

Dynamic Changes in Agriculture and Implications for Marketing

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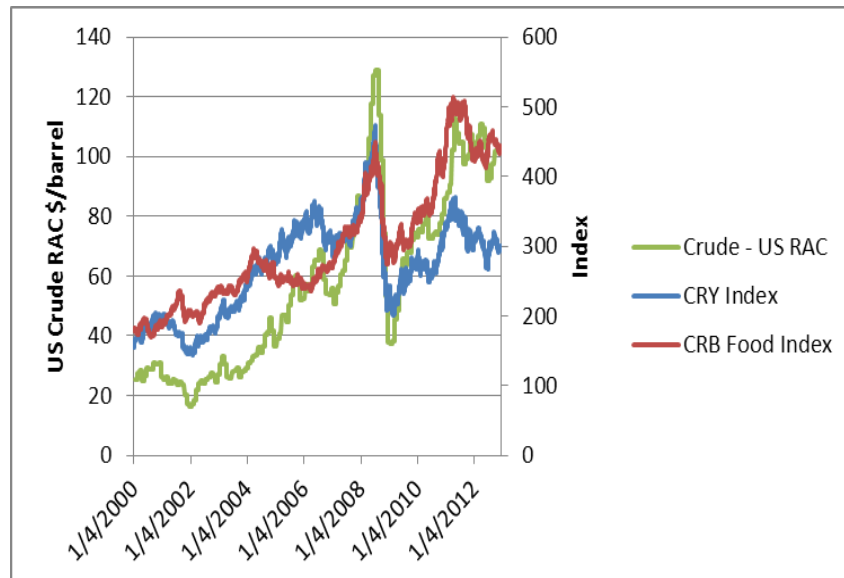
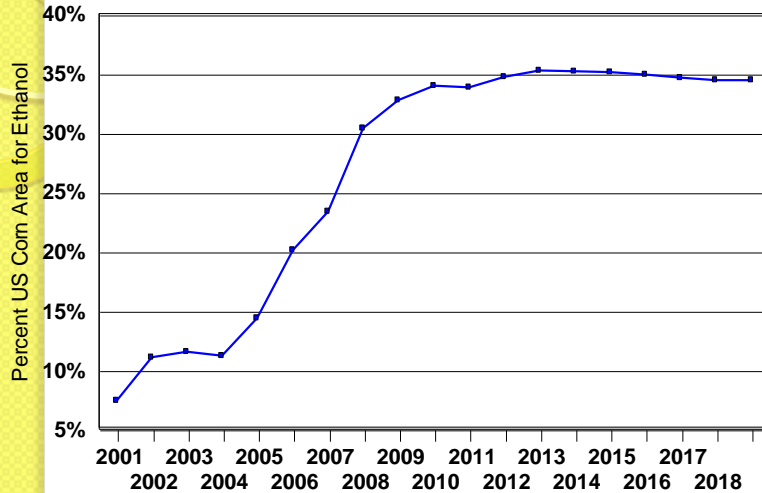
Topics

- Macro/dramatic Changes in Agriculture
- Biotech, Risk and Logistics
- Investment implications
- **Major theme:** *Agriculture is changing very rapidly, impacting exports and ultimately marketing opportunities and risk, more than ever before.*

Macro Drivers to Changes in Agricultural Markets

- **Global supply and demand**
 - Demand growth exceeds productivity growth
 - China, Brazil, FSU
- **Biotechnology**—change in trend, geography, future traits, wheat, US vs... ROW
- **Change in geography of production and trade**
 - Partly in response to biotechnology
 - More cropping alternatives
- **Biofuels**—35% of corn area in US is now supporting ethanol
- **Volatility**---more risky—
- **Major Themes**
 - Growth in exports driven by demand growth exceeding productivity growth (bullish—8-10 years)
 - Increase investment in ag and ag infrastructure
 - Challenges in crafting strategy w.r.t. targeted investments and responding to greater risks on a broad scale.

Oil Prices and Ag



- 35 % of corn plantings now are used for ethanol
- Ag has become inextricably tied to oil prices.
- 2012: Record area planted to corn (75 Years) and soybean
- **Now:** OIL and Ag are highly positively correlated
- Energy is an input into agriculture
- Agriculture is an input into energy via ethanol and biodiesel.
- CRB Food Index and CRY is CRB Index

Popular Press Representation of the Same Theme

- *Economist*: by 2050 world grain output will have to rise by half and meat production will need to double ...when growth in grain yields is flattening out, there is little extra farmland and renewable water is running short...
- *Wall Street Journal* “Food Prices Rise as Asia Projects Stall
- *Business Day*: (Sept 1 2010) Scramble for food companies a warning of crisis to come
 - And, overall inflationary expectations for most commodities, including grains and oilseeds!
- *Business Week* (October 10). Coping with Commodity Shock:
 - Extreme price volatility and supply concerns are forcing companies to rethink strategies
 - This commodity cycle has a much bigger exogenous shock to it than past ones
- *Financial Times* (Oct 15 2010) Production must rise to banish hunger
- *WSJ* Oct 21 2010. Dilemma Over Pricing: From Cereal to Helicopters, Commodity Costs Exert Pressure.
- *Business Week* (Oct 25 2010): Those Amber Waves are Fueling Exports—

Economist Magazine—Feb 2011...

- Increasing growth rates in consumption
- Declining area planted world wide
- Productivity growth rate is insufficient to meet demands

Wilson Average growth rate in demand for most grains/oilseeds is 2-4%

- Across all countries and grains
- Varies with many countries in the 1-2% growth rate area
- This is in addition to new sources of demands (biofuels)
- **Yield growth rate:**
 - about 1-2%/year (wheat=.8%/yr; ND=1.5%/yr) corn 1.4%/year)
- **Implication:**
 - More land,
 - More yield and technology
 - High prices and reduced stocks (and hence, more risk)

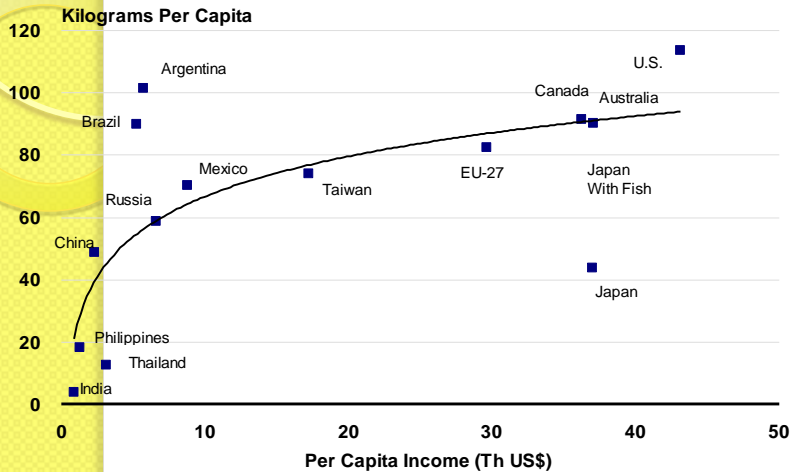


Summary of the Problem:

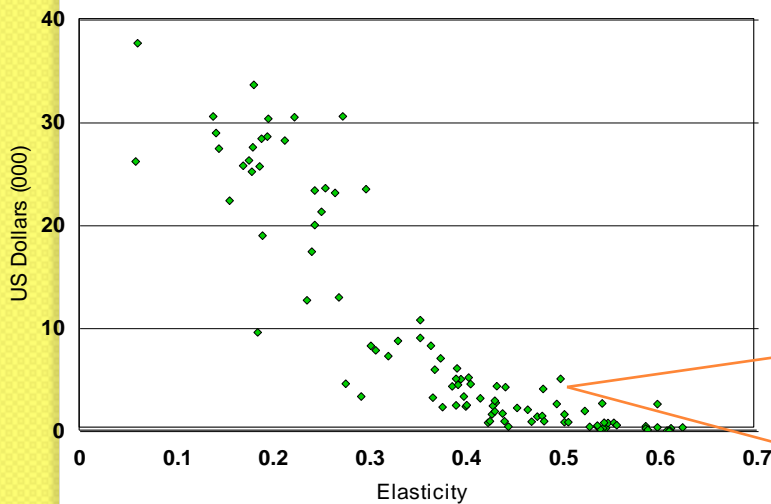


- Change in demand
 - Accelerating population growth
 - Urbanization
 - Dominance by China in many commodities
- Growth in ag productivity is slowing...
 - 1960's 3.5%/yr
 - 2010 1.5%
 - Fertilizer use increased from
 - 1961 2 t/sq km
 - 2010 11 t/sq km
- Declining area planted in many countries/regions of the world
- Paradigm shift in commodity prices
 - 1900-2000 declining prices
 - 2000 to current..rapid real appreciation in all commodity prices

Where Does the Growth Come From (e.g., Soybean)?



- Source of Demand Growth driven by:
 - Population, income growth, urbanization, women in work force and demographics
- Income growth: impacts of large income elasticities ($\% \Delta D / \% \Delta I$)
 - China: .47 vs... US <.15
 - NAfrica, SE Asia, S Africa also have relatively large income elasticities of demand for soybeans,
 - Africa...very high elasticity, but, no income
- **Urbanization, women in the work force and population demographics!**
 - Results in irreversible changes in diets
 - Similar impacts in corn, higher-protein wheats

