

# **The Browning of Biofuels: Environment and Food Security at Risk**

C. Ford Runge, Distinguished McKnight University Professor of Applied Economics and Law, University of Minnesota

Robbin S. Johnson, Hubert H. Humphrey Institute of Public Affairs, University of Minnesota. Formerly Senior Vice-President, Cargill, Inc.

# U.S. Biofuels Policy

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- 51¢/gallon “blenders credit” passed through to producers (reduced to 45¢/gallon in 2008 Farm Bill)
- 54¢/gallon tariff on imported ethanol (extended from 2010 to 2012 in 2008 Farm Bill)
- 36 billion gallon mandate by 2022, of which 21 billion “cellulosic”
- 385 million dollars in subsidies to cellulosic pilot plants (more subsidies in 2008 Farm Bill)

# Government Support in Dollars from Combined Subsidies

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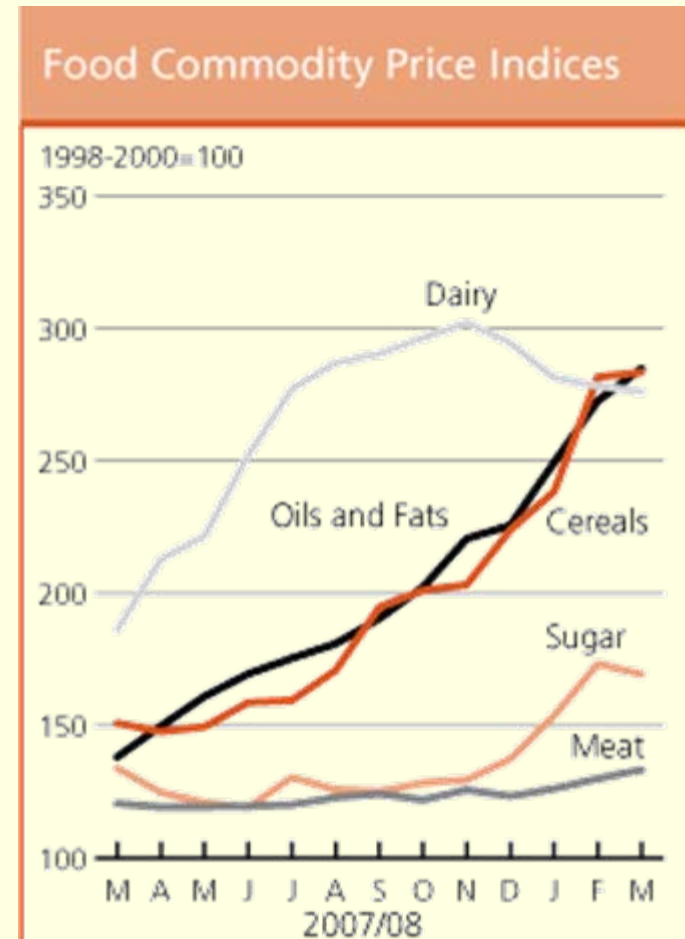
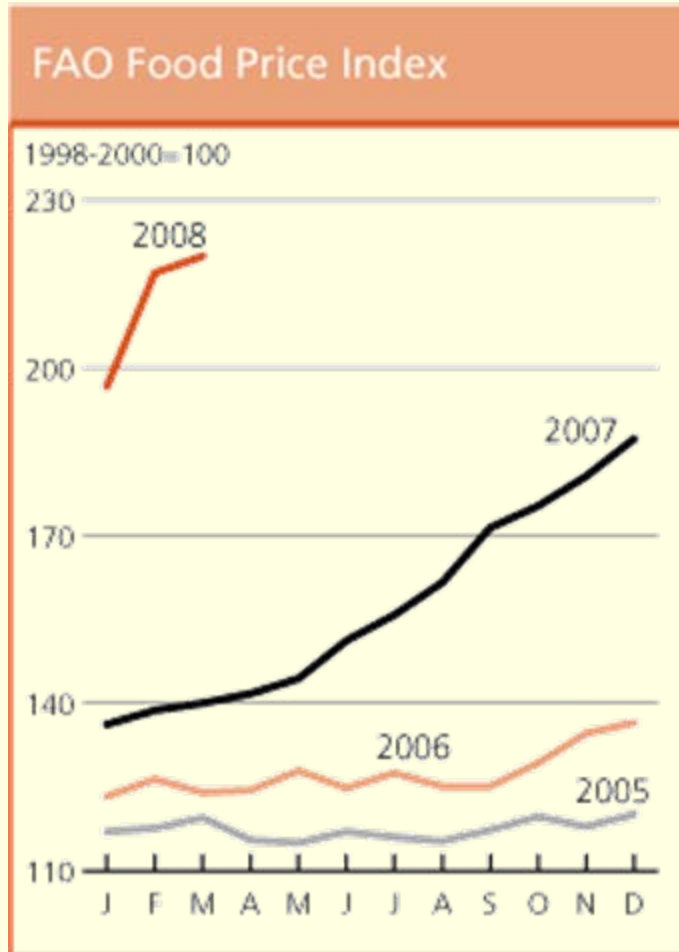
- U.S. 2007: \$6 billion
- EU 2007: \$4.8 billion

