



# **The Global Fertilizer Situation: What Is Going On?**

*2009 Tomato Production Meeting  
Woodland, CA*

*Robert Mikkelsen  
International Plant Nutrition Institute  
Merced, CA*

Experts.... “Gas prices will easily be over \$5.00/gallon by Christmas...”



Experts today...

# Why did fertilizer prices increase?

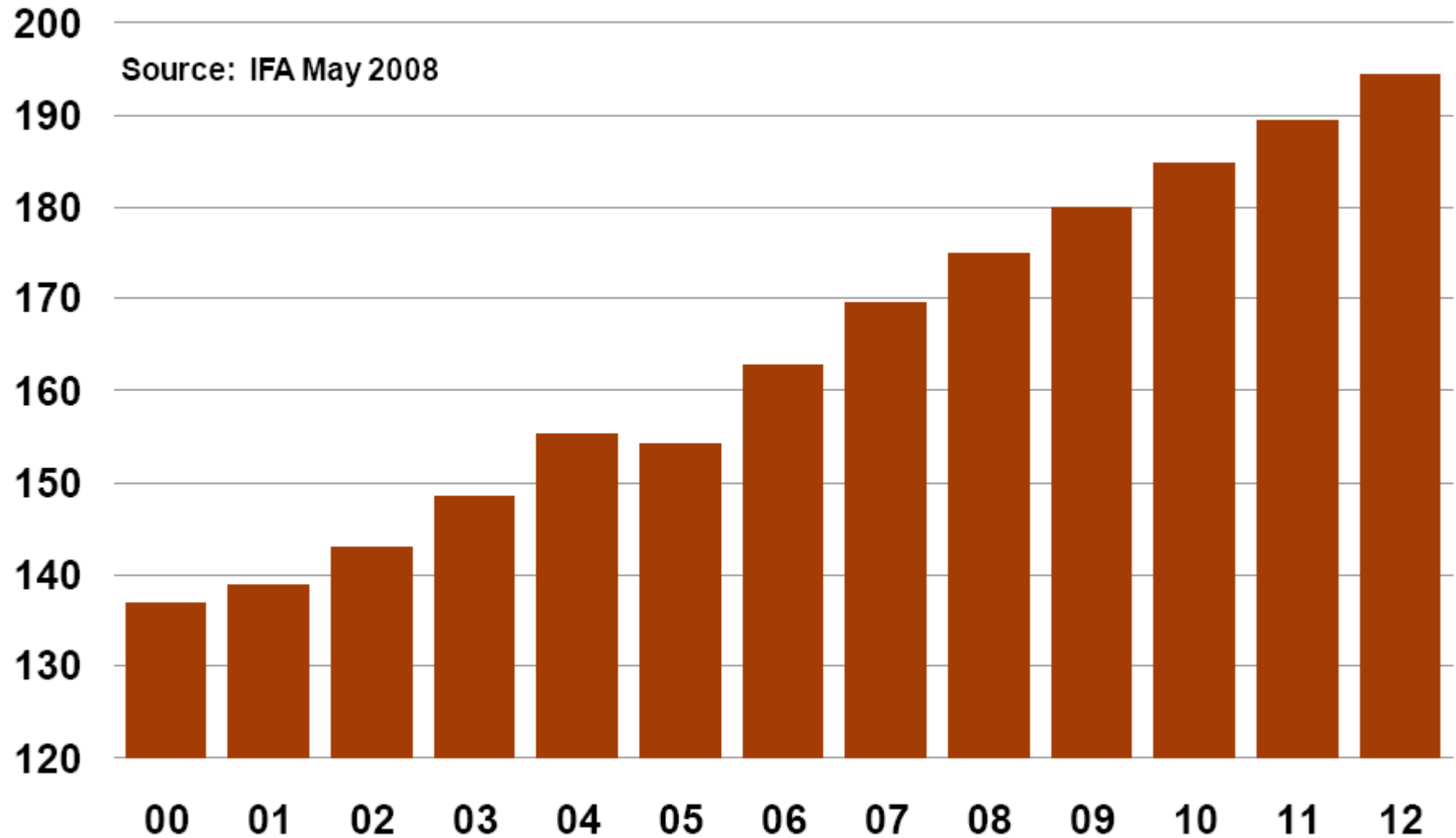
## Fundamentals:

- Fertilizer is a world market commodity ... subject to supply and demand
- Price increases are a result of:
  - Global demand is increasing
  - High energy and raw materials costs
  - Higher transportation costs
  - Weak USD
  - Strong commodity prices
  - Export tariffs on fertilizer in some countries