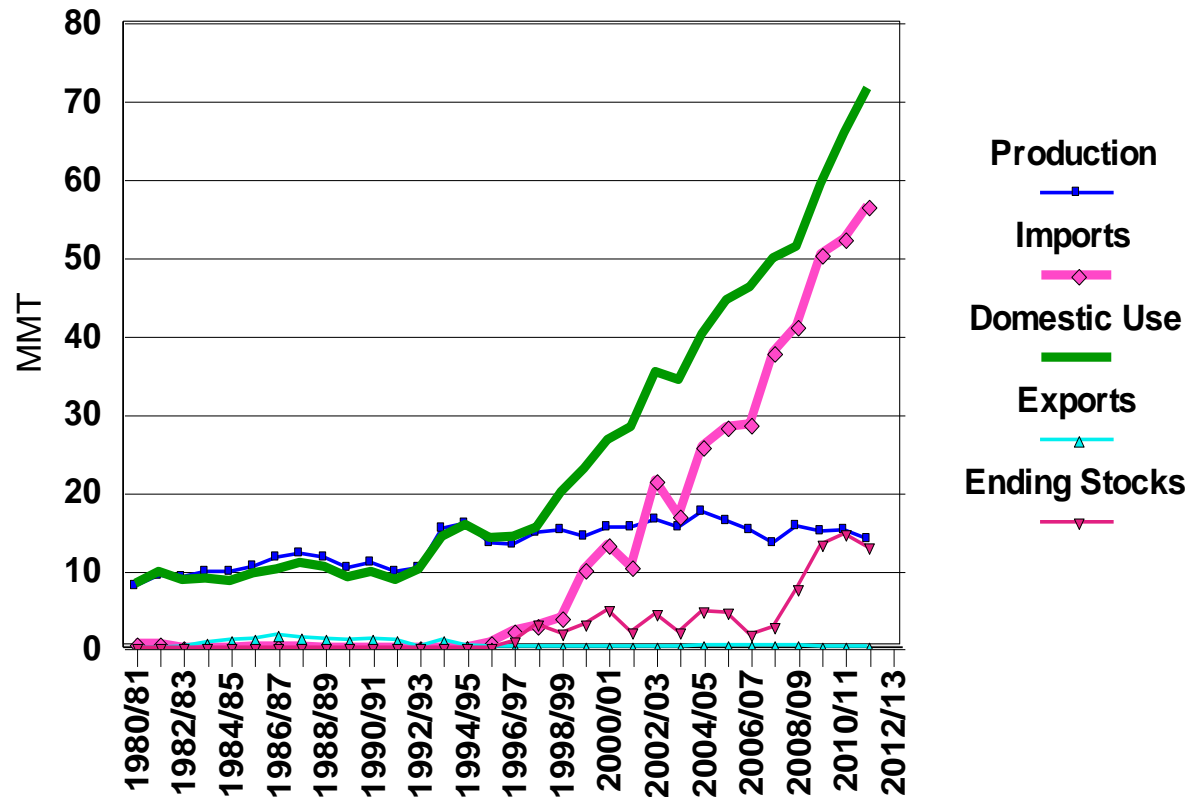


Income Elasticity of Demand:
 $(\% \Delta D / \% \Delta I)$

China

China Soybean Supply Demand

- **The fastest growth market in the world is China Soybean Imports**
- **ND soybeans are nearly 100% to China and Asia**
- **ND is the lowest cost supplier of soybeans to Asia**
 - **Production**
 - **Logistics costs**
- **This has induced**
 - **Huge investments in port (PNW)**
 - **Infrastructure and expansion in rail/handling capacity**



Cargill Sees China 'Mega-Trend' of Rising Meat, Milk Demand *Longshore and Shipping News, Sept 11, 2012*

- Meat consumption in China, ..., will continue to expand even as the economy slows, sustaining demand for feeds made from corn and soybeans, according to Cargill Inc...
- “We are looking at a mega-trend of increasing consumption of meat, milk, eggs
- Rising incomes in China,..., have increased demand for meat including pork, making the nation the largest buyer of soybeans, which are crushed to feed pigs and chicken.
- China may increase soybean imports in 2012-2013 even amid record prices, *Rabobank International* said in July.



China Corn Supply Demand

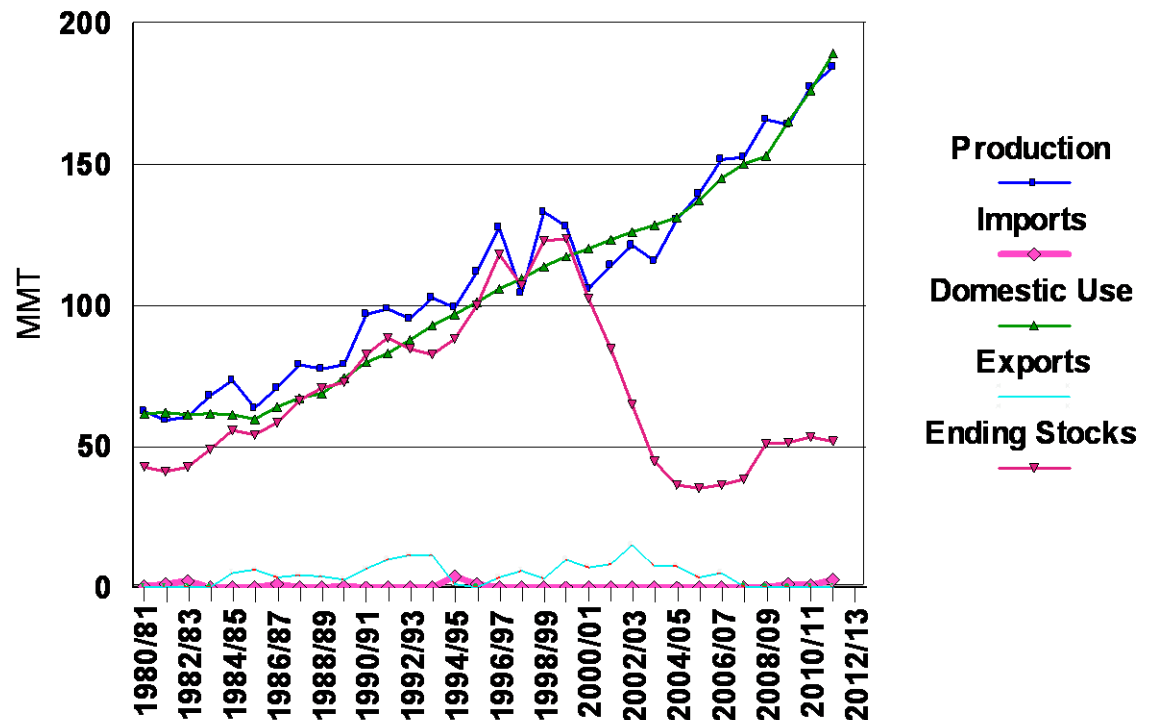
- **Past:**

- Periodic exporter (from North to South)
- Draw down in stocks is a significant change in policy in early 2000

- *Recent suggestions of like acceleration in corn imports*

- Hanver Li (JCI Intelligence) anticipates that China will import as much as 15mmt in 2014-2015.
- Basse (November 2011) at 8-12 mmt by 2014
- Rabobank 10 mmt (Nov 2011) by 2014 (down from 25 mmt est in Dec 2011):

- Chinese apparent strategic efforts on corn acquisition (buy at CME<600)



Emergence of Corn Competitors

- Market Growth

Year	World Market Size (mmt)
2000/01	77
2011/12	95

- Market shares

Year	World Market Shares of Trade %			
	US	Argentina	Brazil	FSU (Ukr)
2000/01	64	12	8	0
2011/12	43	21	9	14

- Earlier projections (Wilson- 2002): Brazil corn to 10 mmt by 2020 (currently 8 mmt going to 14mmt)

Global Economics

Russia Fights for World Dominance—in Wheat

▶ It may supplant the U.S. as the world's top exporter in less than 10 years

▶ "We are completely opportunistic. We ship anywhere there is demand"

On May 28, Egypt, the world's biggest importer of wheat, bought 180,000 metric tons from Russia for \$178.50 per ton, about \$13 less than the U.S. price. The deal is one of many signs that Russia is challenging America's supremacy in the global wheat market. In the past 11 months Russia has won 58 percent of Egypt's regular purchases of wheat, compared with 40 percent the year before. The U.S. share of Egypt sales fell to 8 percent from 13 percent over the same period, says Egypt's General Authority for Supply Commodities.

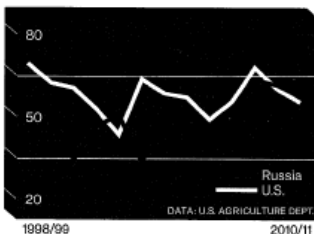
For Russia, it's an extraordinary turnaround. As recently as the 1990s, it had to buy wheat from U.S. farmers to feed its people, so inefficient were its farms after decades of ruinous Soviet practices. Then Russian investors slowly started buying land and introducing modern farming in the country's fertile "black earth" region near Ukraine and the Black Sea. In 2002 the country emerged as a major exporter for the first time in decades by selling 15.6 million tons abroad. "Exports suddenly became profitable," says Arkady



A Soviet-era statue depicts peasants on a communal wheat farm

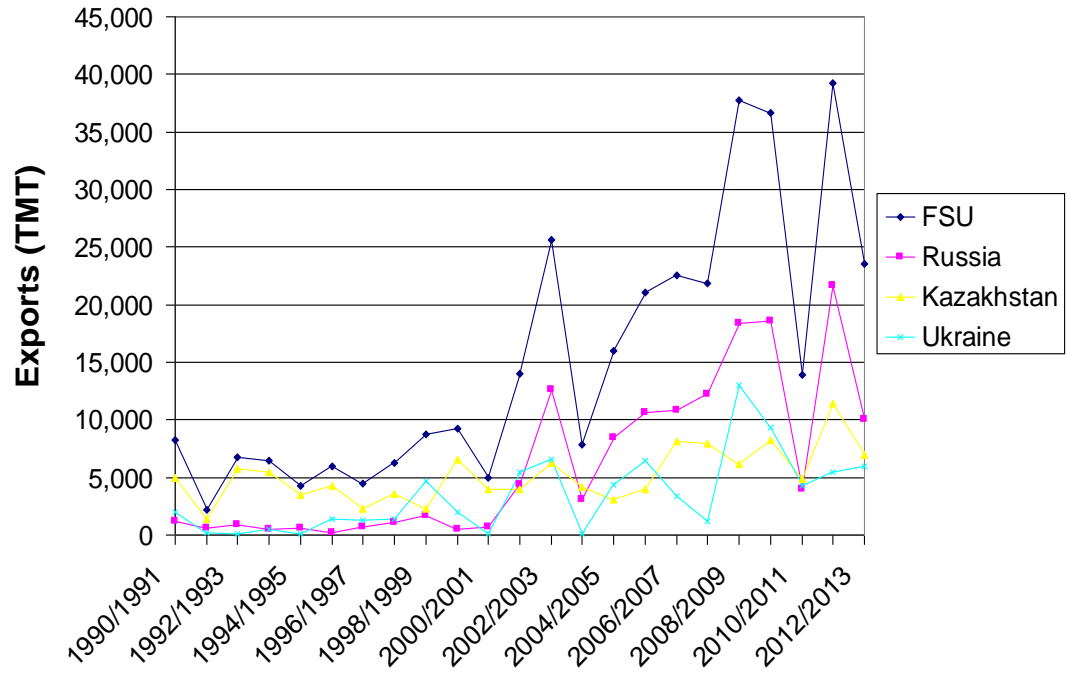
The Amber Waves of Russia

Russian wheat production vs. U.S. (millions of metric tons)



Russia Wheat

- Exports Increased substantially from 2000
- Comprise 24% of world trade
- Markets: N. Africa, Egypt, EU etc
- Expanded to Asia including Philippines, Indonesia, and into L. America, etc
- Prices: Typically about \$20-50/mt under US values (i.e. selling at severely discounted values reflecting in part quality). Have converged in 2012