More U.S. subsidies in 2008 Farm, Energy  
Legislation

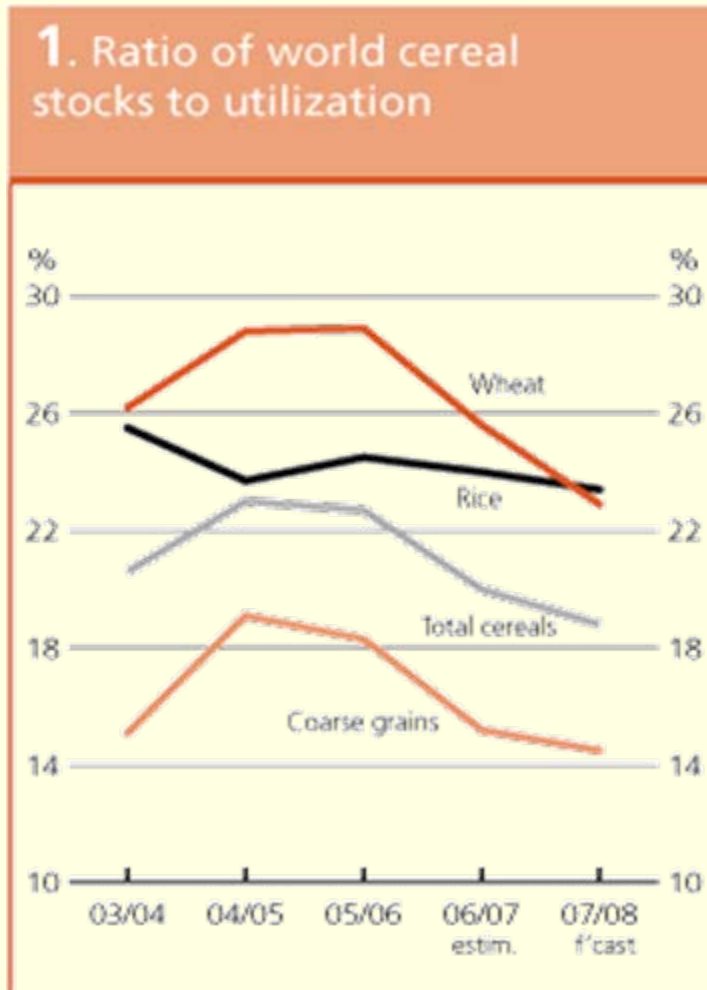
# Corn (C, CBOT)



# Food Price Increases (FAO)



# FAO Global Cereal Supply and Demand Indicators



# Countries in Crisis Requiring External Assistance

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## **Africa (21 countries)**