Mil Tonnes

## World Nutrient Use

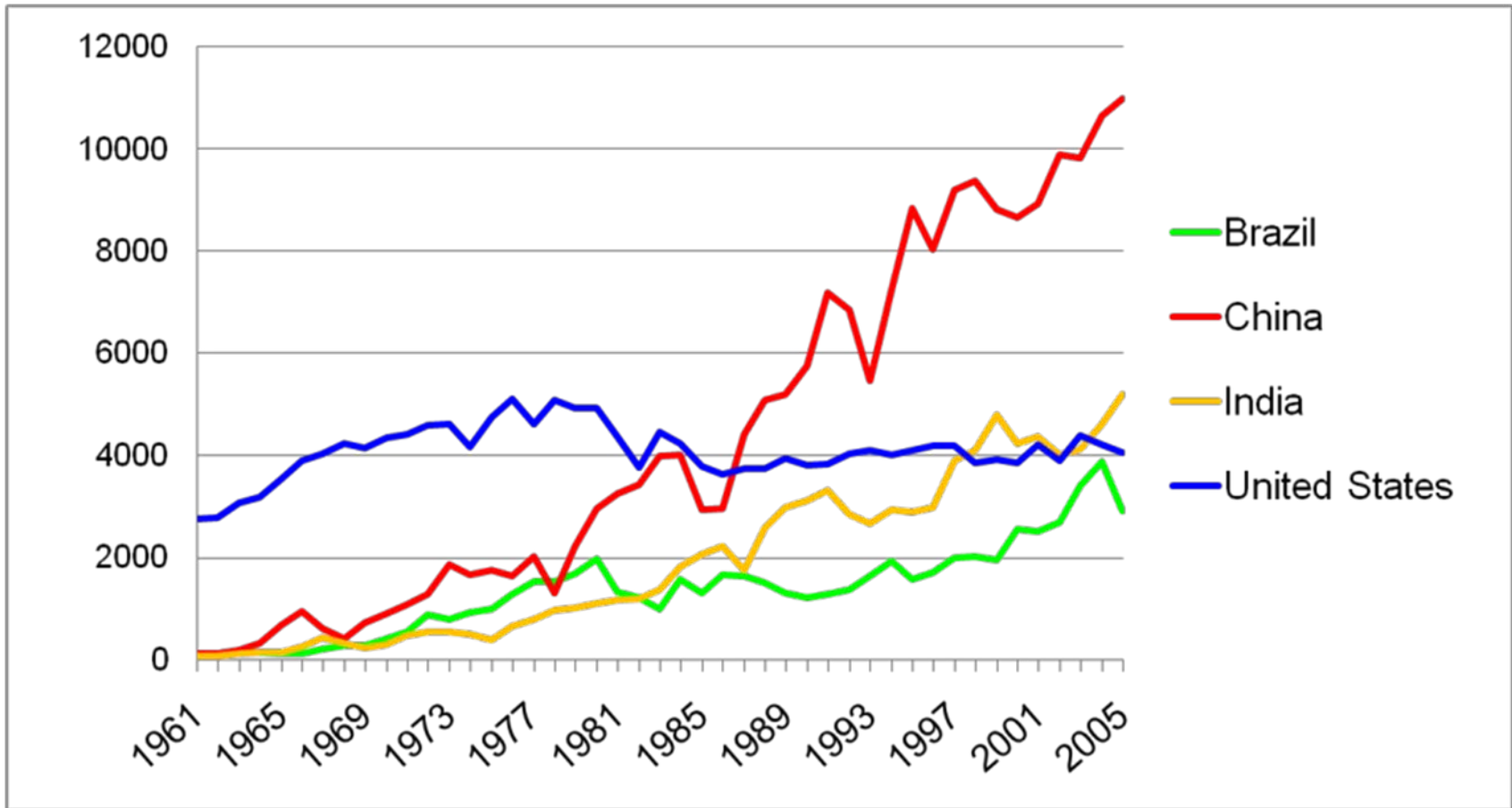
Source: IFA May 2008



# ROCK PHOSPHATE AS A P SOURCE



# Phosphate consumption, '000 t P<sub>2</sub>O<sub>5</sub>

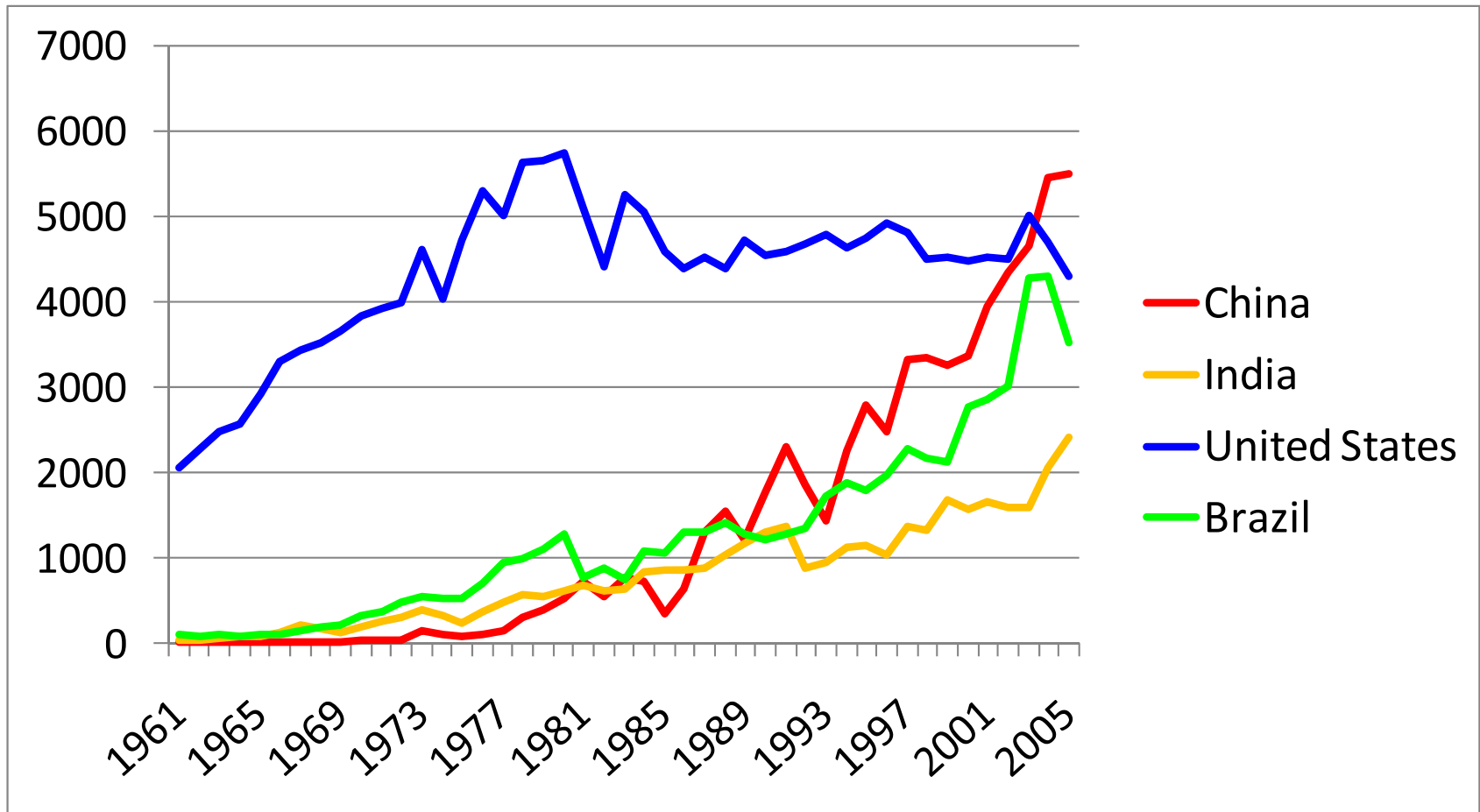


- As of 2005 these 4 countries accounted for about 63% of world phosphate consumption
  - US 11%, Brazil 8%, China 30%, and India 14%

# POTASH ORE COMES FROM UNDERGROUND MINES



# Potash consumption, '000 t K<sub>2</sub>O



- As of 2005 these 4 countries accounted for about 61% of world potash consumption
  - US 17%, Brazil 14%, China 21%, and India 9%

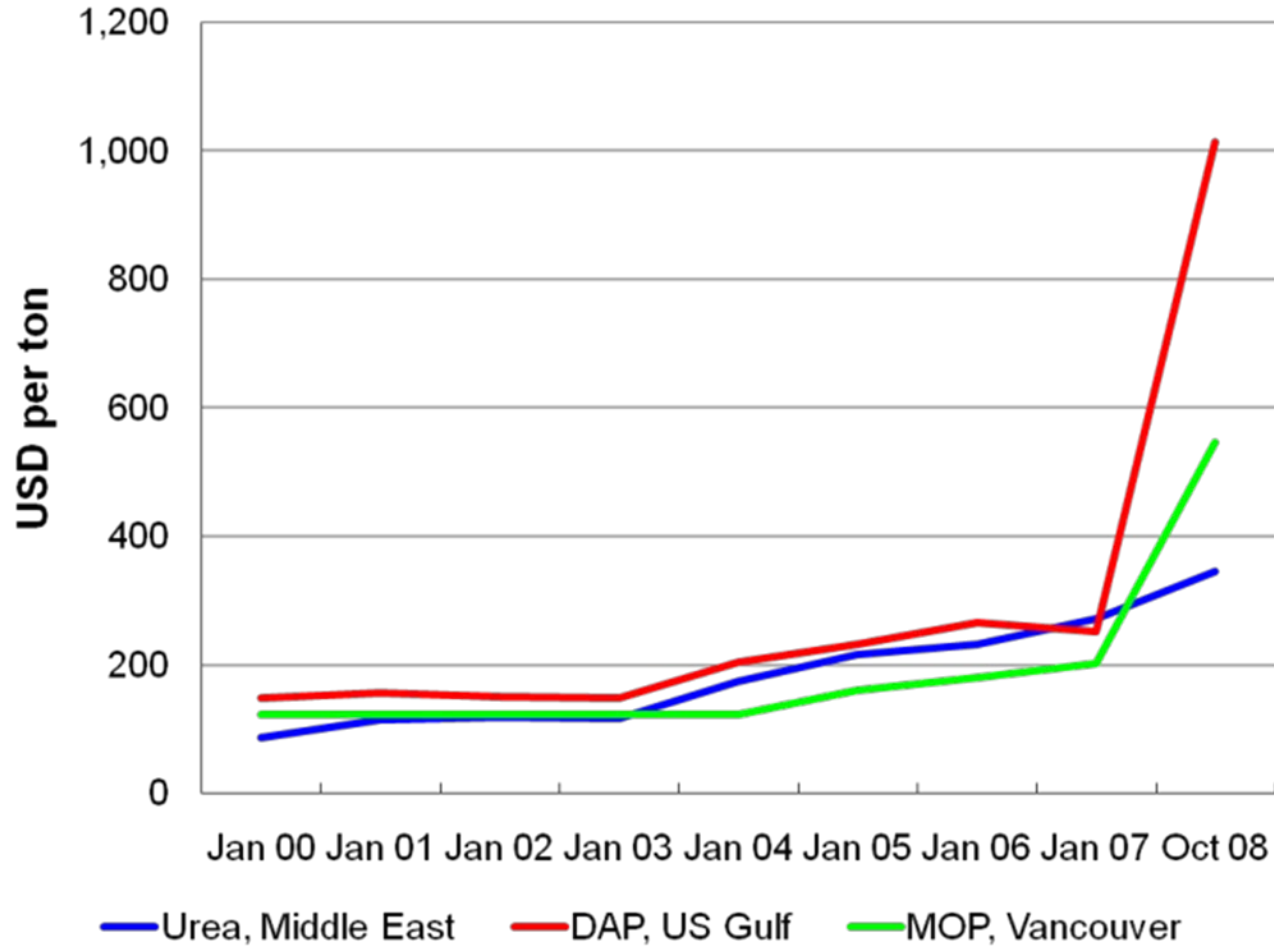


# Global Fertilizer Consumption Forecasts to 2012/13 (Mt nutrients)

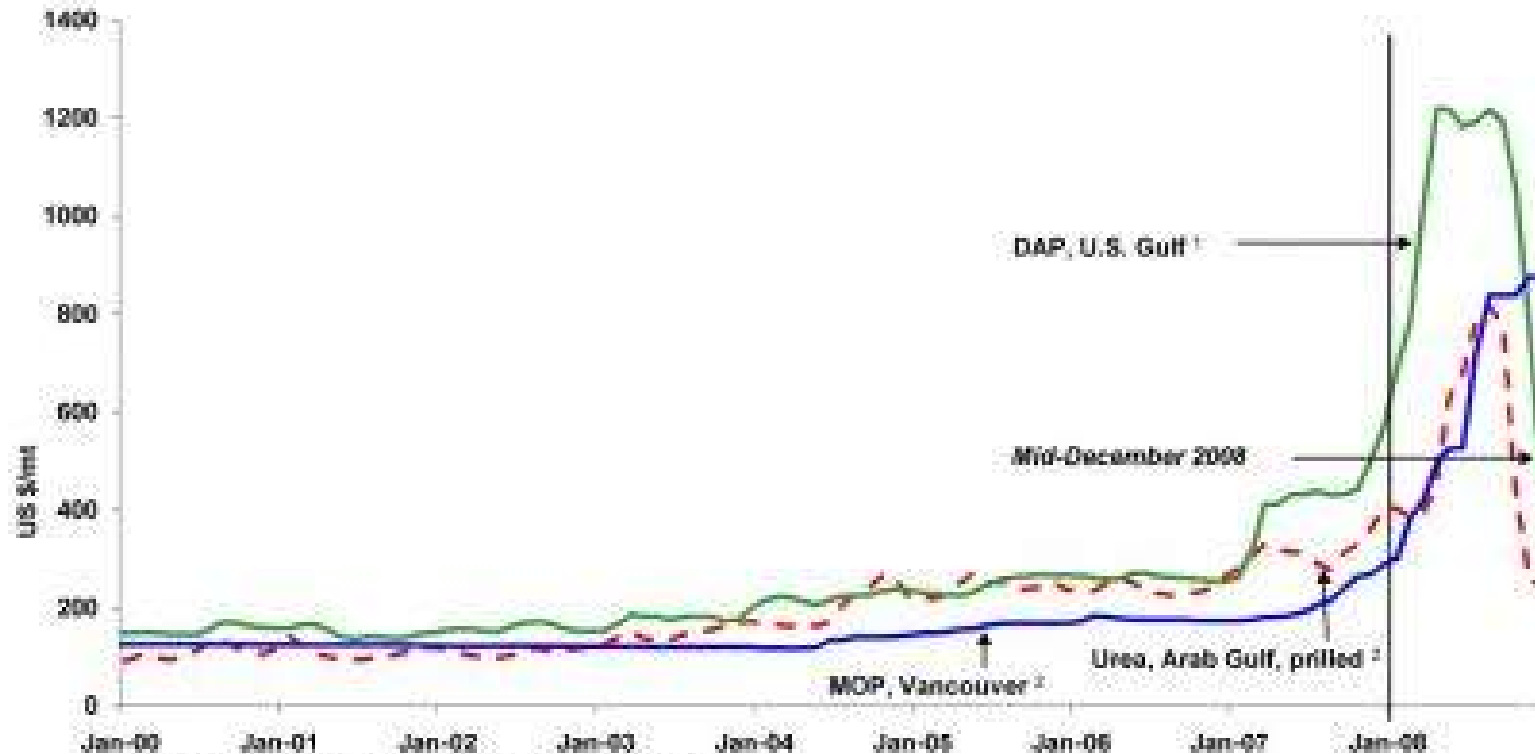
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total
<b>Ave. 2005/06 to 2007/08 (e)</b>	<b>95.5</b>	<b>38.6</b>	<b>27.6</b>	<b>162.1</b>
<b>2012/13 (f)</b>	<b>115.6</b>	<b>45.7</b>	<b>33.0</b>	<b>194.3</b>
<b>Ave. Annual Change</b>	<b>+3.2%</b>	<b>+2.8%</b>	<b>+3.0%</b>	<b>+3.1%</b>

Source: P. Heffer, 2008. *Medium-Term Outlook for World Agriculture and Fertilizer Demand 2007/08 – 2012/13*. IFA Annual Conference, Vienna, Austria

# FOB World fertilizer prices, monthly averages January, 2000 – October, 2008



**Fertilizer Prices  
(FOB, bulk)  
Monthly Averages  
January 2000 - Mid-December 2008**



1. Derived from *Grain Markets*. 2. Derived from *FMI Weekly*.

World fertilizer prices doubled in 2007 and reached all-time highs in April 2008. But prices began dropping dramatically in October and November.