Bringing in the maize

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Reuters

FSU Production Possibilities

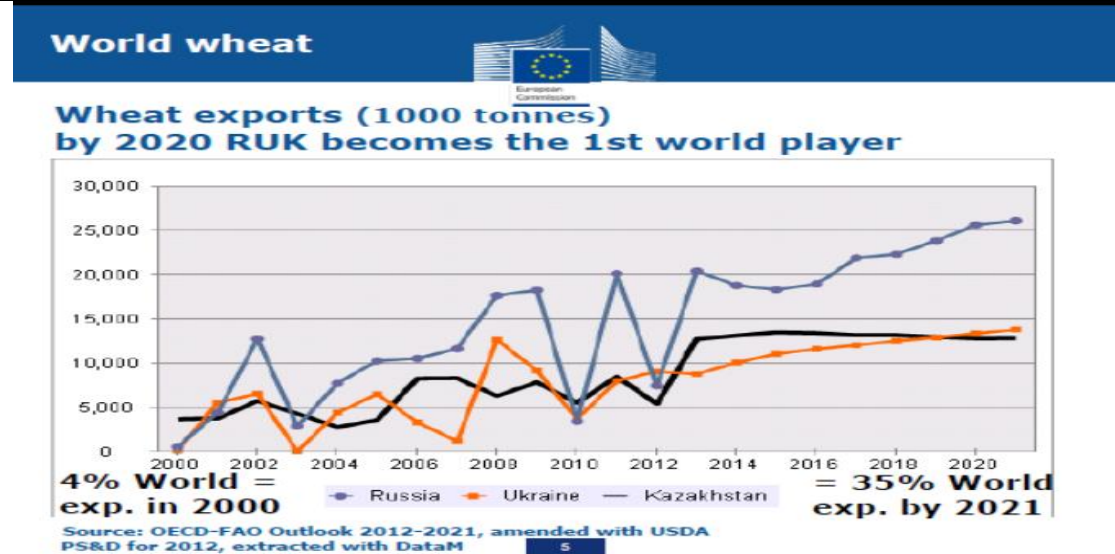
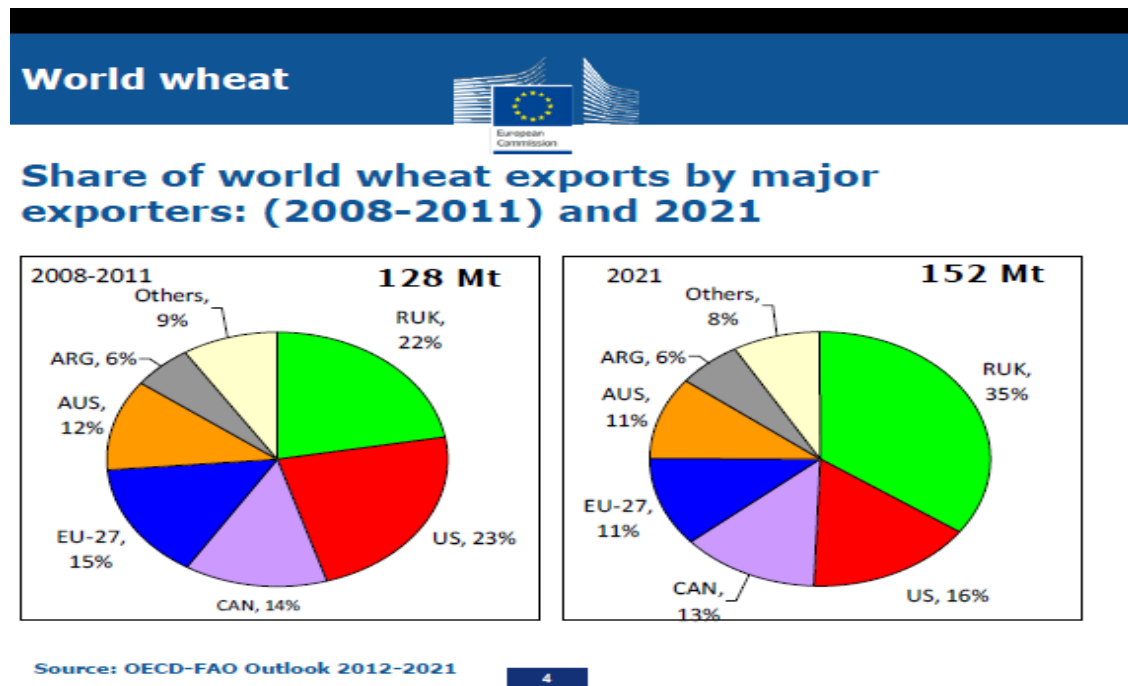
- **Area planted:** Potential to increase production by expanding into new areas
- **Yields:** Potential to expand productivity by adopting more advanced technologies
- **Exports:** Potential to expand exports from 20 to 32+mmt (Russia) wheat from Russia (IKAR) by 2021
 - Middle East and North Africa with world's cheapest 11.5-12.5% protein milling wheat

Country	Area (%)	Yield (%)
Russia	15	44
Ukraine	21	71
Kazakhstan	27	59

Source: European Bank of Reconstruction and Development

Recent EU Outlook on Longer-Term Wheat Exports (Source: OECD FAO): Major Changes to 2021

- Decreasing market share
 - US (23 to 16)
 - EU
 - Canada
- Increasing market shares
 - Russia, Ukraine, Kazakhstan (22 to 35%)



Holdings Operations Argentine bags - Canadian Temporary Bins - grain dryer

isn't it amazing

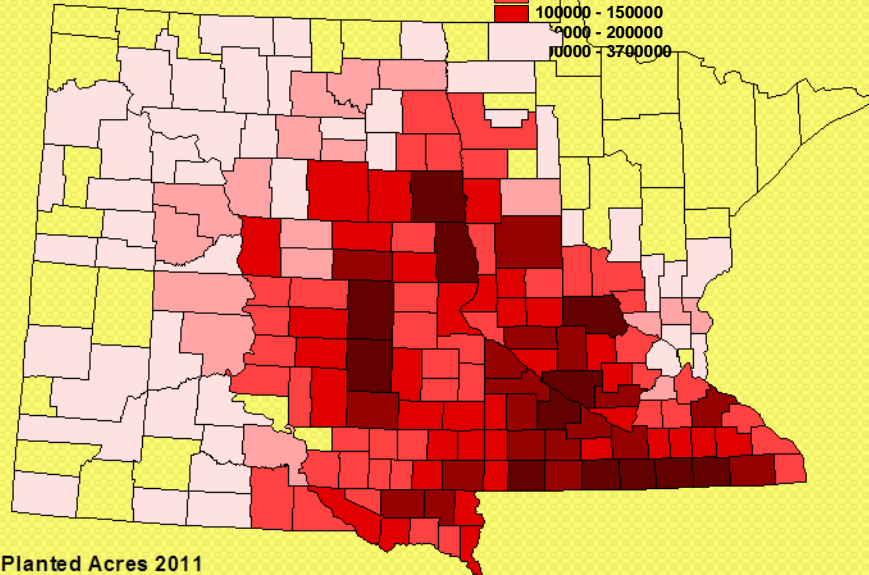
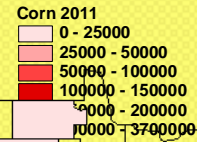
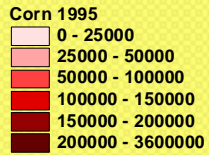
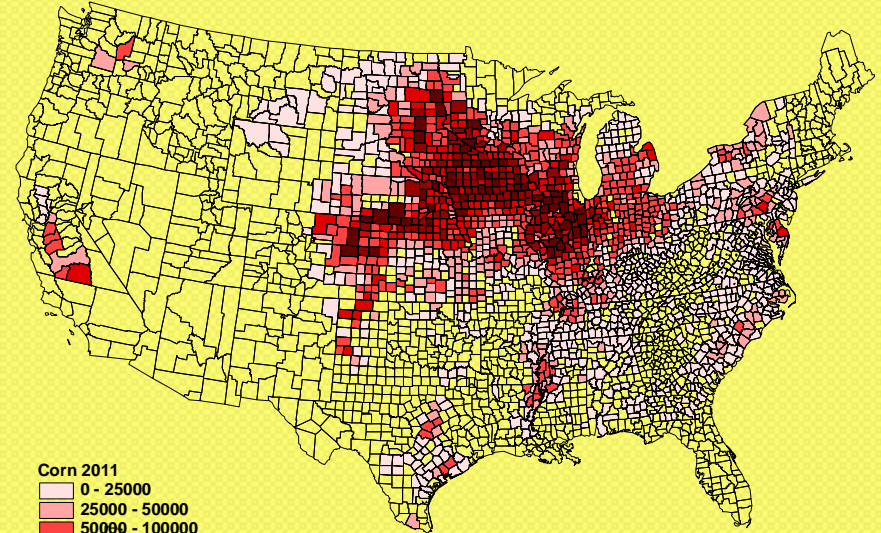
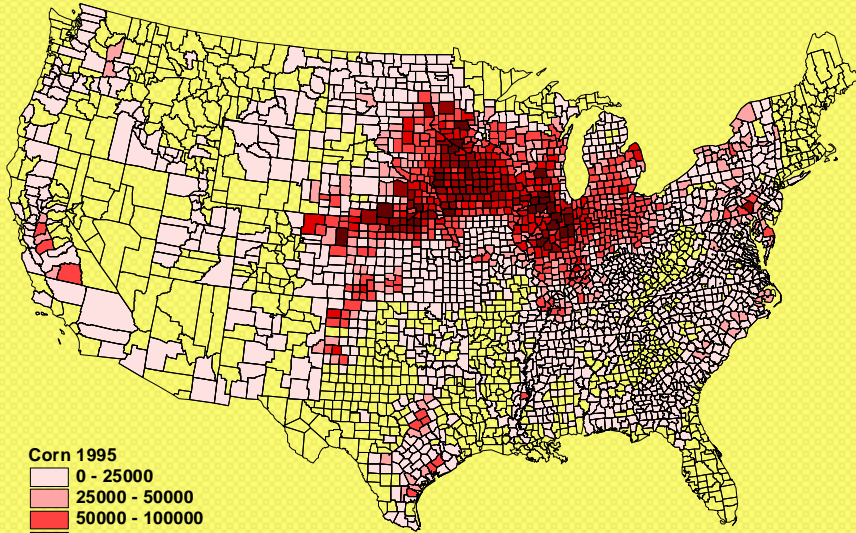


Genetic Modification in Grain Crops— *Game Changer*

- Changing geography on production and displacing other crops, notably small grains
- Changing technology growth rates
- Impacts
 - First mover advantages to countries/regions/states targeted by agbiotech firms---4-5 year advantage
 - Greatest appreciation in land values
 - *those regions transforming from non-GM technology; to more GM technology.*
 - *i.e., technology efficiency is partly capitalized into value of technology and value of land for which the technology is applied*

Corn Planted 1995

Corn Planted 2011



Corn Planted Acres 2011

Corn Belt Moves North!

