Fertilizer Update
2011-2012

By
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Outline

• Players
• 2008
• 2009-2010
• 2011

• What is next
<table>
<thead>
<tr>
<th></th>
<th>Buyers</th>
<th>Sellers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>China, India, US</td>
<td>Middle East, Russia, Ukraine</td>
</tr>
<tr>
<td>Phosphate</td>
<td>India, Brazil, Pakistan</td>
<td>US (Florida), Russia, Morocco</td>
</tr>
<tr>
<td>Potash</td>
<td>China, India, US</td>
<td>Canada, Russia</td>
</tr>
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</table>
Why did prices increase in 2008?

- Global demand is largely to blame
  - Everyone wants to eat like an American
    - Or at least improve their diet
  - The first thing folks do when they have money is improve their diet, the 3rd world was doing well
  - Moral – better diet means more protein which means more fertilizer
Worldwide Growth in Fertilizer Use

Fertilizer use has been growing faster in developing countries than in the industrialized world in recent years. But rising demand has produced a big price jump. Increased fertilizer runoff is expected to worsen the problem of dead zones along ocean shores.

**Worldwide fertilizer consumption**
160 million tons

<table>
<thead>
<tr>
<th>Year</th>
<th>Developed Countries</th>
<th>Developing Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006-07</td>
<td>30 million tons</td>
<td>120 million tons</td>
</tr>
<tr>
<td>1996-97</td>
<td>10 million tons</td>
<td>90 million tons</td>
</tr>
<tr>
<td>10-year change</td>
<td>+16%</td>
<td>+31%</td>
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**Fertilizer use compared with 10 years ago**

- North America: +12%
- Eastern Europe: +2%
- China: +38%
- Bangladesh: +40%
- Pakistan: +65%
- Iran: +71%
- India: +54%
- Thailand: +11%
- Vietnam: +75%
- Philippines: +3%
- Malaysia: +66%
- Indonesia: +31%
- Australia and New Zealand: +27%

"Dead zones" Areas in which fertilizer runoff has created algae blooms that suck oxygen from the water.

"Data for these regions are for 2005-6 and the 10-year change is from 1996-96.

**Sources:** International Fertilizer Industry Association; "Eutrophication and Hypoxia in Coastal Areas: A Global Assessment of the State of Knowledge." Mindy Selman, Susan Greenhalgh, Robert Diaz and Zachary Bragg (World Resources Institute).
**India Urea Imports**

- Indian import demand has been relatively steady throughout 2008.
- Subsidized domestic prices mean that domestic demand is unaffected by global market volatility.

Source: Fertecon, British Sulphur, Agrith
Ethanol Demand Supports Corn Prices

2007/08

- Feed Use 47%
- Exports 18%
- Ethanol 23%
- Seed & Industrial 10%

- Corn used to produce ethanol was 32% in 08/09, today approaches 50%
- Mandated ethanol production will support ethanol demand
- How many corn acres will go to ethanol?

- Corn is important because considered a high fertilizer crop, 90,000,000 +/- acres

32% - Ethanol 2008/09

35% - Ethanol 2009/10

Today 50%

Source: USDA, Doanes

OSU-HAREC Blaylock, 2008
What did we think this meant in 2008?

- High commodity prices
  - I do not know what high is but I would bet we are not headed back to $4 wheat
    - (obviously I may be wrong)

- Wheat $5+/-, Corn $6+/- today
  - Off from 2011 highs
From a 2008 presentation

DAP Fertilizer (fob Gulf Coast)

Implied Domestic Production Costs

Source: Decyter, Wells Fargo Ag Economics
2008-2009

- Fertilizer went through the roof
- Credit crunch (The Great Recession)
- Fertilizer prices imploded
  - Including demand
- Dealers got caught with expensive inventory
- Cautious market
Global shipments back on track

Mil Tonnes KCl

World MOP Shipments

95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11F 12F

25 30 35 40 45 50 55 60
DAP cost 2006–2010

http://www.indexmundi.com/commodities/?commodity=urea&months=60
Prices stabilise briefly ahead of renewed competition from China

These are not prices that your dealer has

Current local price $600-700/t
What were we saying in 2009

- Short term
  - Fertilizer demand will increase, today’s prices are not necessarily real because there is no demand
  - What happens when the ice thaws?
    - This will determine the true cost of fertilizer
  - Could we have spot shortages?
    - Everybody will want fertilizer today/yesterday
2010–2011

- Increasing prices from 2009
  - But gradual
- Fertilizer demand picks back up

- Mid-season 2011
- Prices increased substantially
  - Heading into fall with expensive inventory
Long term Dap costs

US Dollars per Metric Ton

http://www.indexmundi.com/commodities/?commodity=urea&months=60
Global Market

- Nitrogen production is down in the USA because natural gas has been much more valuable for other uses

- World demand is up

- So guess what? Prices are back up
Predicting Fertilizers Prices is Like predicting your portfolio’s value

- Impossible

- However, the current trend is down/ stable / increasing, depending on the product
Fertilizer Prices 1971–2011