FOB = free on board (average price, with buyer paying freight and insurance, to destination port).

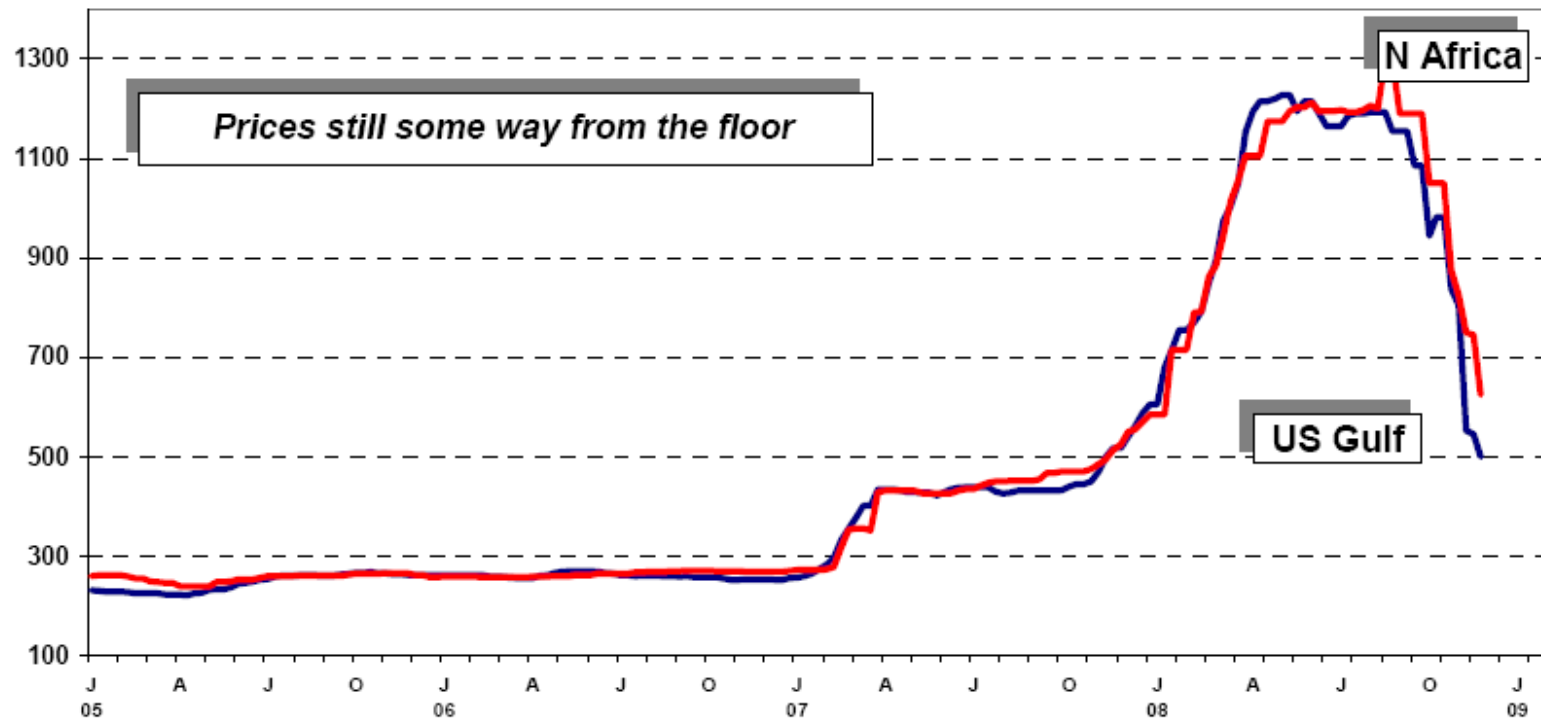
DAP = diammonium phosphate. MOP = muriate of potash.



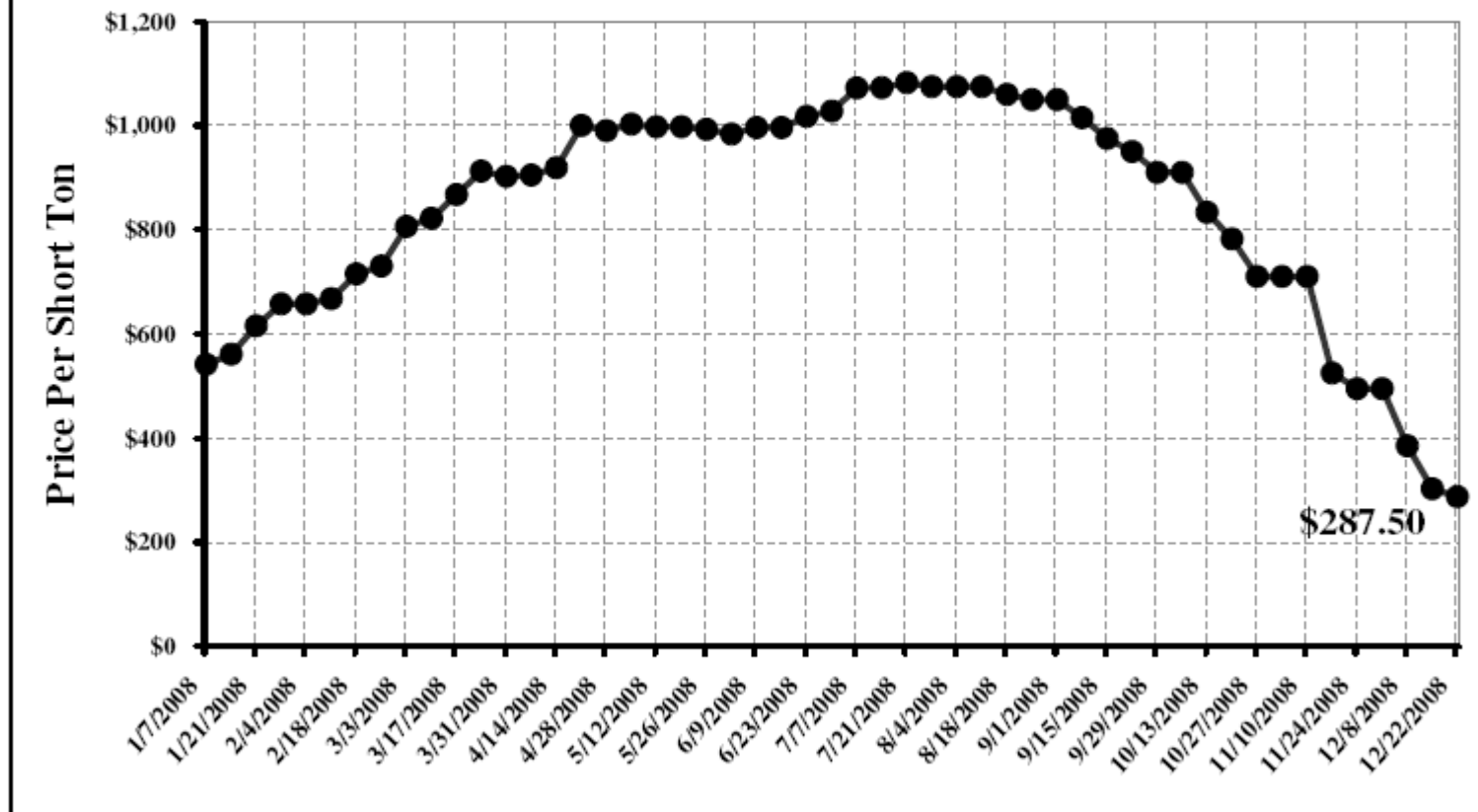
Graph by IFDC—An International Center for Soil Fertility and Agricultural Development

\$pt fob

## DAP Price Comparison



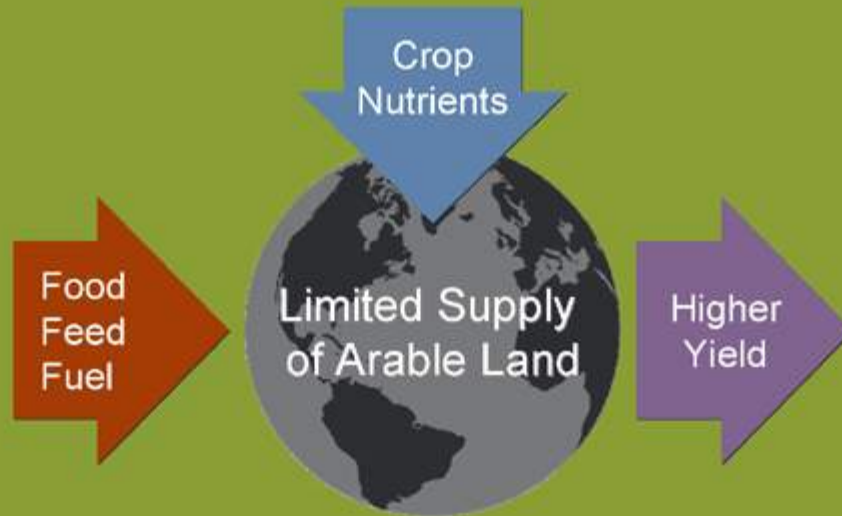
## DAP: NOLA Barge Jan. 2008 through Present (Weekly Average)



Source: *Green Markets Historical Pricing Database*

# Ag Supply & Demand Dynamics

Bio-fuel products have added a significant new end-market competitor for crops.