BusinessWeek, Nov 12

The Corn Diaspora

A warming climate means more hospitable growing conditions for Canadian corn, and the farmland market is responding.



Climate Change

Canada's Corn Belt Attracts the Hot Money

is likely to climb by as much as 3C (6F) in the region by 2050, according to Canadian researchers.

A temperate climate and longer growing season are ideal for corn. An

Gavilon: *ND feeding the planet!*

October 2012

Jamestown -----

- Corn _____ going to Enid OK
- *Corn to* ___ *Decatur* Tate and Lyle going to Decatur IL

New Rockford ---

- Corn to Altus OK..... billed to Altus OK
- Corn B/E _____ *going to Peoria IL*
- Corn to Decatur _____ going to Decatur IL

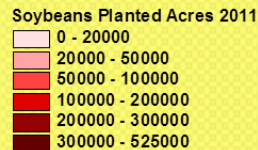
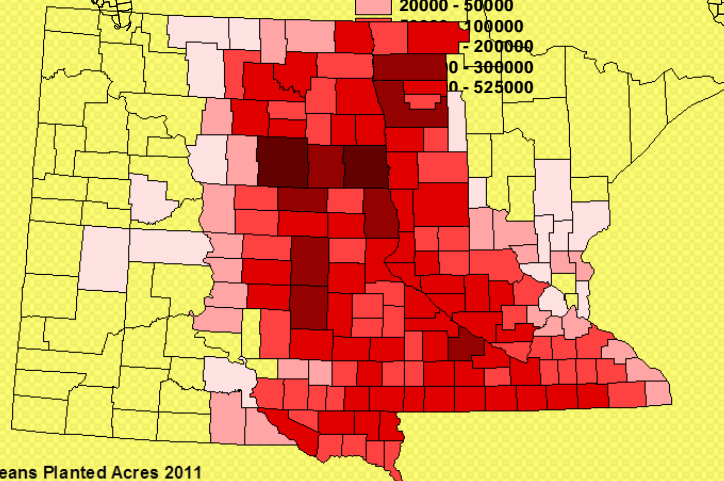
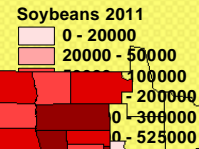
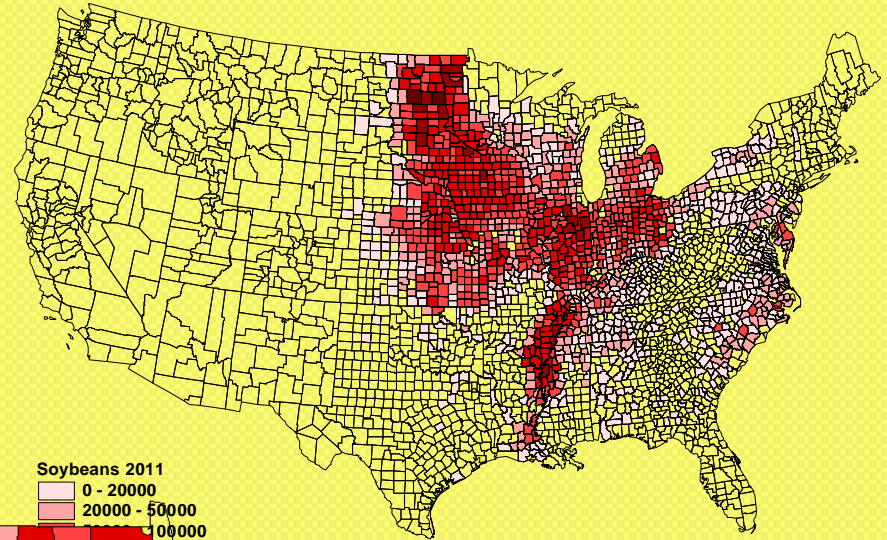
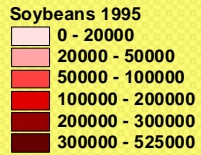
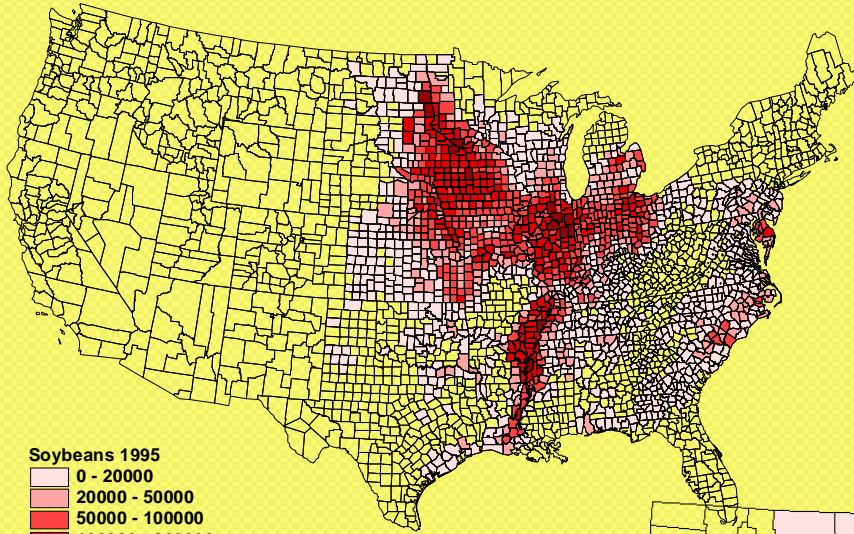
Grand Forks ----

- Corn to Clovis NM .. going to Clovis NM

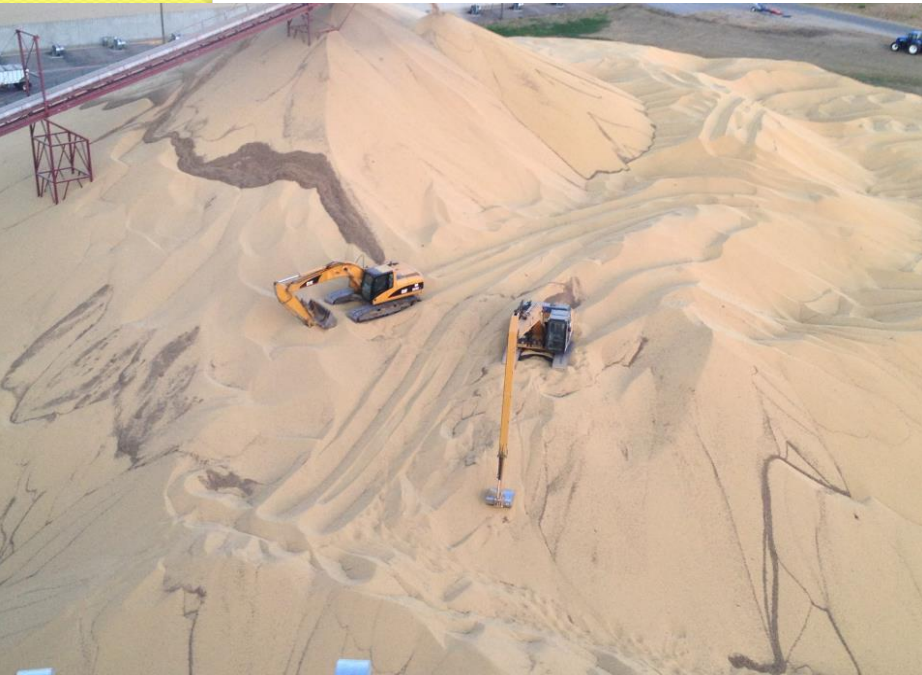
- I hear there are two trains from ND heading to California right now as well....

