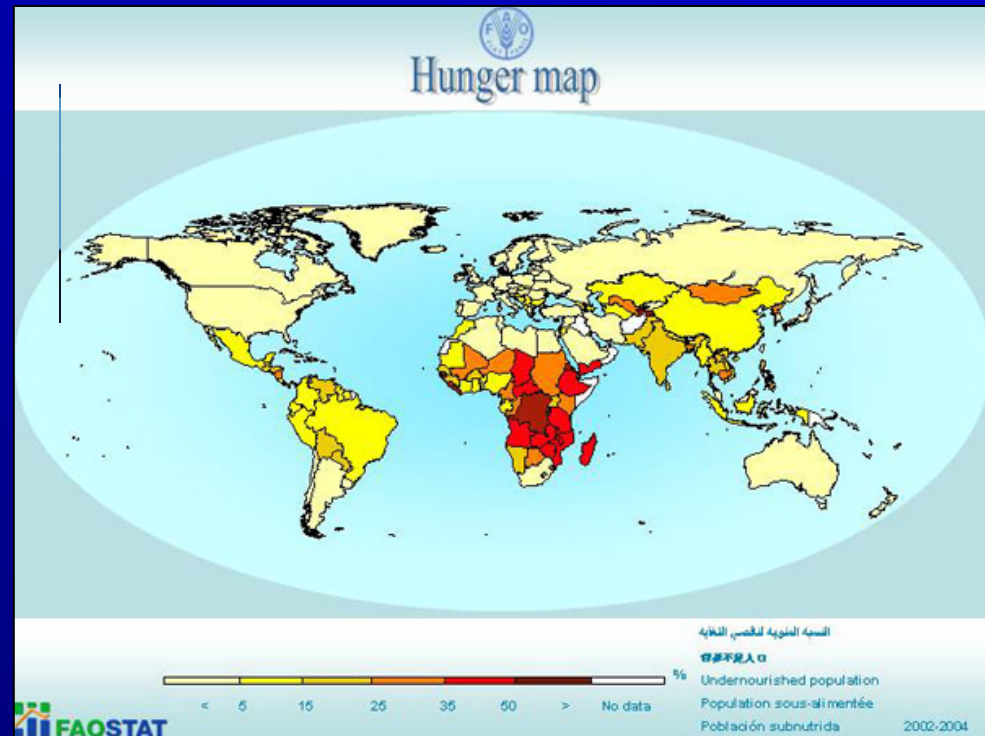


# World Food Security

## Impacts on Food Security



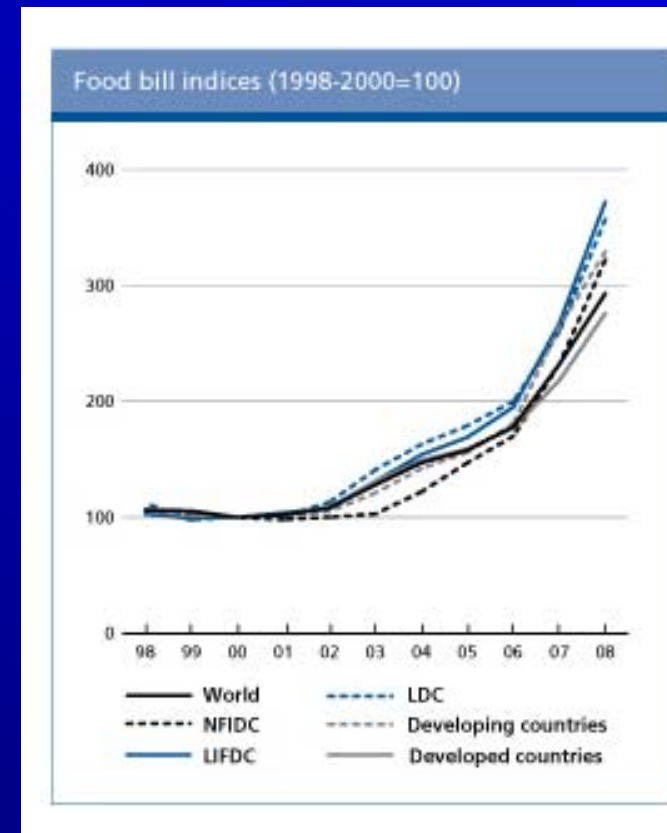
- The risks to food security posed by the present regime of low worldwide food stocks and high food prices are substantial.
- (June 2008)
- HLC/08/I.NF/1e pres