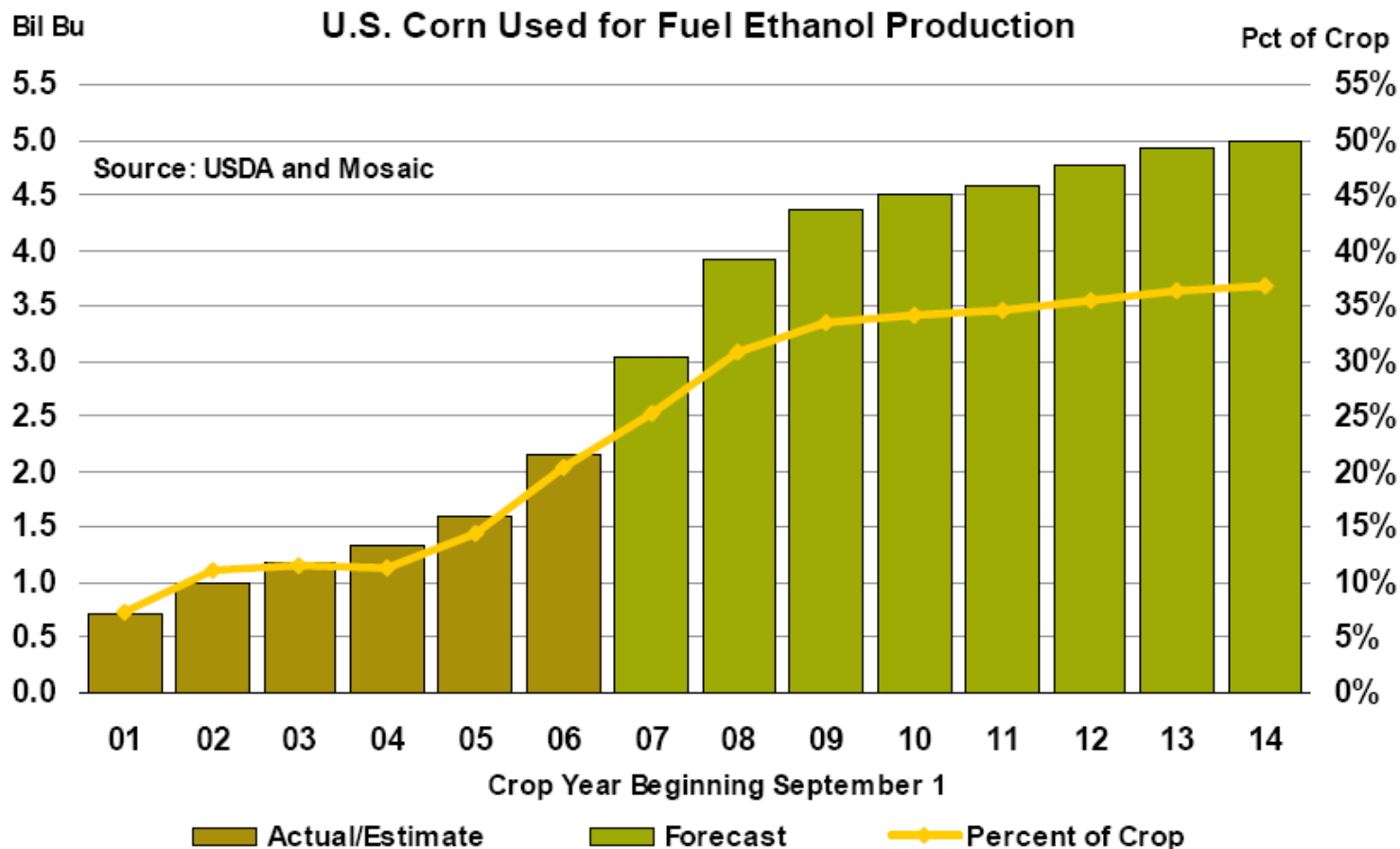
**Food,  
Feed,  
Fiber  
and Fuel**

# ETHANOL IS HERE TO STAY

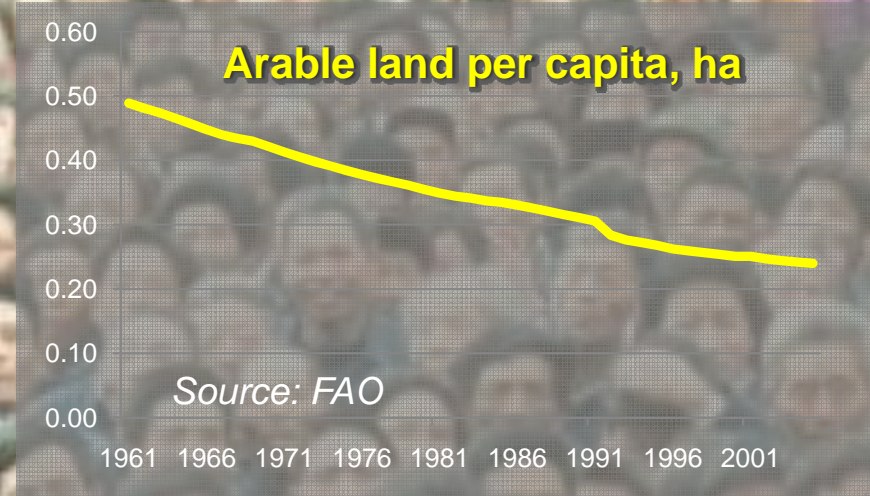
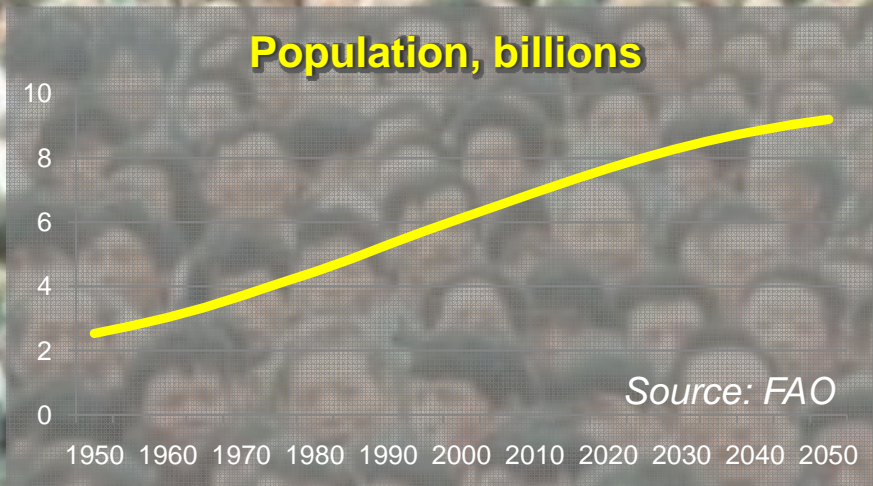
## U.S. Corn Used for Ethanol Production

Billion Bushels

% of Corn Crop



# World demand for food

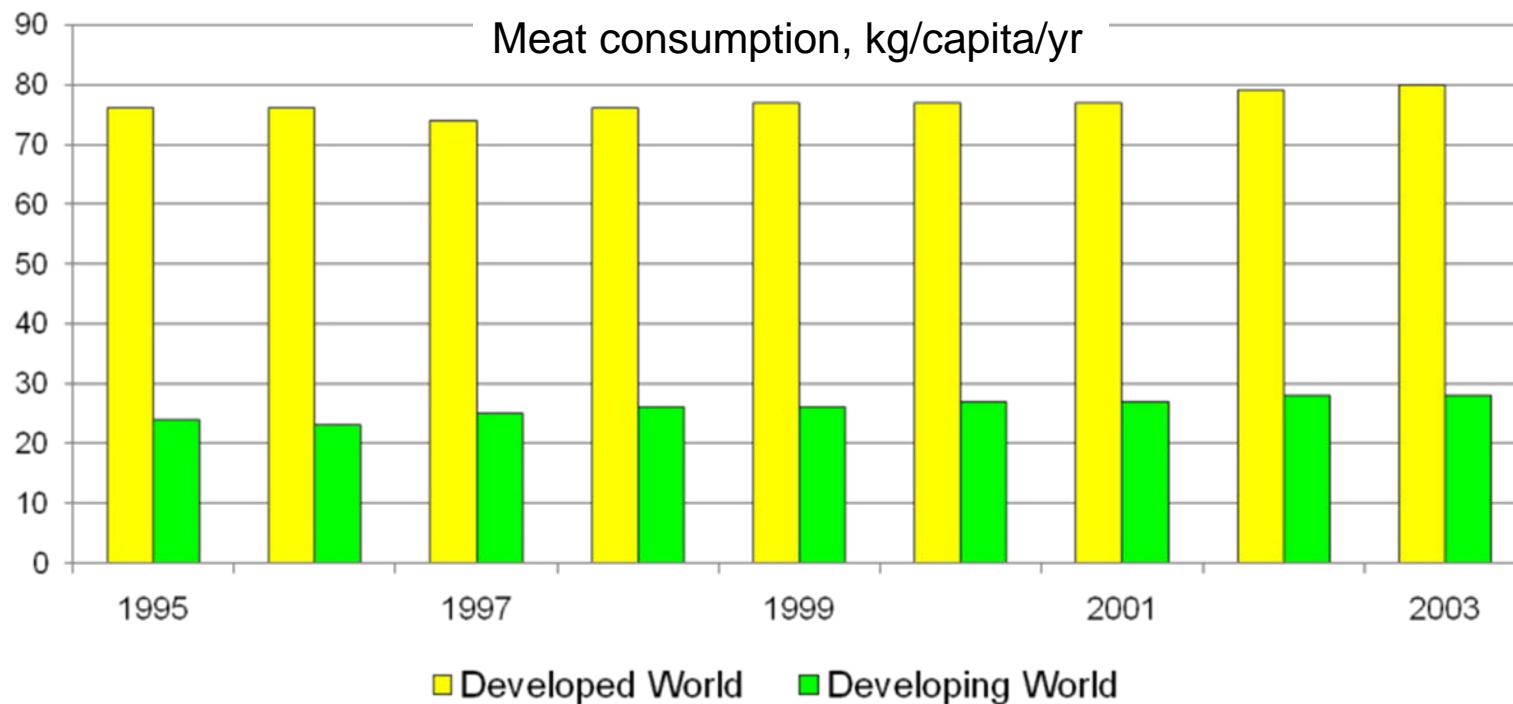


- “...food production has to increase 50% by 2013 and double in 30 years...”