Soybean Planted Area 1995

Soybean Planted Area 2011

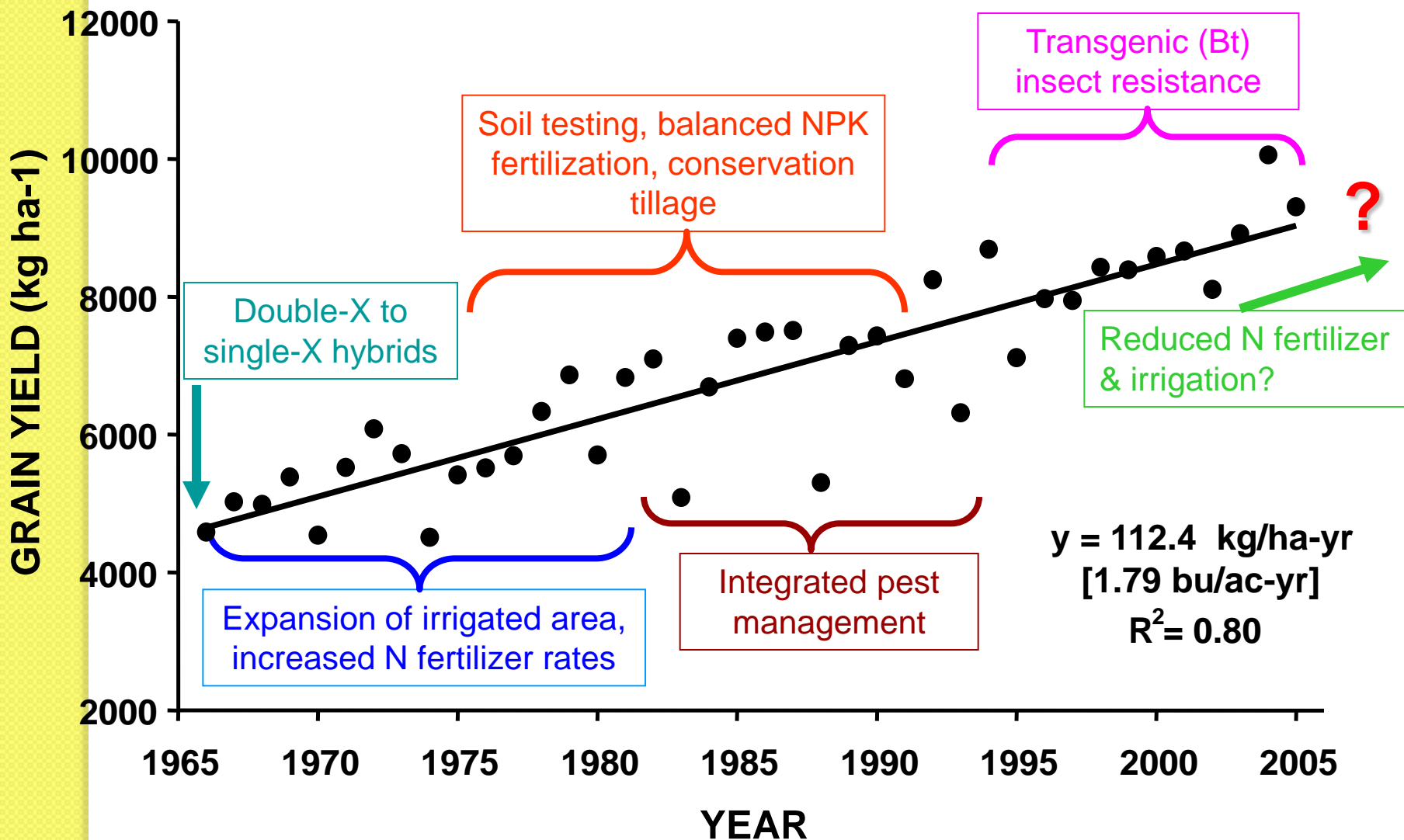


JVG—Southern ND October 2012



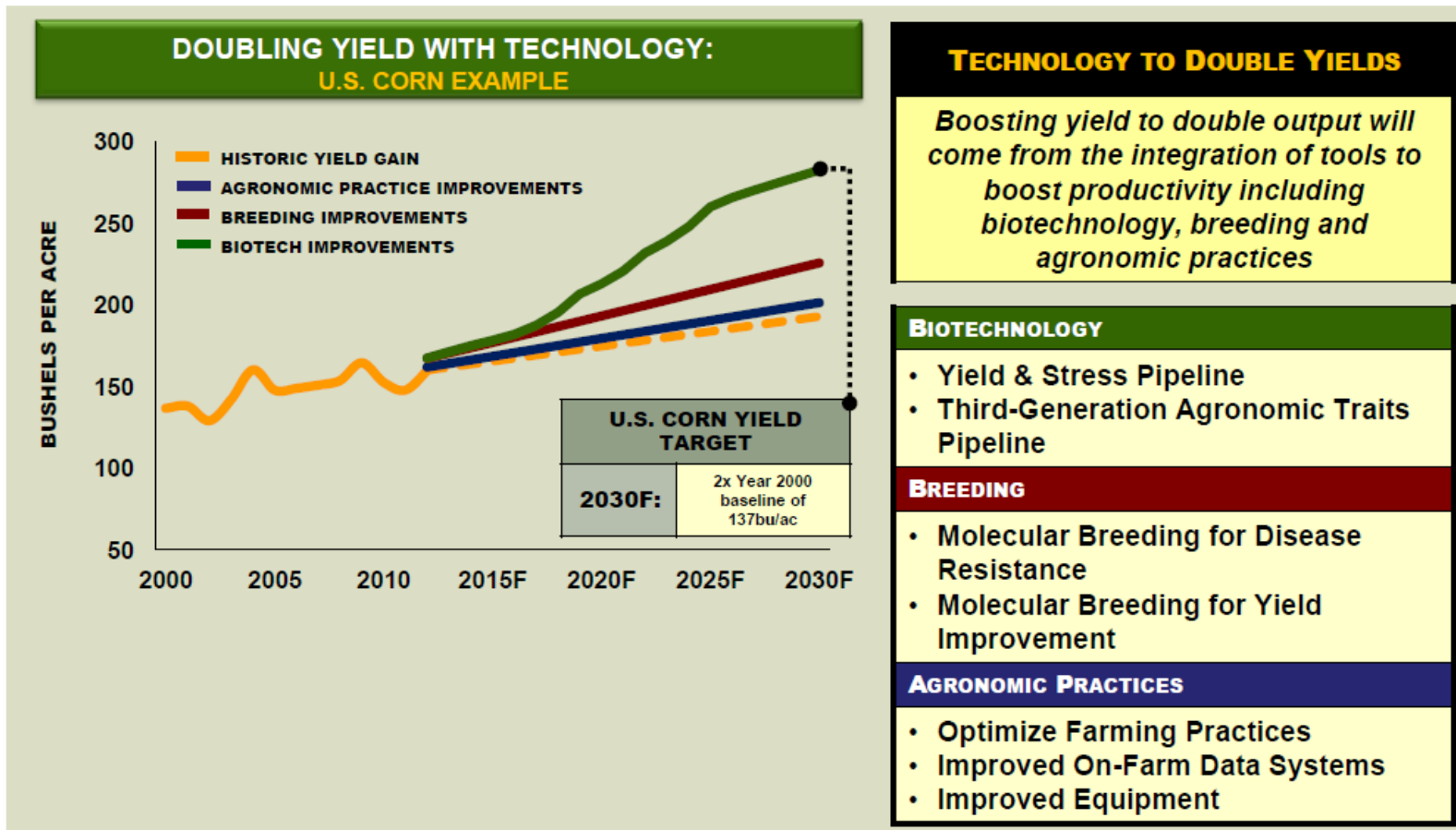
Yield Trends in Corn: USDA View

(embodies tremendous technological innovation)



Monsanto on Doubling of Corn Yields:

Source: *Monsanto Biennial Investor Event*, Nov 10, 2011

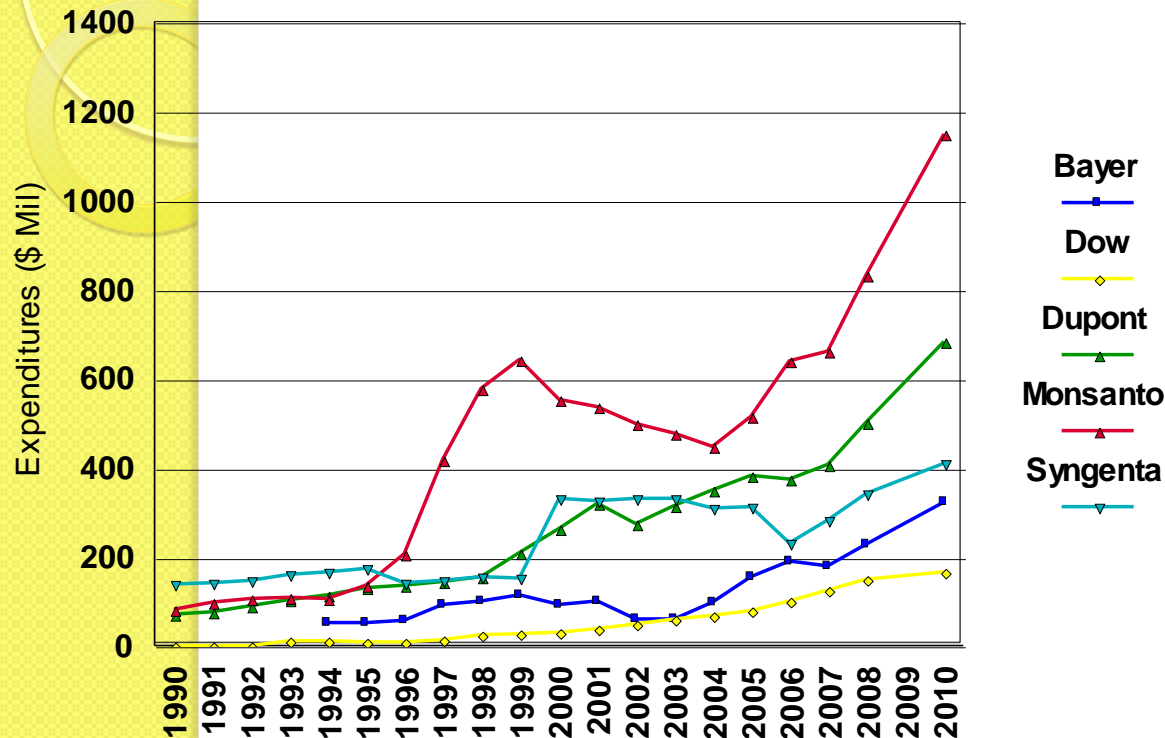


Crop Improvement Technology: GM Tech and “Seeds and Traits”

- Competing crop technologies have embraced
 - Marker-Assisted Breeding
 - GM technology
- Emergence of “Seeds and Traits” as business
- **Seeds & Traits Platform:** combining novel genetic traits with elite germplasm to develop crops that thrive while expressing the desired trait.
 - Discovering novel genes.
 - Transforming them into the cells of plants.
 - Optimizing the expression of the genetic trait in plants in the correct plant tissues, at the appropriate time and in sufficient levels.
 - Incorporating, through breeding, the genetic trait into commercially viable varieties or hybrids.
- Business strategy e.g., From Dow
 - Introduction of genetic traits via biotechnology does not reduce the importance of superior germplasm in the host plant, nor does it replace the need for plant science and plant breeding.
- Fundamental *Paradigm Shift* on Technology Distribution

Research Expenditures: Seeds and Traits

SOURCE: Context Research



- Following 1996 Monsanto's R&D on Seeds and Traits increased drastically from about \$200 million/year to \$600 million in 1998 and another peak in 2008 at over \$1.2 billion.
- Other agbiotechnology companies increased spending on seeds and traits but did not do so until about the early 2000s.
- By 2006 each of the agbiotechnology companies has further accelerated their spending on seeds and traits.
- Monsanto has a lead on its rivals by about 5-6 years.
- SOURCE: Context Research