# World Food Security

## Impacts on Food Security

- Substantial increases in the global cost of imported foodstuffs.
- For vulnerable groups - LDCs and LIFDC's – sustained rises in imported food expenditure is alarming.



# World Food Security

## Impacts on Food Security

- 3 June 2008 - At the World Food Security Summit, FAO Director-General Jacques Diouf appealed to world leaders for USD30 billion a year to re-launch agriculture and de-fuse the world food crisis and avert a looming threat of conflicts over food.



Climate change, energy and food

# World Food Security

## Impacts on Food Security

- **World Bank President Robert Zoellick said 2 billion people across the world are struggling with high food prices, and 100 million extra people in poor countries may be pushed into poverty by the crisis.**



# World Food Security

## How to Improve Food Security

- The UN secretary general Ban Ki-moon warned that with food prices at a 30-year high, the world must "respond immediately", but it must also put the long-term focus on "improving food security."



# WSRO Annual Meeting 2008

## Future Trends in World Food Security



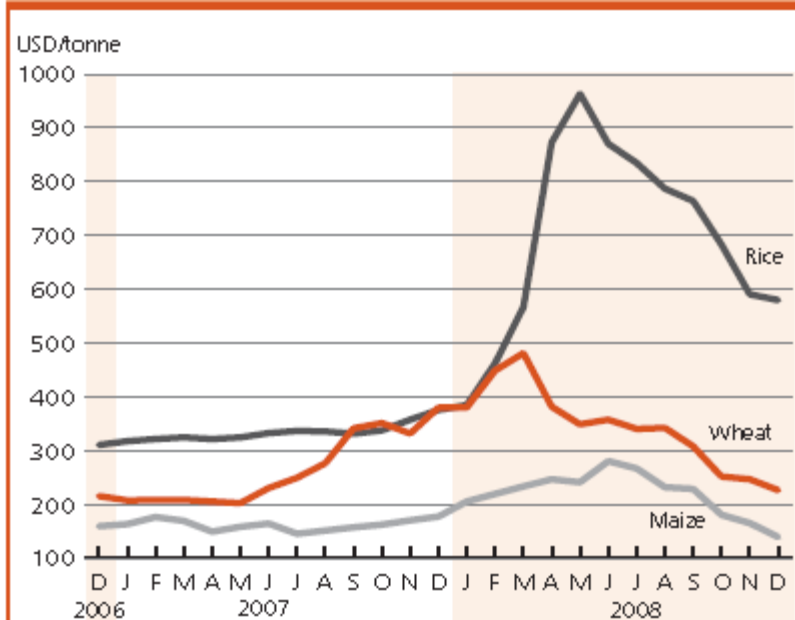
**Falling prices and the  
global financial crisis**

# World Food Security

## Food Prices

- **Collapse in commodity prices largely laid at the feet of the dramatic reversal of global economic and investor fortunes.**
- **First signs of possible decline in prices emerged last June with favourable crop prospects.**