— (Source: *Global Challenges for Humanity, 2008 State of the Future, Millennium Project*)



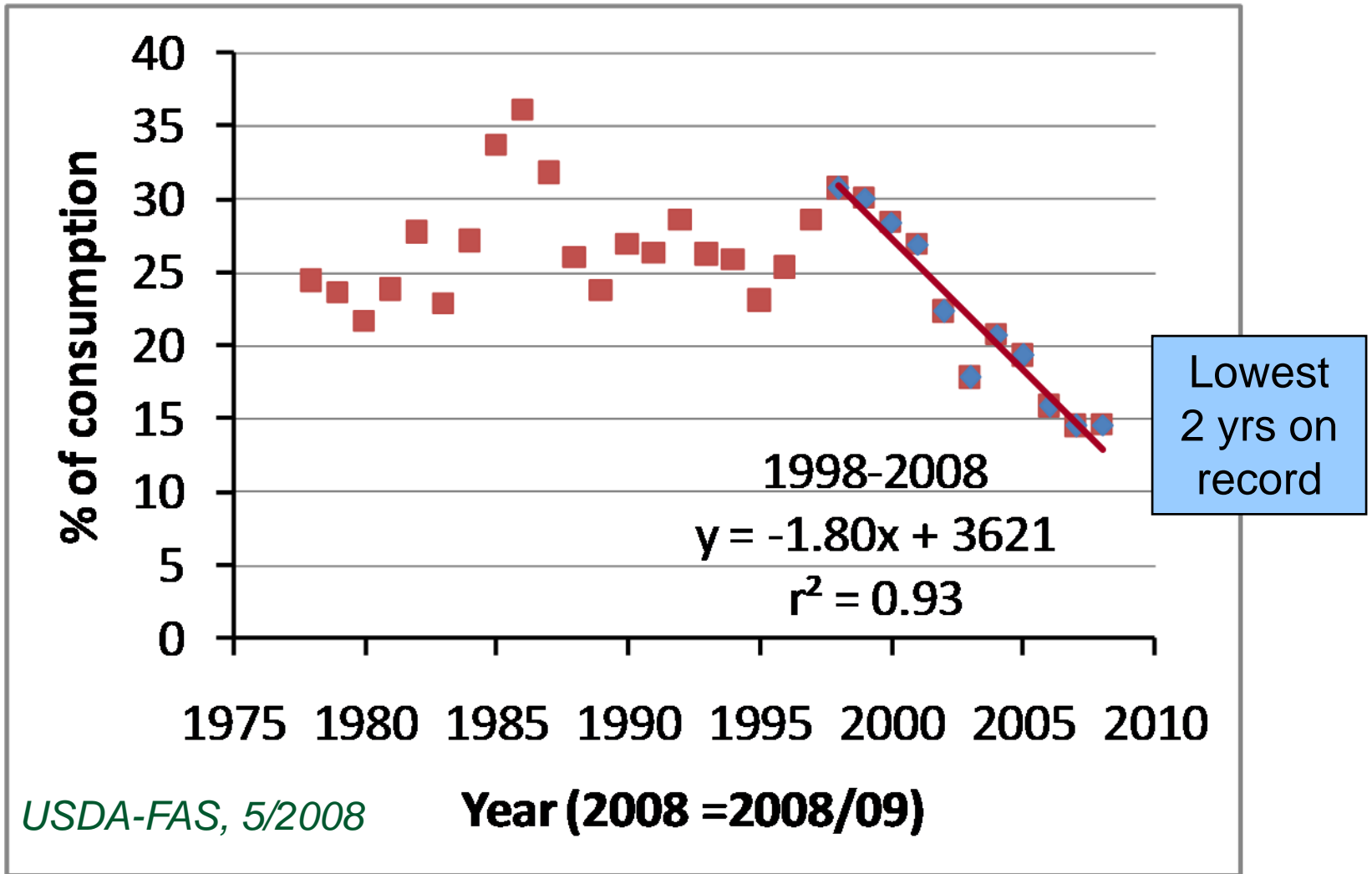
# Diets are changing ... more protein.



Source: FAO

- Requires more feed grains to produce protein
  - 7 kg/kg beef, 4 kg/kg pork, and 2 kg/kg poultry

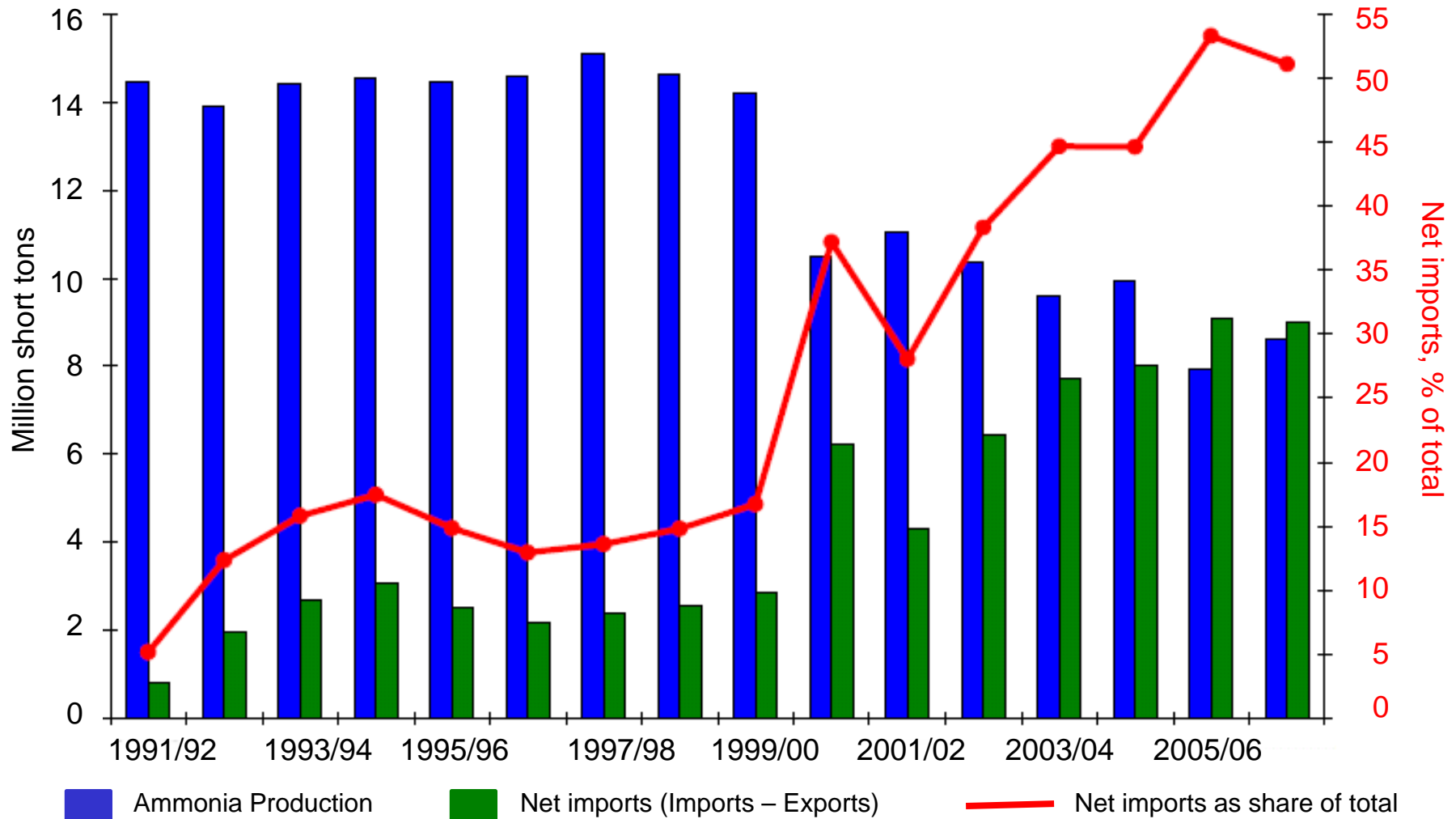
# World wheat plus coarse grains ending stocks, 1978-2008



# Why did fertilizer price increase?

- fertilizer is a world market commodity ... subject to supply and demand
- Price increases are a result of:
  - Global demand is increasing
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  - Higher transportation costs
  - Weak USD
  - Strong commodity prices
  - Export tariffs on fertilizer in some countries