### **Exceptional shortfall in aggregate food production/supplies**

- Lesotho
- Somalia
- Swaziland
- Zimbabwe

### **Widespread lack of access**

- Eritrea
- Liberia
- Mauritania
- Sierra Leone

### **Severe localized food insecurity**

- Burundi
- Central African Republic
- Chad
- Congo, Democratic Republic of
- Congo, Republic of
- Côte d'Ivoire
- Ethiopia
- Ghana
- Guinea
- Guinea-Bissau
- Kenya
- Sudan
- Uganda

# (cont.)

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## **Asia (10 countries)**

### **Exceptional shortfall in aggregate food production/supplies**

- Iraq

### **Widespread lack of access**

- Afghanistan
- Korea, Dem. People's Rep. of

### **Severe localized food insecurity**

- Bangladesh
- China
- Nepal
- Sri Lanka
- Tajikistan
- Timor-Leste
- Viet Nam



# (cont.)

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## **Latin America (5 countries)**

### **Severe localized food insecurity**

- Bolivia
- Dominican Republic
- Ecuador
- Haiti
- Nicaragua

## **Europe (1 country)**

### **Exceptional shortfall in aggregate food production/supplies**

- Moldova

# Environmental and Ecological Impacts

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## Water Use

NAS (2007): Corn grown for ethanol consumes 200 times more water than to process it.

Processing requires 4 litres of  $\text{H}_2\text{O}$  per litre of ethanol, compared with 1.5 litres of  $\text{H}_2\text{O}$  per litre of gasoline.

**(cont.)**

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## Water Pollution

Nitrogen (N), Phosphorus (P) loadings into lakes, rivers, streams: Dead Zone in Gulf to rise in 2007-2008 to 22,127 km<sup>2</sup>: 25 percent above 2006-2007.

**(cont.)**

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## Land Use

Millions of acres leaving U.S. Conservation Reserve Program (CRP) for corn, and soybeans: both erosive row-crops.

10 percent substitution of ethanol and biodiesel for petroleum fuels will require 43 percent of U.S. crop and 38 percent of EU cropland

(Righaleto and Spracklen, *Science*, 2007)

**(cont.)**

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## Carbon Loadings and “Debt”

Fargione, et al. (*Science*, 2008): corn for ethanol on converted cropland creates 98 year carbon “debt”. Soybean biodiesel from rainforest 319 year debt; palm oil biodiesel from peatland rainforest 423 year debt.

**(cont.)**

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Searchinger, et al. (*Science*, 2008): land use changes worldwide for biofuels double GHG emissions over 30 years, increase GHG's for 167 years. Switchgrass based biofuels on corn lands increase GHG emissions by 50 percent.

**(cont.)**

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Crutzen, et al. (*Journal of Atmospheric Chemistry and Physics*, 2007):  $\text{N}_2\text{O}$  released from corn, rapeseed grown for biofuels 296 times more damaging than  $\text{CO}_2$ , net GHG *negative*.

# Biofuel Impacts Matrix by Feedstock

	Maize	Soybeans	Wheat	Switchgrass	Sugar	Other
Cost per unit energy						
Water quantity per unit energy						
Water quality impacts						
Nitrogen loadings						
Land use changes						
Current price						
GHG emissions						



# Policy Responses

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- (1) Replace fixed 51¢/gallon blender's credit with subsidy varying inversely with price of corn (e.g., at \$3.00/bushel, credit would be 51¢; at \$3.51, it would be zero).
- (2) Phase-out 54¢/gallon tariff on imported ethanol.
- (3) Impose 5 year moratorium on mandates.

# Policy Responses (cont.)

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- (4) Introduce conservation-inducing “negative pollution taxes” and credits (e.g., rising taxes on horsepower, hybrid vehicle rebates, fees on housing spaces greater than 3,500 square feet).
- (5) Shift subsidies from cellulose plants to cellulosic R&D.