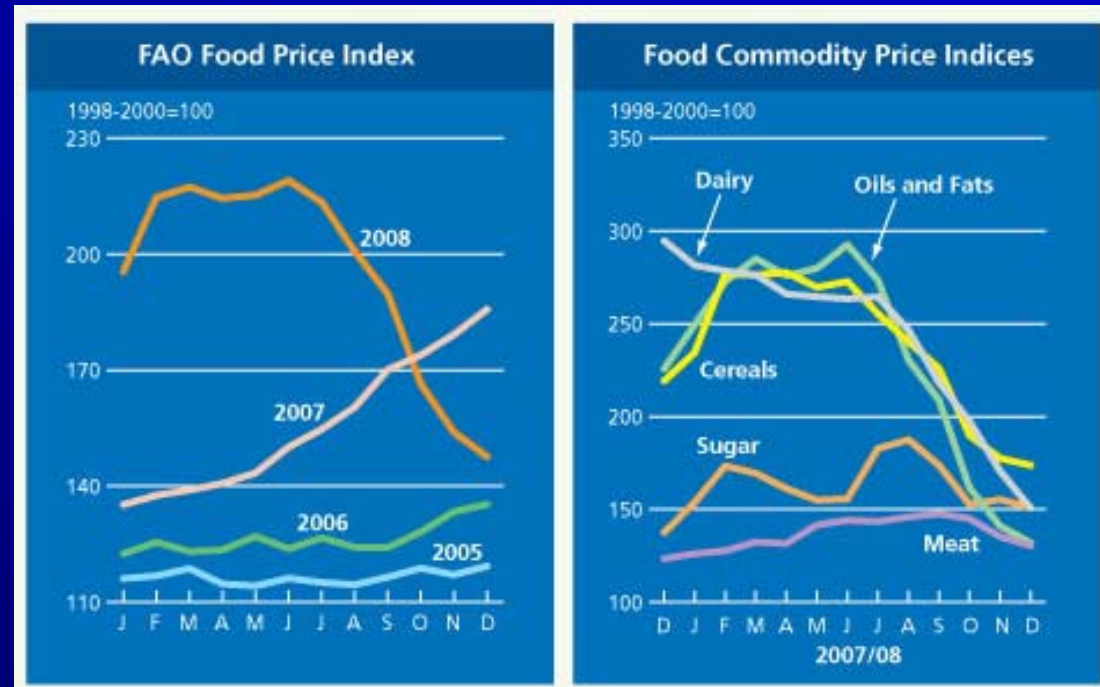
Selected international cereal prices



Note: Prices refer to monthly average. For December 2008, two weeks average.