# U.S. Ammonia Production and Net Nitrogen Imports

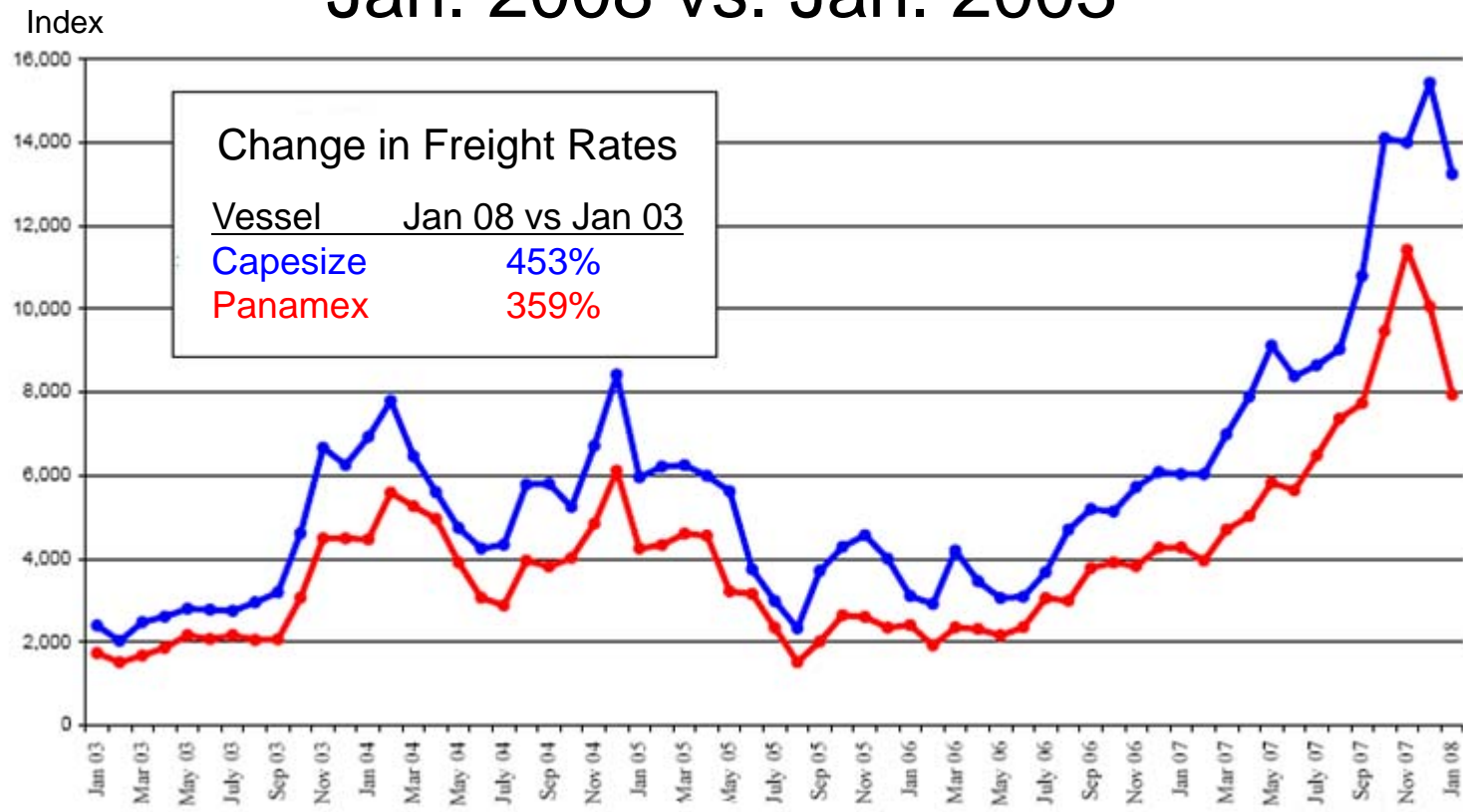


Source: TFI and U.S. Department of Commerce



# Shipping and distribution costs increase

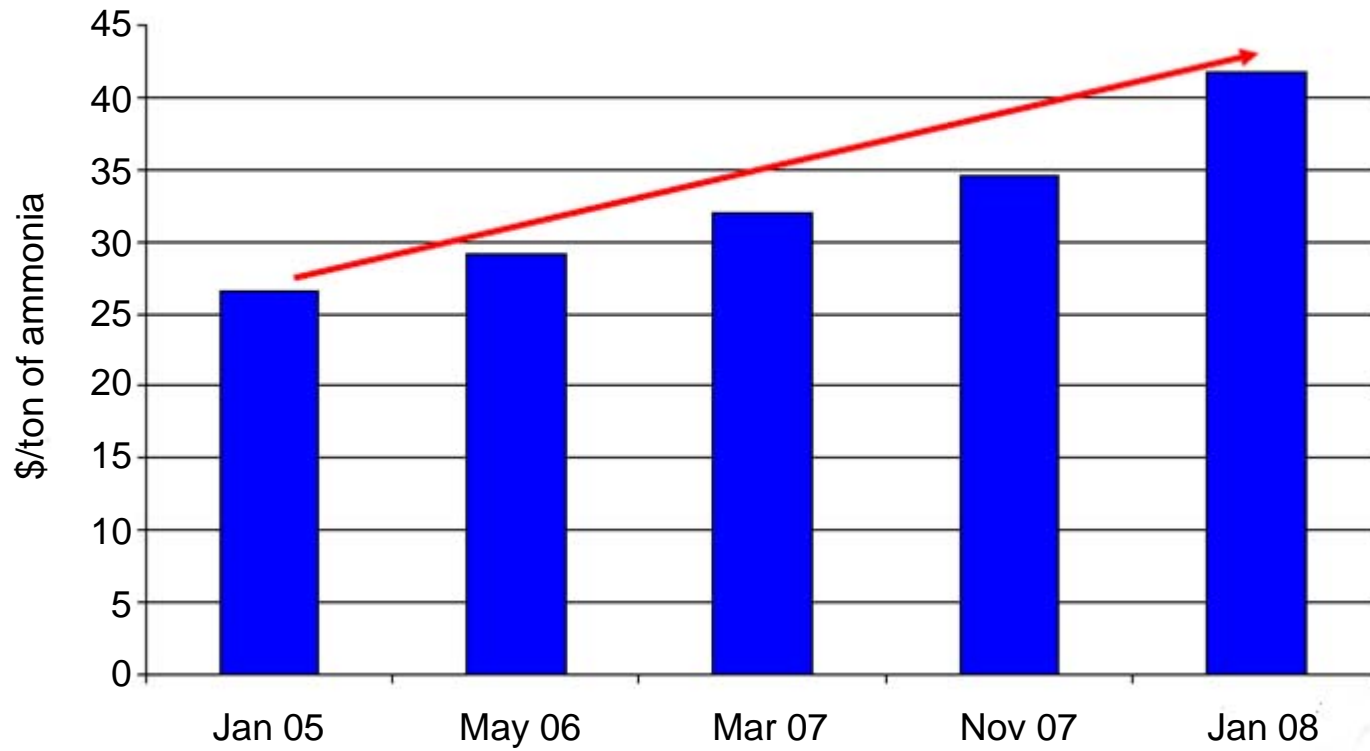
## Baltic Ocean Freight Rate Index Jan. 2008 vs. Jan. 2003



Source: Overseas Marine Service, PotashCorp, TFI

# Shipping and distribution costs increase

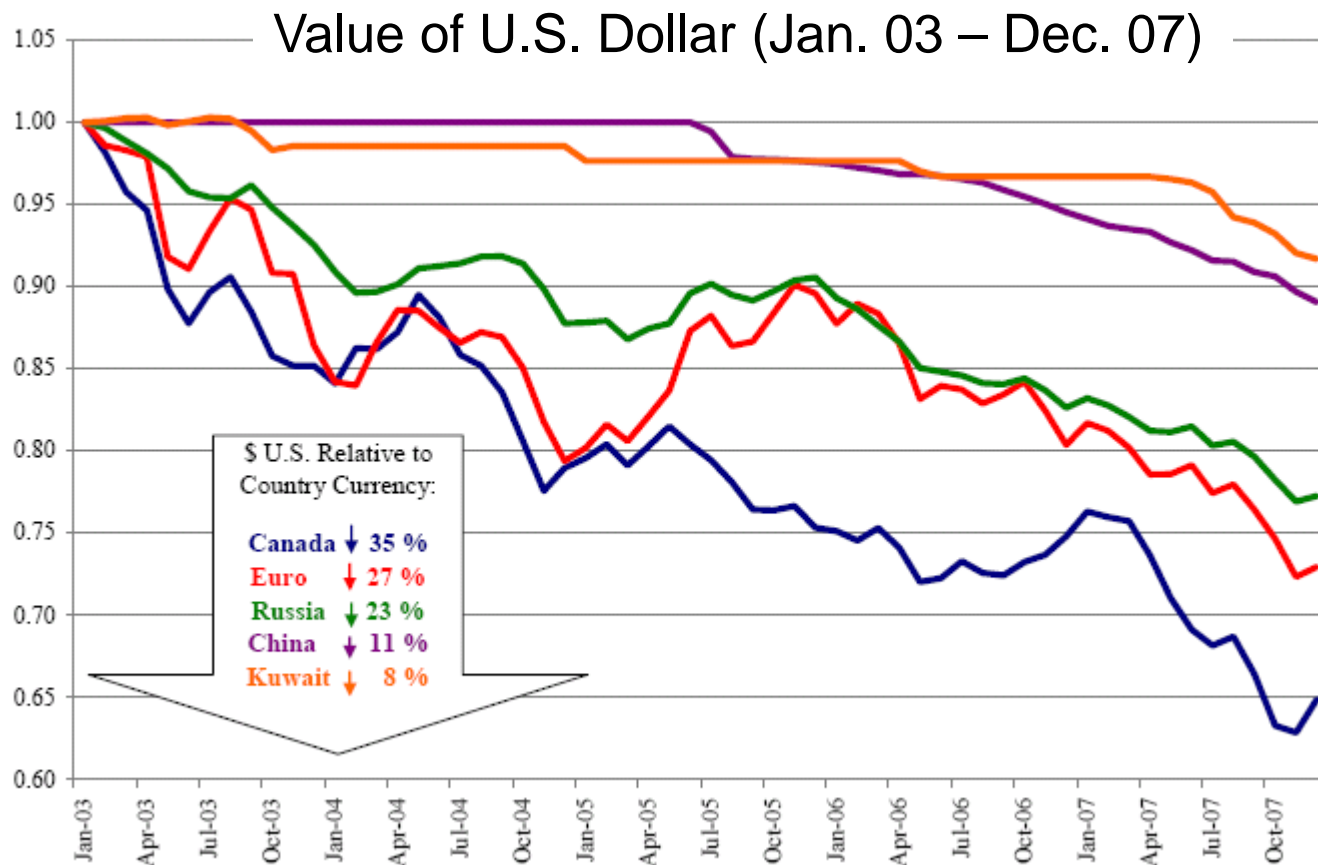
## Rail Rates: Anhydrous Ammonia Tariff Rates - BNSF