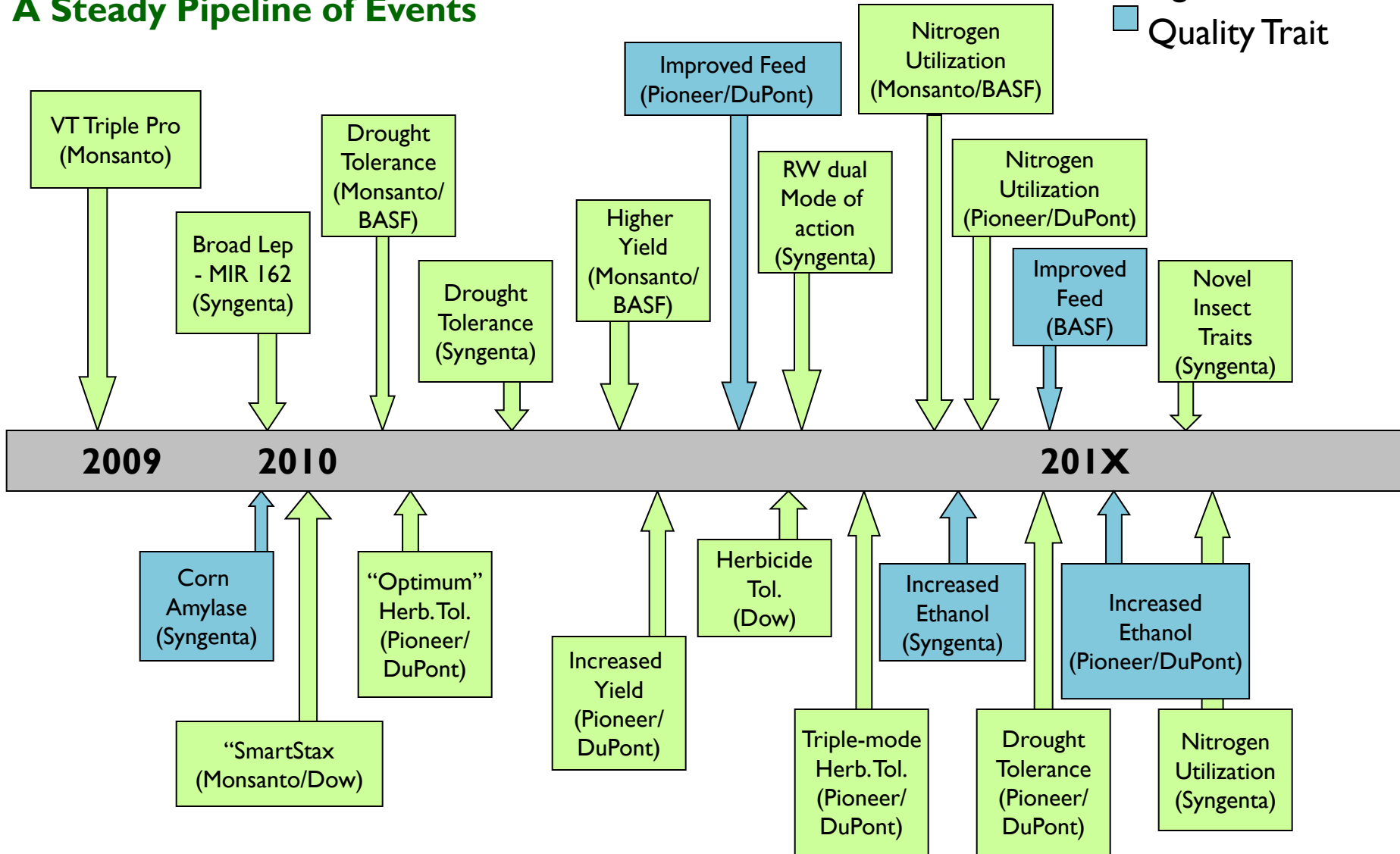
New GM Traits and Competition

- Results of these expenditures in research is for
 - Emergence of new GM traits
 - An escalation in yield growth rates

Industry Corn Portfolio*

A Steady Pipeline of Events

■ Agronomic Trait
■ Quality Trait

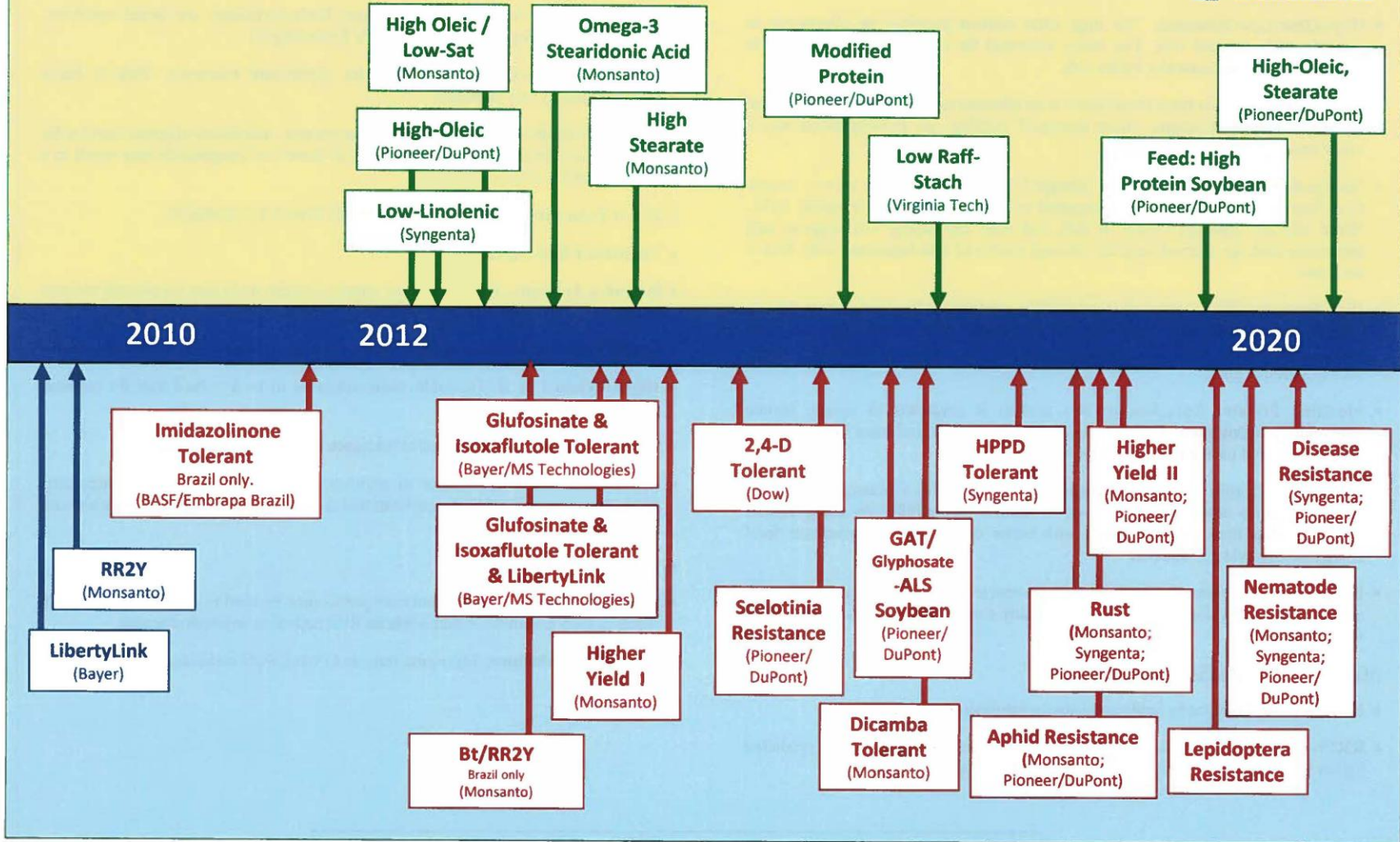


*Estimated commercialization pipeline of corn biotech events prepared by the **U.S. Grains Council**
 Commercialization dependent on many factors, including successful conclusion of regulatory process

Soybean Industry Portfolio

Pipeline of biotech events and novel trait releases

- Quality/Food
- Agronomic
- Commercialized



Source: Pipeline from Industry Sources; prepared by ASA, USSEC, USB. Updated June, 2010

Corn trait efficiency: *Drought Resistance*

- Potentially improve yields by 8-22% (15% average) under drought stress that reduces yields by 50%
- Monsanto (2008) indicated
 - yield improvements of 6-10% in water stressed environments.
 - Testing of first and second generation DT corn varieties ranges from
 - 7 to 13% for first generation tests
 - 9-15% for second generation
 - 9-10% yield advantages were reported in low drought seasons and 15% in a high drought.
 - Approved in Dec 2011, and field trials in 2012
- Syngenta:
 - 15% less yield loss during dry years.

Drought

PIPELINE UPDATE

Multi-Generational Drought-Tolerant Corn Creates Value Across Multiple Market Segments

KEY MARKET ACRES	U.S.	BRAZIL	ARGENTINA
AVAILABLE MARKET	80M	30M	6M
PERCENT PENETRATED	0%	0%	0%

HOT PROJECT Drought-Tolerant Corn

6 R&D Pipeline

Drought-Tolerant Corn

PROJECT CONCEPT:
First-generation drought tolerance is targeted to minimize uncertainty in farming by buffering against the effects of water limitation, primarily in areas of annual water stress

2006 PERFORMANCE UPDATE:

2006 STATUS: Phase 2

- Yield enhancement demonstrated again in 2006 under water-stress conditions in U.S.
- Lead gene chosen
- 2007 trials expected to demonstrate yield enhancement in multiple hybrids under dryland conditions

VALUE CATEGORIES:

TOTAL RETAIL VALUE/ACRE:	\$10 - \$30/acre
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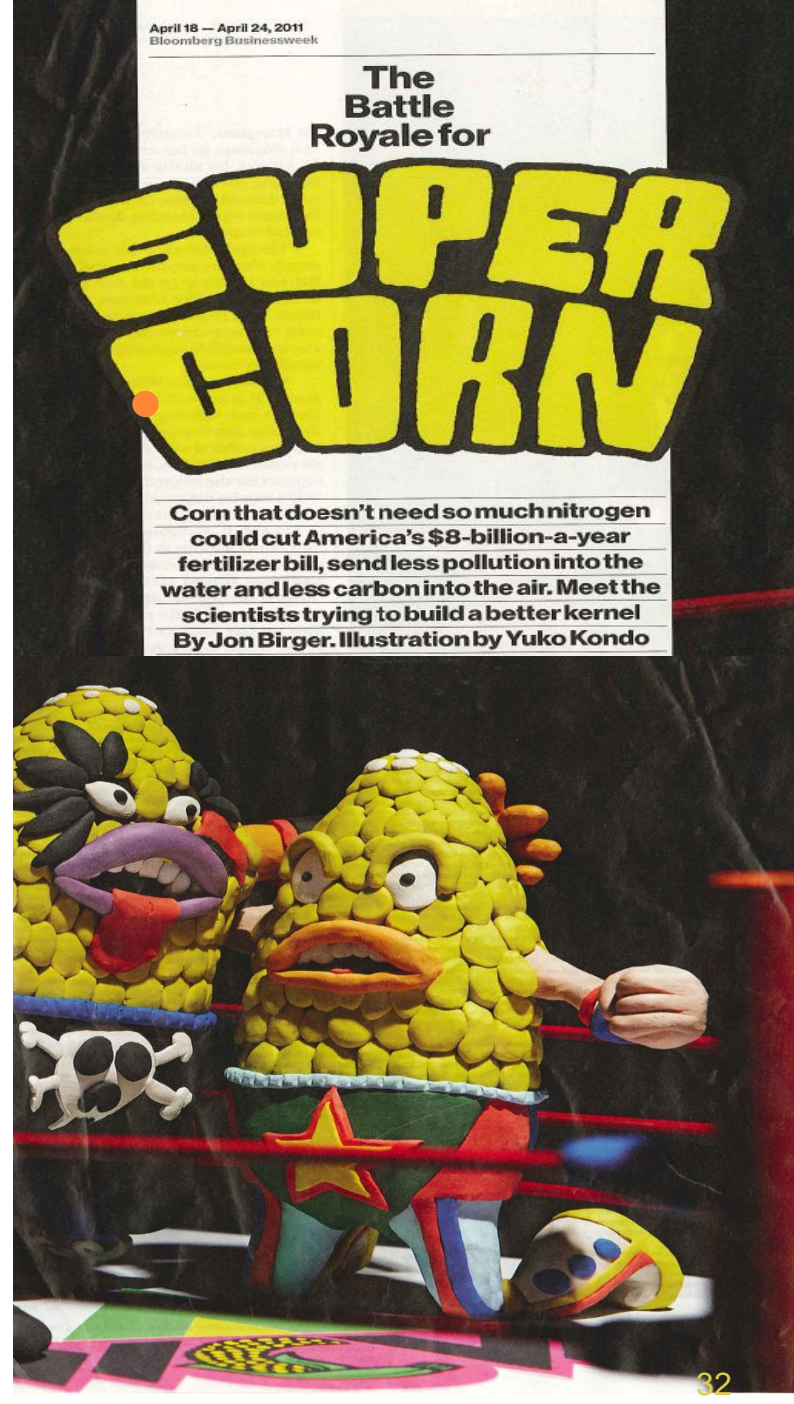
SEGMENTED VALUE OPPORTUNITY ACROSS MARKETS: U.S. EXAMPLE