# World Food Security

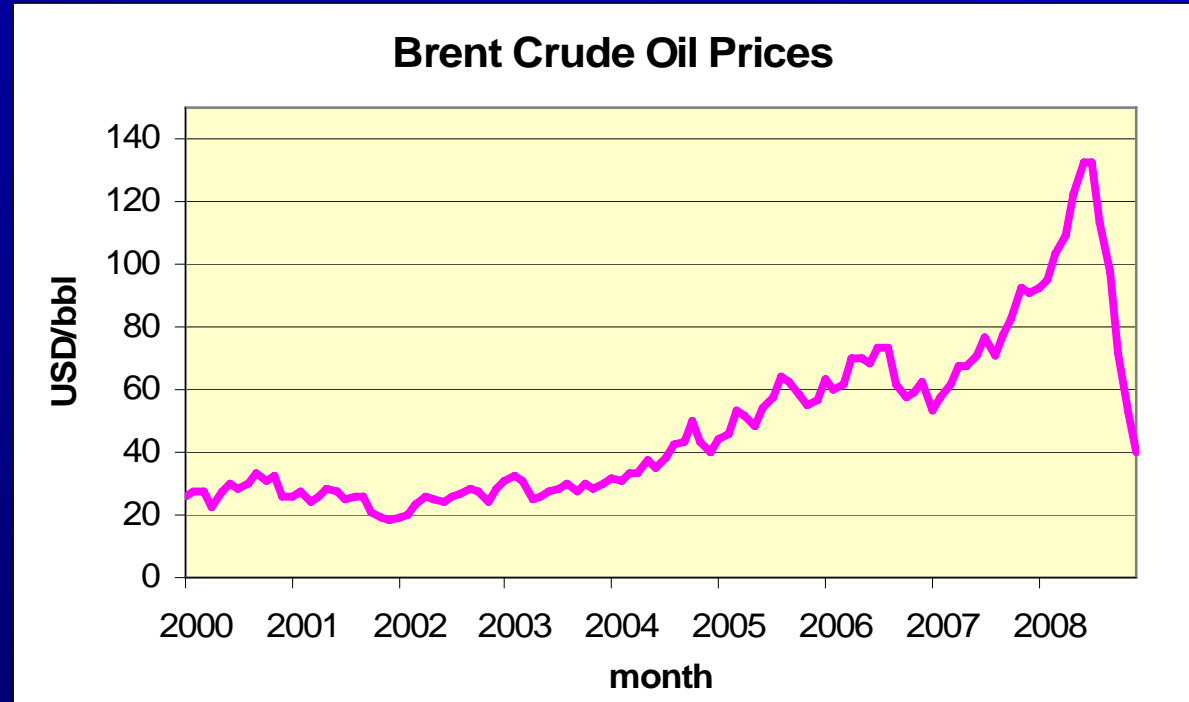
## Food Prices



- Most dramatic price falls for dairy products, oils and fats and cereals.

# World Food Security

## Food Prices



- **Halving of world crude oil price key driver for general commodity price crash.**

# World Food Security

## Food Prices

- Uncertainty is now a key feature of world agricultural commodity markets and this is not likely to change in the near future.



# WSRO Annual Meeting 2008

## Future Trends in World Food Security



**Do falling prices mean  
that world food  
security concerns  
have evaporated?**

# World Food Security

## Food Prices

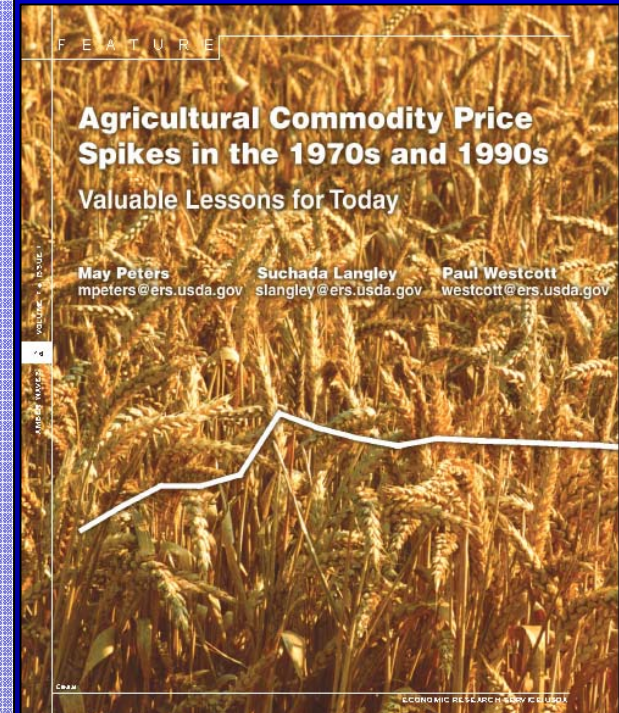
- The World Bank projects:
- Real food prices to decline by 26% between 2009 and 2010;
- Energy prices to fall by 27%; and
- Metals to fall by 32% (see Global Economic Prospects 2009).
- At the same time the Bank warns that food prices should nevertheless remain higher than they were during the 1990s.



# World Food Security

## Food Prices

- The USDA argues:
- As the world economy recovers, food demand growth will resume;
- Food demand in developing countries will likely accelerate because:
  - they will continue to experience large population growth;
  - along with urbanization and expansion of the “middle class”;
- Additional demand strength if US and international policies favour development of biofuels.
- These factors will keep crop prices from falling as low as their pre-spike levels.



# World Food Security

## Food Prices

- **Longer term challenges to food security remain:**
  - Land and water constraints to future agriculture production remain;
  - Investments in rural infrastructure and agricultural research capacity are still low;
  - Agricultural inputs remain relatively expensive relative to farm-gate prices; and
  - there remains the ongoing need to adapt to climate change.