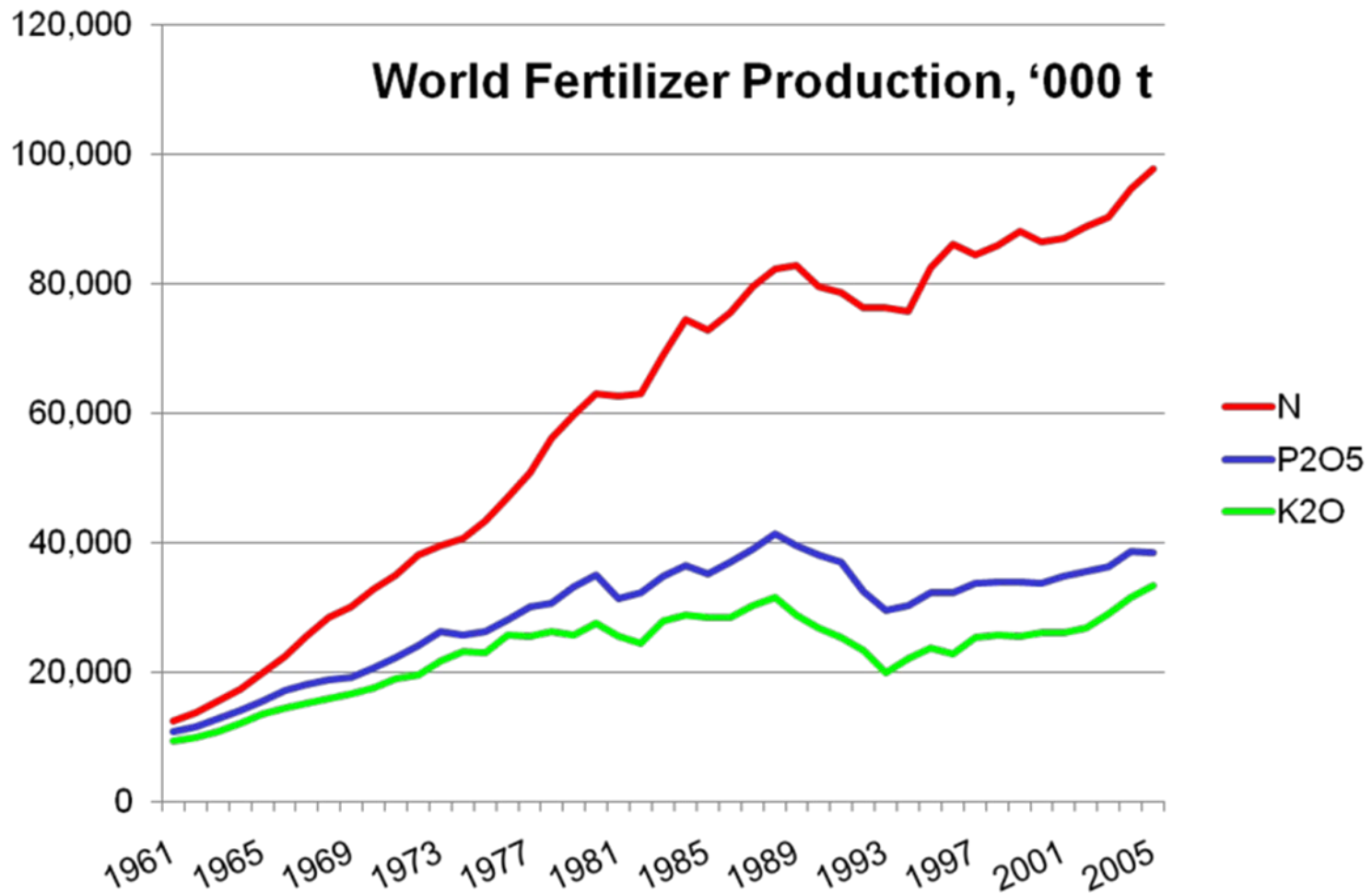
Source: Overseas Marine Service, PotashCorp, TFI



# Falling U.S. dollar ... increased cost for imported fertilizer



# Global Consequences: Increased investment by the industry in production capacity

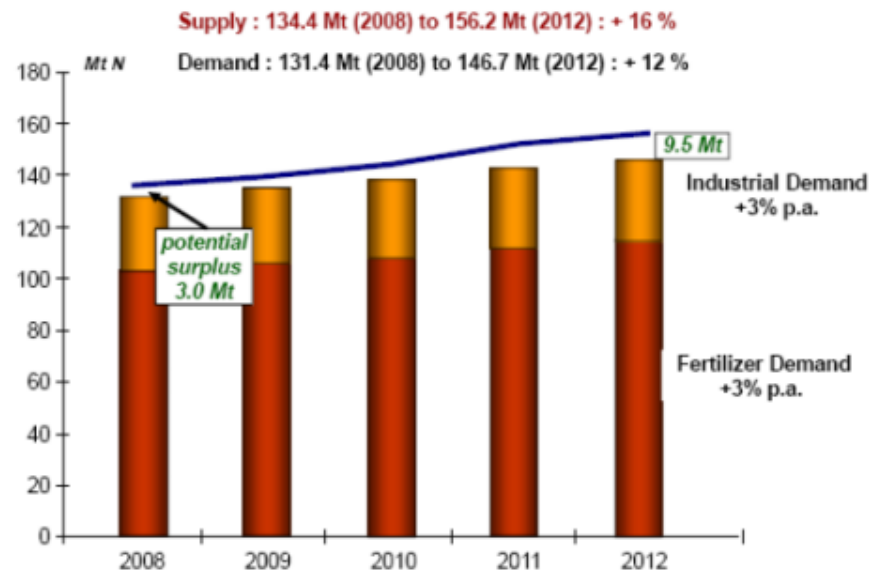


Source: IFA

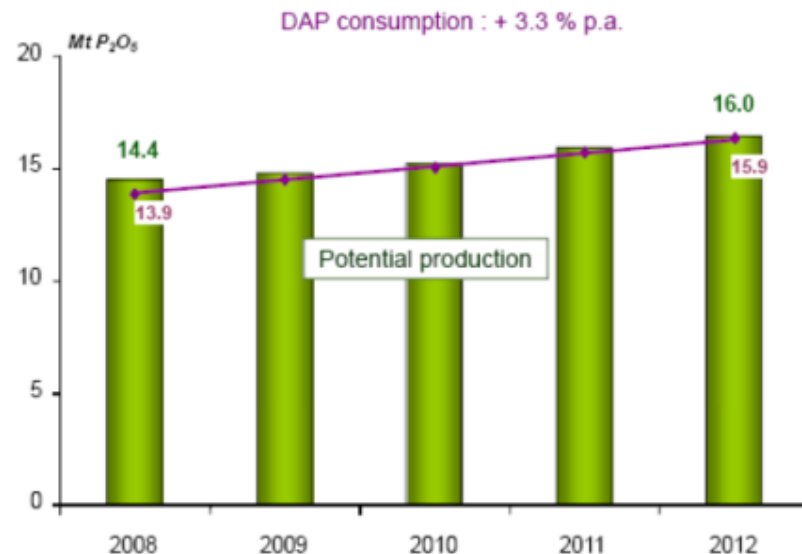


# Global Consequence: Supply will catch up to demand in next 5 years

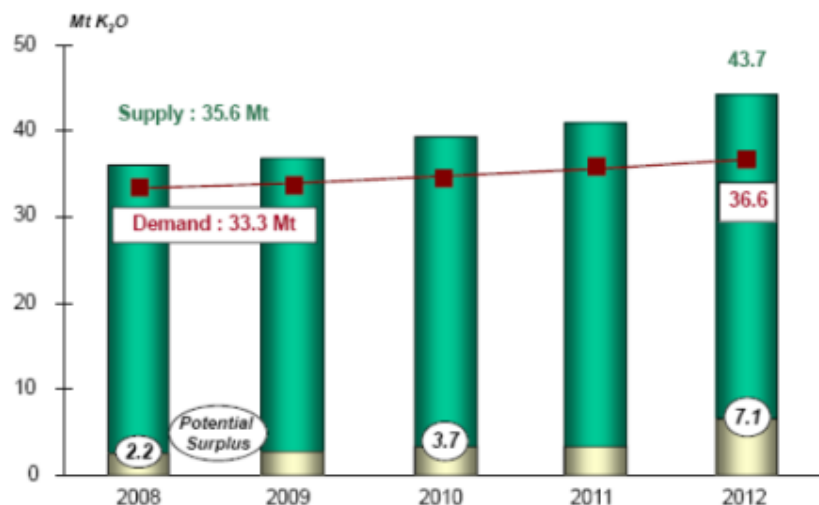
## World Nitrogen Supply / Demand Balance



## World DAP : Supply / Demand



## World Potash Supply / Demand Balance



Source: M. Prud'homme. 2008. Global Fertilizers and Raw Materials Supply and Supply/Demand Balances 2008-2012, IFA Annual Conference, Vienna, Austria

# Deliberate nutrient shortages...



...like taking the  
spark plugs from the engine of a car

# Fertilizer is International Commodity

“Demand Collapse” ... unwillingness to pay  
(global credit, trade recession, slow world economic growth)

Every international fertilizer company has curtailed production to cope with the over-supply in fertilizer

Price of ammonia strongly correlated with natural gas prices because 85 to 90% of production cost is gas

China - India- Ukraine - Africa -

# Food and fertilizer exports curbs

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THE FOOD CHAIN

### Hoarding Nations Drive Food Costs Ever Higher

By KEITH BRADSHER and ANDREW MARTIN  
Published: June 30, 2008

**BANGKOK** — At least 29 countries have sharply curbed food exports in recent months, to ensure that their own people have enough to eat, at affordable prices.

[Enlarge This Image](#)



When it comes to rice, India, Vietnam, China and 11 other countries have limited or banned exports. Fifteen countries, including Pakistan and Bolivia, have capped or halted wheat exports. More than a dozen have limited corn exports. Kazakhstan has restricted exports of sunflower seeds.