Source: Spatial Climate Analysis Service, Oregon State University






IRRIGATED	WESTERN DRYLAND	STABILITY
8-12M acres	10-12M acres	50-60M acres
14-18" typical precipitation in growing season	14-18" typical precipitation in growing season	17-19" typical precipitation in growing season
Irrigated	Non-irrigated	Non-irrigated
Value is in replacing irrigation, reducing the variable costs of irrigation	Value is in improved yields annually, by improving water-use efficiency	Value is in improved yields when moisture is less than optimal

NUE Corn

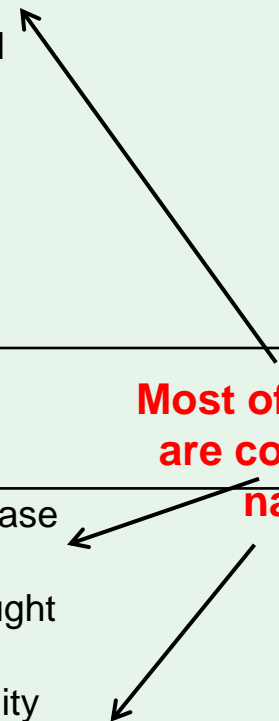
- 5 companies working on NUE
- 5-10 years out
- 2 technologies
 - GM
 - MAS (does not need dereg)
- Trait efficiency
 - Produce same yield with 30% less fertilizer
- Or,
 - Produce greater yield w/same fertilizer
- Value: \$700 million (US), \$1.5 bill. worldwide



Wheat Research Landscape

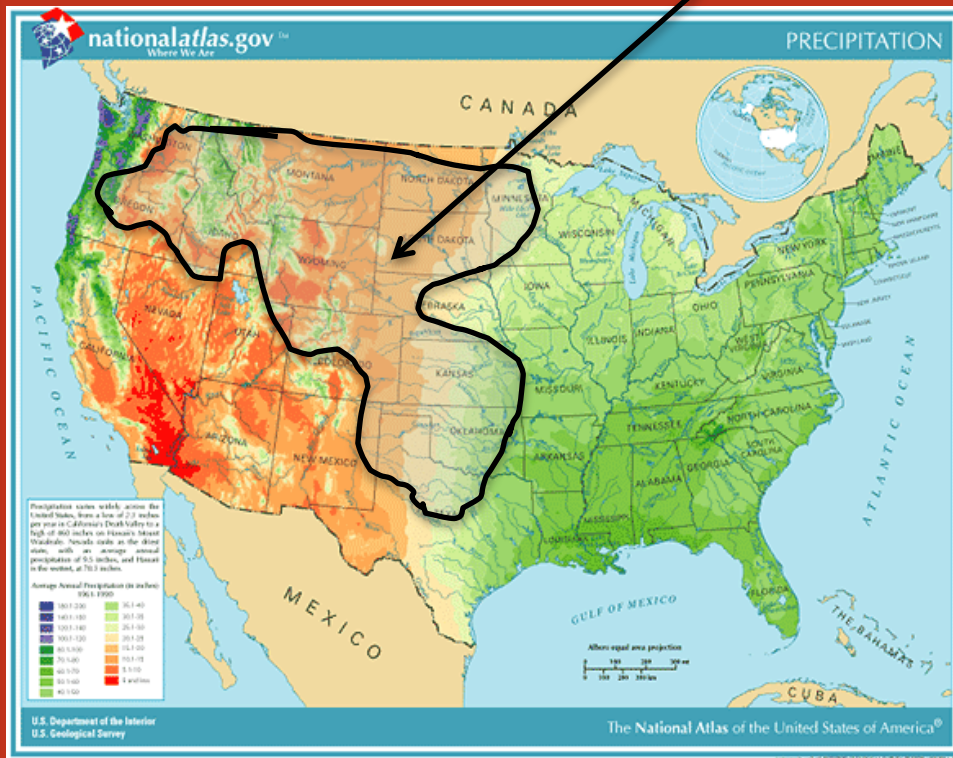
Company	Acquisitions or Partners (Year, Country)	GM trait targets ¹
	Athenix (2009, US) CSIRO (2009, AU) Evogene (2010, IL) NARDI (2011, RO) RAGT (2011, FR) SORT, EUROSORT (2010, UA) South Dakota State University (2011, US) Texas A&M (2011, US) University of Nebraska-Lincoln (2010, US)	Drought NUE Yield
	HRZ Wheat (2011, US) Northwest Plant Breeding (2011, US)	
	Arcadia (2010, US)—they own a small share Acquired Trident seed.. Biogemma (FR) U of idaho CSIRO (2006. AU)	Disease Drought Quality
	BASF (2010, US) Intergrain (2010, AU) Kansas State University (2010, US) Westbred (2009, US) Virginia Tech (2010, US) NDSU (2012)	Drought—stress Herbicide tolerance Yield
	CIMMYT (2010, MX)	hybrid...

Most of the traits are complex in nature



Improving Wheat is Particularly Challenging Due to Water Scarcity and Pests (Monsanto)

Wheat is Grown in Drought Area



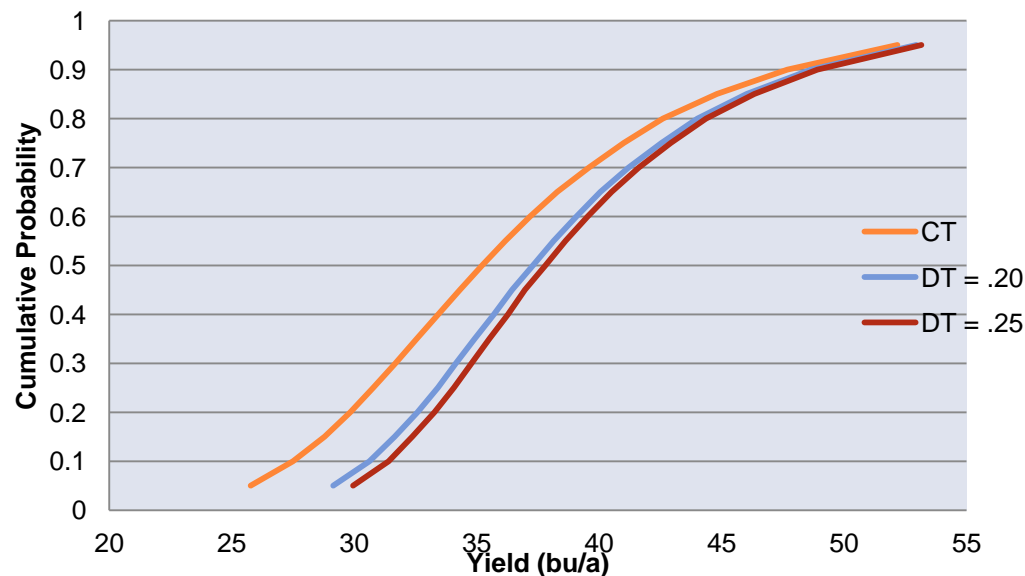
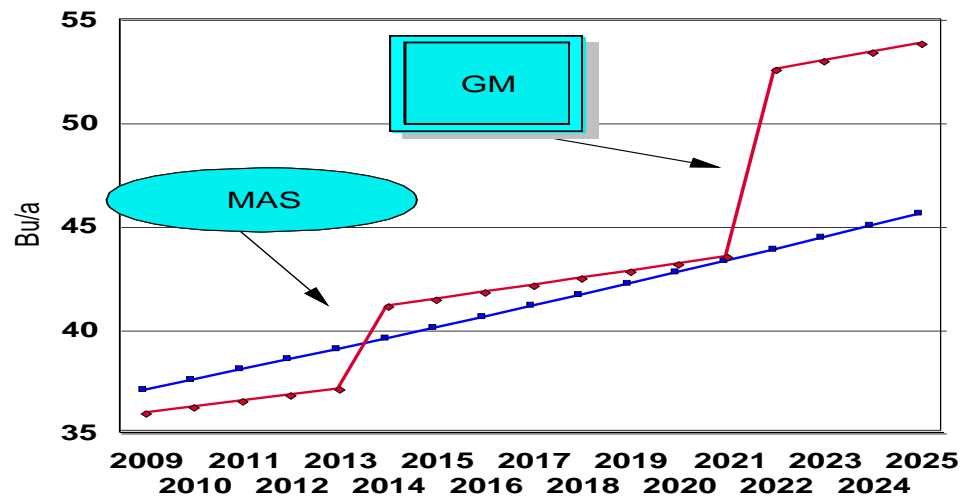
Typical annual precipitation: 15" or less

Key Pests

- **Fungi**
 - Fusarium (scab)
 - Rusts (stripe, leaf, stem)
 - Septoria (blotch)
- **Insects**
 - Wheat stem sawfly
 - Hessian fly
 - Aphids
- **Viruses**
 - Barley yellow dwarf virus
 - Wheat mosaic virus
- **Weeds**