# WSRO Annual Meeting 2008

## Future Trends in World Food Security



**How to improve  
food security?**

# World Food Security

## How to Improve Food Security

- World community must create a global enabling environment for carrying out policies...
- ...ensure that governments have the human, financial, technical and material resources they need to implement reforms and policies.



Climate change, energy and food

# World Food Security

## How to Improve Food Security

07.05.2008

- **Lamy says food crisis adds urgency to concluding the Round**
- Director-General Pascal Lamy, in his report to the General Council on 7 May 2008, said “the reasons why we must conclude the Round this year are visible to all of us and they are becoming more critical by the day”. He said “the WTO can provide part of the solution” to the current food crisis, “which is why it can, and must, play its full part in this vital effort”.



# WSRO Annual Meeting 2008

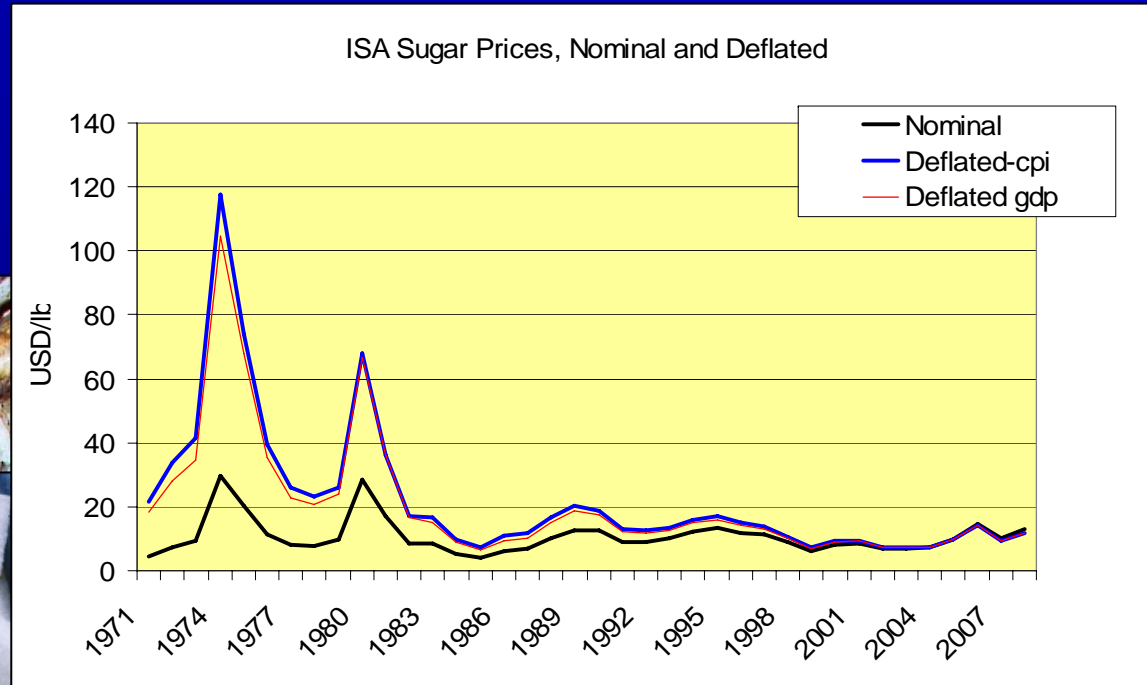
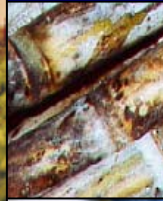
## Future Trends in World Food Security