- Anhydrous Ammonia
- Urea
- DAP
- Potash

USDA
## Nitrogen Cost/Corn Price Ratio

### Purdue Crop Budgets

<table>
<thead>
<tr>
<th>Year</th>
<th>N Price $/lb</th>
<th>Corn Price $/bu</th>
<th>Ratio N price/Corn price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>.26</td>
<td>2.12</td>
<td>.12</td>
</tr>
<tr>
<td>2006</td>
<td>.34</td>
<td>2.31</td>
<td>.15</td>
</tr>
<tr>
<td>2007</td>
<td>.28</td>
<td>3.71</td>
<td>.07</td>
</tr>
<tr>
<td>2008</td>
<td>.46</td>
<td>5.00</td>
<td>.09</td>
</tr>
<tr>
<td>2009</td>
<td>.49</td>
<td>4.00</td>
<td>.12</td>
</tr>
<tr>
<td>2010</td>
<td>.30</td>
<td>4.20</td>
<td>.07</td>
</tr>
<tr>
<td>2011</td>
<td>.49</td>
<td>5.54</td>
<td>.09</td>
</tr>
<tr>
<td>2012 Est</td>
<td>.54</td>
<td>6.30</td>
<td>.09</td>
</tr>
</tbody>
</table>
Global shipments back on track

World MOP Shipments

Mil Tonnes KCl

World MOP Shipments

25 30 35 40 45 50 55 60 65

95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11F 12F

55 51 53 56-57 58-60
It is unlikely that we go back to the prices of old unless we also go back to $1.70 corn and $3.00 wheat

What is going to happen in the EU?
- PIIGS, will they default/break up the EU?
- Once PIIGS settled what will happen in US?

This places great uncertainty into the market
Dealers unlikely to get stuck with expensive inventory again

So stocks of certain fertilizers are relatively low

Exception is K and UAN

India bought bunch of K at $550/ton
  ◦ This kind of set the floor
There is great uncertainty in the market.

Where this will take us will be interesting.

Looks like price is pretty firm on K and UAN.

Others are less firm and more cloudy:
  ◦ What will happen in the EU?
  ◦ This will likely impact cash flow around the world.
It’s a new world

- Fertilizer prices have skyrocketed!!!!!!!!!
  - 11-52-0 (MAP) has quintupled
  - Potash is up 200-300%
  - Nitrogen is up almost 100%
  - Sulfur went up $200 this spring in a single day
Results

- N
- More controlled products have become more economically feasible
- Lots of voodoo products making spectacular claims
- We may shortly see $1 N
Results

- P
- Fertilization has become nearly prohibitive
- 200 to 400 #/a P2O5 can cost $200 to $500
Results

• **K**
  
  Price increases have just started for K currently $0.50/ pound K2O

• **S**
  
  Soil acidification has become prohibitively expensive.
Why

• Global demand is largely to blame
  – Everyone wants to eat bad like an American
  – The first thing folks do when they have money is improve their diet
  – Moral – better diet means more protein which means more fertilizer
Why

• N
  • Largely US N is being exported to S. America

• P, K
  • Largely being exported to China, India and Pakistan
  • Both SOP and 10-34 projected to be in tight supply
It’s a global market

• Global c

• Fertilizer cartels are setting the price

• Price has had little effect on demand
US Nitrogen Exports

Source: USDA, Wells Fargo Ag Economics
DAP Fertilizer (fob Gulf Coast)

Source: Decyfer, Wells Fargo Ag Economics

Implied Domestic Production Costs
So here we are

• Forward contracting for fertilizer has all but disappeared unless you have storage to take immediate delivery.

• A fertilizer dealer cannot accept this price risk for you, they would not last long unless they can inventory the product.
The perfect storm

• High commodity prices
  – Corn
  – Wheat
• Increased world demand
• Bio-fuels
• Pressure to increase food and bio-fuel food stock supply
Potatoes

• WSU enterprise budgets
  – I changed N, P, and K in the WSU enterprises and every one went from black to red. This does not take into account fuel, chemicals (glyphosate) or any other price change
The losing game

- Potato Uptake
- N 400lb./a
  - $280
- P 120 lb P2O5/a
  - $150
- K 600 lb K2O/a
  - $270
- Total $700 and it is not over
The not so losing game

- Onion
- Uptake
- N 150 lb./a
  - $105
- P 60 lb P2O5/a
  - $75
- K 200 lb K2O/a
  - $90
- Total $270 and it is not over
What to do

• Most economical models say that it is still not cost effective to cut back on fertilizer

• In other words maximum yield still pays
NITROGEN DISTRIBUTION

#/A UPTAKE

31-Mar 20-May 9-Jul 28-Aug 17-Oct

TOTAL

TUBERS

OSU-HAREC
POTASSIUM DISTRIBUTION

#/A UPTAKE

TOTAL

TUBERS

OSU-HAREC
POTASSIUM

#A UPTAKE
du/dt

2-Apr 2-May 1-Jun 1-Jul 31-Jul 30-Aug 29-Sep

OSU-HAREC
P DISTRIBUTION

#/A UPTAKE

OSU-HAREC
The solution

• Be as efficient as possible
  – Don’t put faith in unproven products

• Match application in timing and rate to demand as best as possible

• One way a grower is managing/requiring tenants to apply replacement nutrients
  – Be careful who you rent to
Uptake always precedes drymatter
N - Potato

- Mark Pavak is doing some cool stuff on N in spuds – become familiar with his work

- Avoid early and late season N where possible. These usually are inefficient and are not beneficial to yield