The restrictions are making it harder for impoverished importing countries to afford the food they need. The export limits are forcing some of the most vulnerable people, those who rely on relief agencies, to go hungry.

Agnes Dharbeys for The New York Times

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Export tariffs on fertilizers:

- China
- Russia
- Ukraine
- Belarus
- Egypt
- Vietnam
- Indonesia

# What Now?

Many fertilizer dealers ordered fertilizer in the late Summer and Fall in anticipation of even higher prices

Bins are full.... fertilizer orders are at record low levels... tankers sitting in Tampa waiting to sell ammonia and sulfur

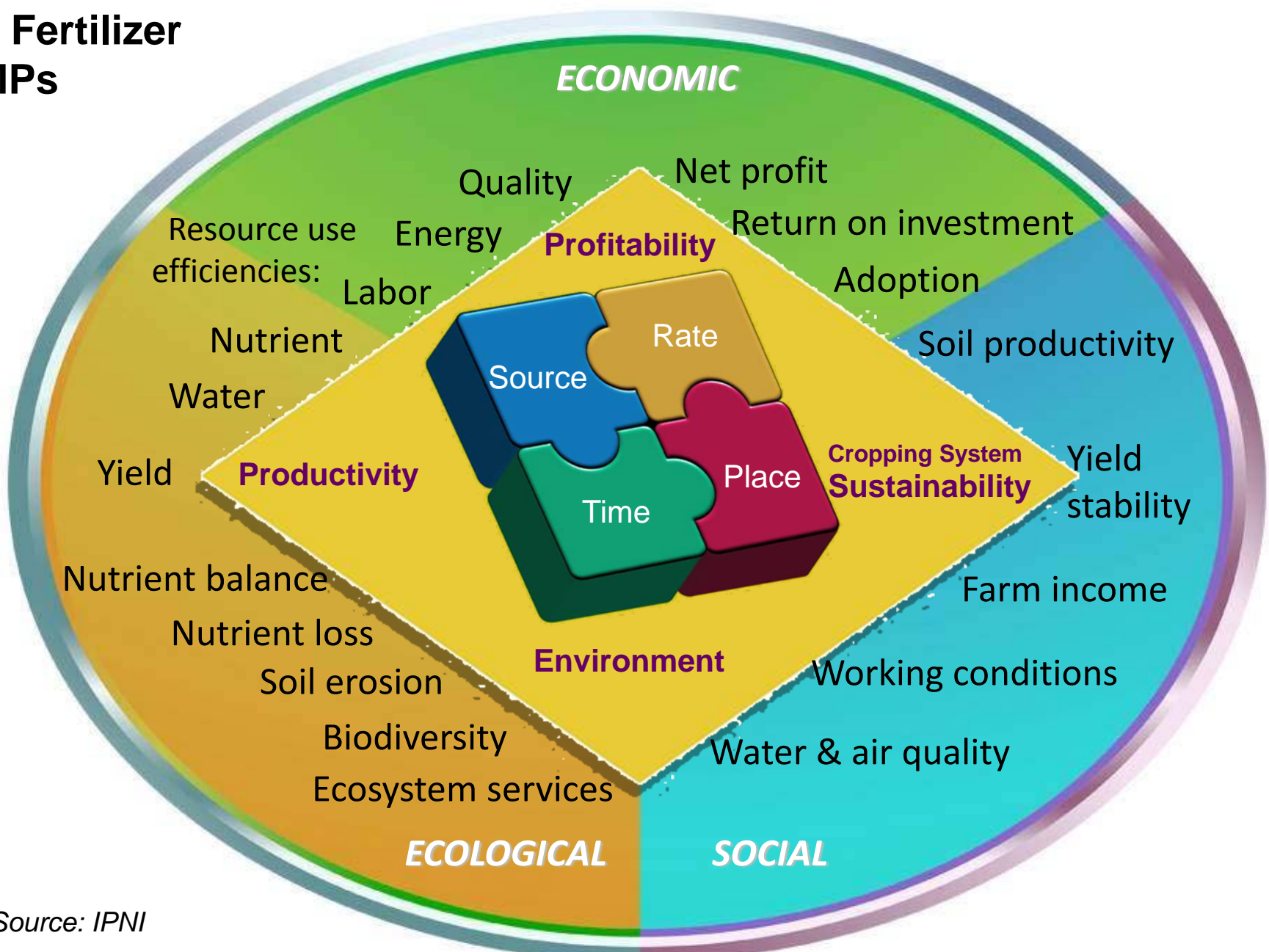
Growers holding off of fertilizer orders in hope for lower prices

Dealers claim that if they sell at current prices, they may have to go out of business

Market at a standstill.... wait until Spring?

Availability of product?

# Global Framework for Fertilizer BMPs



Source: IPNI

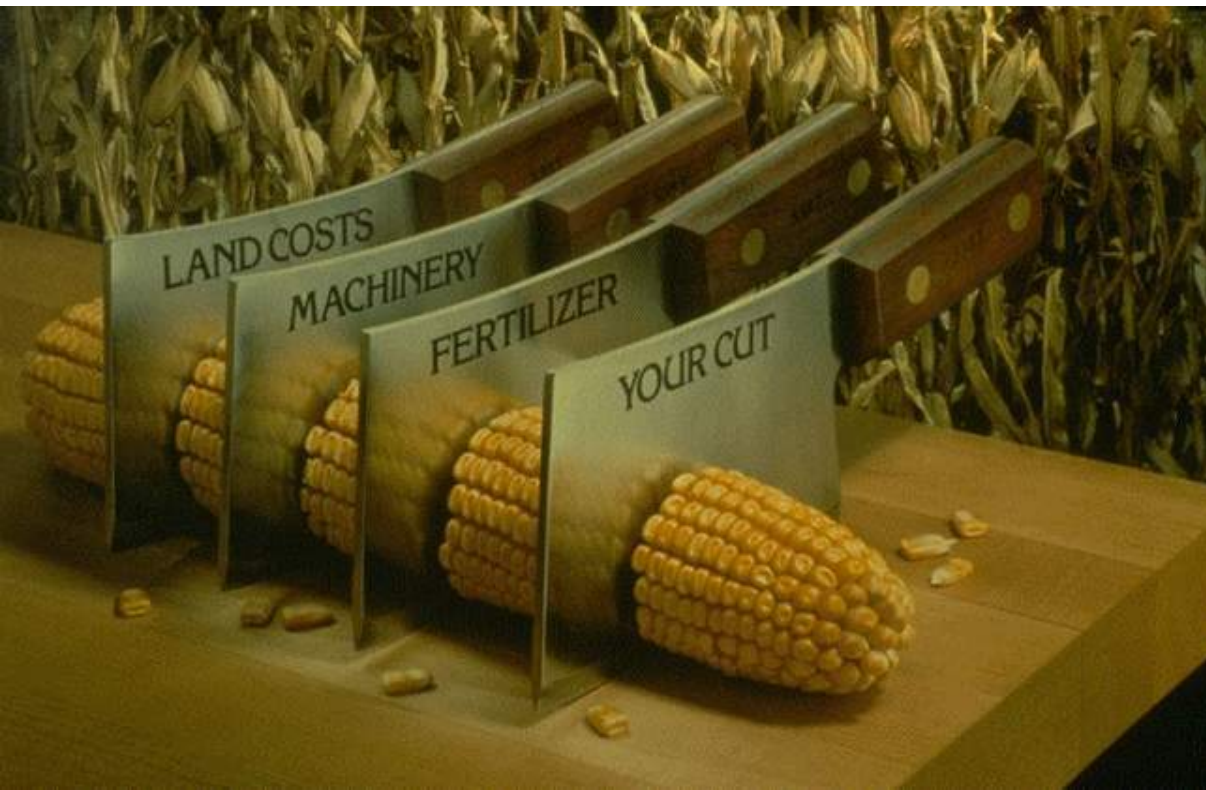
# Productivity

- Yield – per unit area, per unit of time
- Efficiency of all resources involved in production
- Quantity and Quality



# Profitability

- Difference between value and cost of production
- Net profit per unit area per unit of time









# Environmental Health

- Biophysical
  - Material losses to water and air
  - N, P, nitrate, ammonia, nitrous oxide
- Social
  - Demand for labor
  - Working conditions



# Re-emphasize the Scientific Principles for Fertilizer Management: BMPs and improving nutrient use efficiency

BMP Category	BMP Examples	
 <p><b>Right Product</b> <i>Match fertilizer type to crop needs</i></p>	<ul style="list-style-type: none"> <li>• Soil Testing</li> <li>• N, P, K, Secondary and Micronutrient</li> <li>• Enhanced Efficiency Fertilizers</li> </ul>	<ul style="list-style-type: none"> <li>• Nutrient Management Planning</li> <li><i>Select appropriate fertilizer and on-farm nutrient sources for the cropping system.</i></li> </ul>
 <p><b>Right Time</b> <i>Make nutrients available when crops need them</i></p>	<ul style="list-style-type: none"> <li>• Application Timing</li> <li>• Controlled Release Technologies</li> </ul>	<ul style="list-style-type: none"> <li>• Inhibitors</li> <li>• Fertilizer Product Choice</li> </ul>
 <p><b>Right Place</b> <i>Keep nutrients where crops can use them</i></p>	<ul style="list-style-type: none"> <li>• Application Method</li> <li>• Incorporation of Fertilizer</li> <li>• Buffer Strips</li> </ul>	<ul style="list-style-type: none"> <li>• Conservation Tillage</li> <li>• Cover Cropping</li> </ul>
 <p><b>Right Rate</b> <i>Match amount of fertilizer to crop needs</i></p>	<ul style="list-style-type: none"> <li>• Soil Testing</li> <li>• Yield Goal Analysis</li> <li>• Crop Removal Balance</li> <li>• Nutrient Management Planning</li> <li>• Plant Tissue Analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Applicator Calibration</li> <li>• Crop Scouting</li> <li>• Record Keeping</li> <li>• Variable Rate Technology</li> <li>• Site-Specific Management</li> </ul>



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