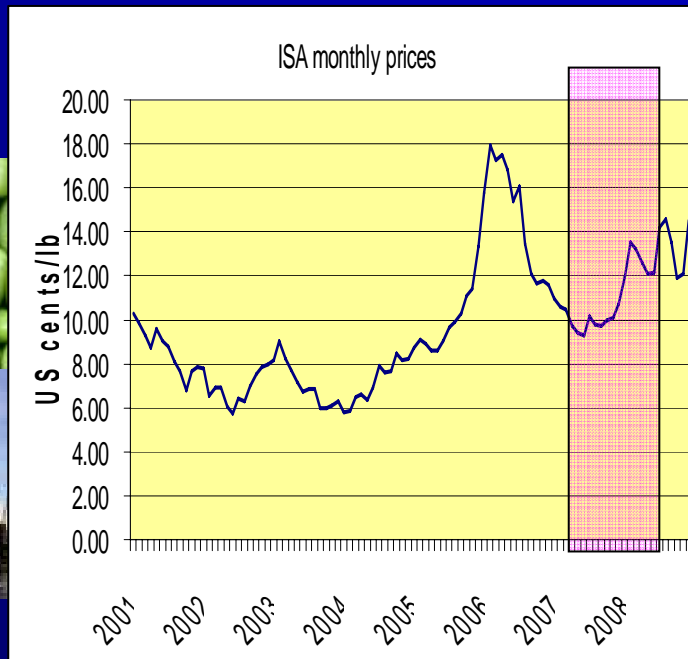
**What about  
sugar?**

# WSRO Annual Meeting 2008

## Future Trends in World Food Security



# Commodity Prices



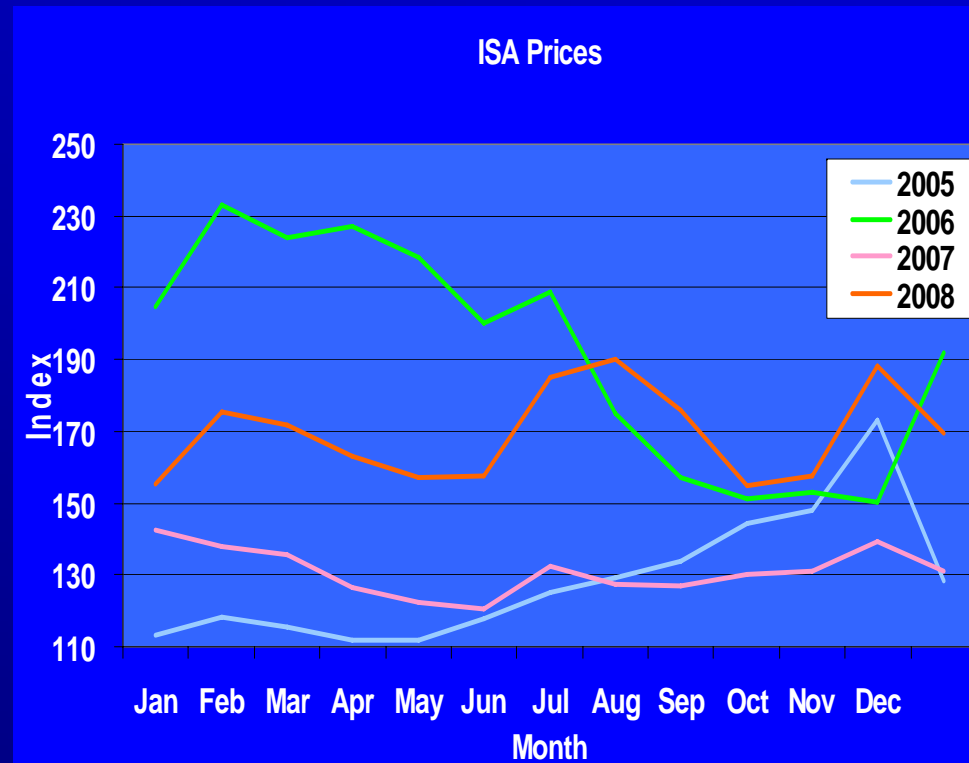
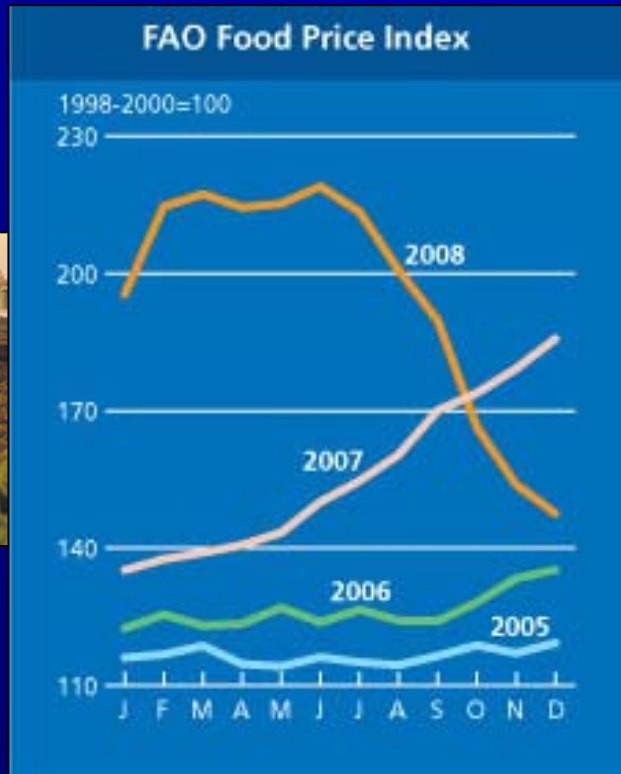
## Commodity price increases

Jan 07 - Mar-08

|                  |             |
|------------------|-------------|
| <b>Wheat</b>     | <b>133%</b> |
| <b>Soybeans</b>  | <b>88%</b>  |
| <b>Coffee</b>    | <b>53%</b>  |
| <b>Cocoa</b>     | <b>58%</b>  |
| <b>Corn</b>      | <b>43%</b>  |
| <b>Cotton</b>    | <b>36%</b>  |
| <b>Crude oil</b> | <b>93%</b>  |
| <b>ISA price</b> | <b>21%</b>  |

# WSRO Annual Meeting 2008

## Future Trends in World Food Security



# World Sugar and Fuel Ethanol

## Feedstock Choice



## Sugar and

# Future Trends in Food Security

## Feedstock Potential for Sugar Crops

- **Brazil will remain by far the globe's largest ethanol producer from sugar crops.**
- **Additional countries are/will produce ethanol from sugar crops:**
  - Argentina, Colombia, El Salvador, Costa Rica, Dominican Republic, Jamaica, Guatemala, Mauritius, Philippines, India, Mozambique, South Africa...
- **Asia: cassava is a key competitor to canejuice.**

# Sugar and Future Trends in World Food Security

## Conclusions




# Sugar and Future Trends in World Food Security

- Concerns over world food security have abated somewhat since mid-2008, at the height of the perceived food crisis and the fears of a “silent Tsunami” which threatened millions with starvation.
- Even so, longer term challenges to improving food security remain.



# Sugar and

## Future Trends in World Food Security

- 
- Sugar was not part of the rapid increase in food commodity prices between 2006 and mid 2008.
  - Market adjustments have brought commodity prices back down over recent months but there is a high level of volatility in agricultural markets.
  - Perception that biofuels were responsible for the spike in food crop prices is clearly not valid for fuel ethanol produced from sugar crops.

# Sugar and Future Trends in World Food Security



## Further Reading:

- Trostle R, 2008, Global « Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices », WRS-0801, USDA.
- FAO 2008, « Soaring Food Prices: Facts, Perspectives, Impacts and Actions Required », HLC/08/INF/1, Rome.
- FAO, 2008, « Food Outlook », May, Rome.
- FAO, 2008, « The State of Food Insecurity in the World 2008 », November, Rome
- FAO, 2008, « Crop Prospects and Food Situation », December, Rome.
- World Bank, 2008, Global Economic Prospects: Commodities at the Crossroads 2009, Washington.