Wheat Yield Under Alternative Technology Assumptions

- Wheat technology
 - Marker assisted selection +1-2%/yr
 - GM technology +20%
- Australia GM lines *had yield 20 percent higher than conventional wheat varieties under conditions of drought stress*
- Value of DR Wheat in N. America
 - *About \$350 million*



Major Changes in World Logistics Impacting Agriculture

- **Brazil:** Need to expand logistics in new production regions
 - Ports, waterways and railroads
 - Funds exist now from GOB
- **Russia/FSU—** New investment needed
 - Concentration inhibiting efficient flows of grains and scalping prices to preclude efficient signals to growers
 - Expansion of ownership (and desire for increased controls) by UGC (government backed handling/trading entity)
 - Kazak exports now constrained by lack of investment
- **Canada**
 - Extreme control by CWB – now eliminated
 - Rail car fleet—aging
 - Old operating rules inhibiting efficient supply-chain management in grain (ship demurrage; rail car allocation etc)
- **Australia:** Grain marketing deregulation
 - Privatizing RR's and in some cases grain handling
 - Entry of new trading entities
- **Argentina**
 - Old/non-existent railroads
 - Excessive use of roads
 - Shortage of storage (use of bagged storage)
 - No support from Government and new Chinese investment
- **Panama Canal—** Expansion process and plans

Canal Expansion Program Components: \$5.25 Billion



Atlantic Ocean Side Location of Locks

Lane 1



Lane 2



Lane 3



Gatun Lake



Pacific Ocean Side Location of Locks



Lane 1

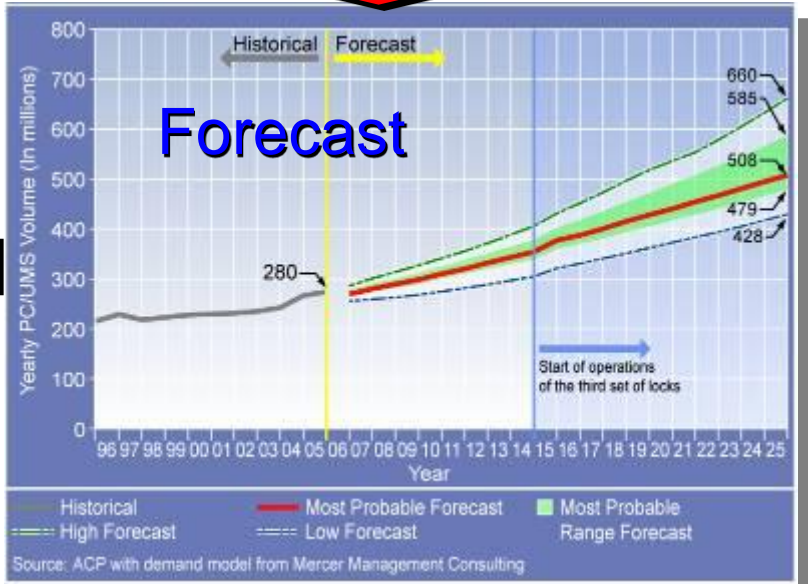
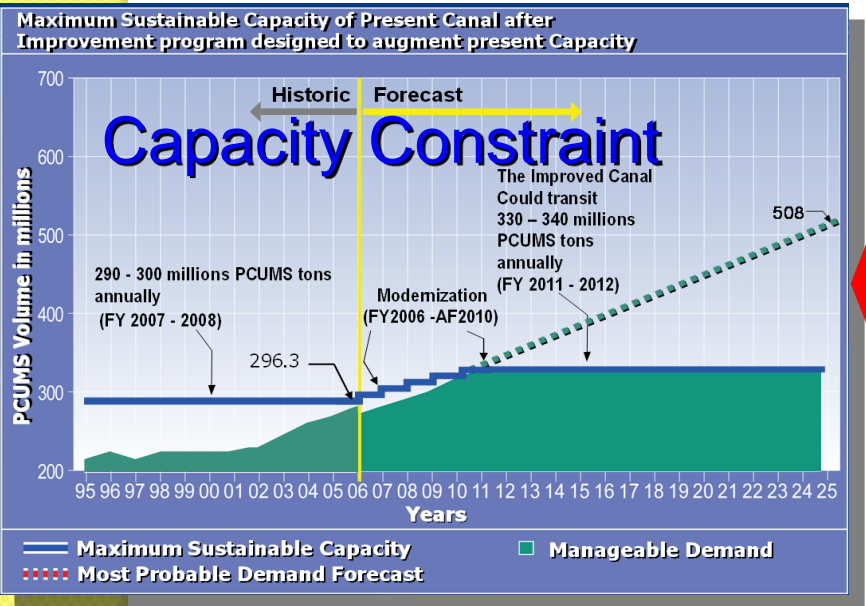
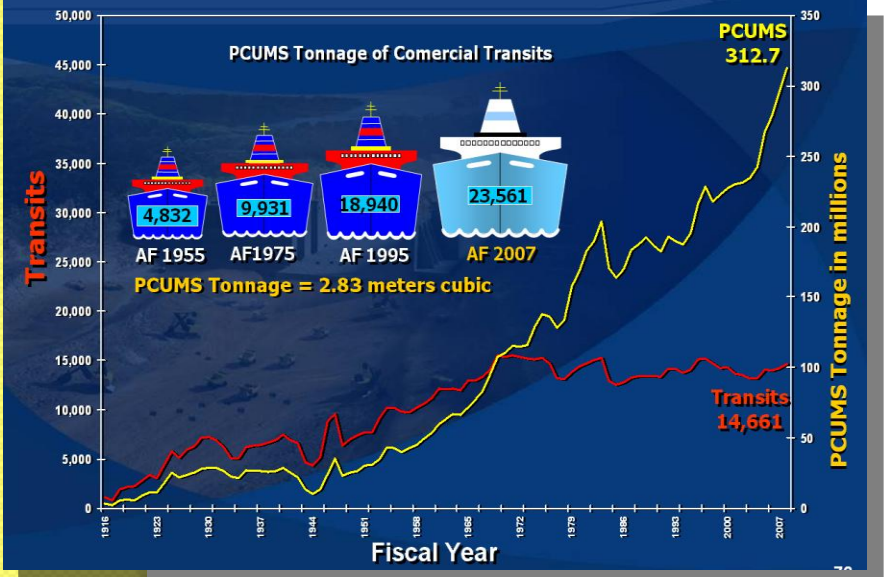
Lane 2

Lane 3

Miraflores Lake



Canal: Motives for Capacity



Source: ACP with demand model from Mercer Management Consulting

Impacts of Panama Canal on US Grain Exports

Facts

- Canal is at capacity
- Toll surcharges during the expansion period will detract from Canal use vs... competing routes
- Recent increase in tolls

Grains

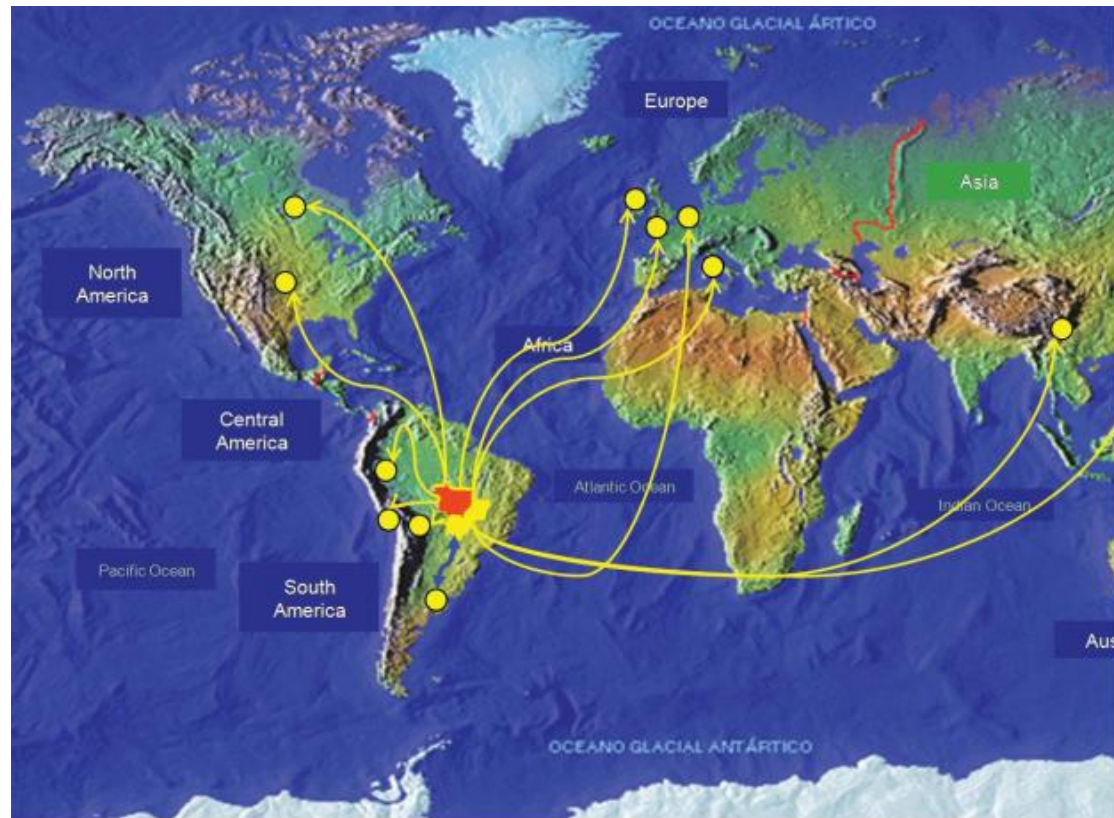
- Less likely to benefit from larger ship sizes in part due to port restrictions (import, notably)
- Increase in ocean spreads is increasing demand for shipments through US west coast; and very likely much more sustainable than reflected in ACP's studies
- Even a slight increase in Canal tolls or reservation fees, will induce a further shift to US PNW.

Summary Impacts of Canal Expansion

<i>Favorable</i>	<i>Factors detracting from increased flows through the Canal</i>
Increase in capacity	Shift in geographical distribution of production driven in part by biotechnology
Increase in ship size: allowing fuller loading of vessels ex-US Gulf vs... PNW (52-59000 increases to 65-69000)	<p><i>Logistical Competition (Inter-port, inter-modal)</i></p> <ul style="list-style-type: none"> • Ocean shipping differentials (driven in part by oil), resulting in differentials favoring shipments from PNW • Expansion of handling capacity at the PNW • Recent increase in Canal Tolls • Reduced dredging on lower Miss. • Shuttle train development and efficiency

Brazil's Main Trade Routes

- Traditionally:
 - Exports from Santos to the EU
 - More recently to China around the Cape



BRAZIL SOYBEAN DEVELOPMENT AREA AND TRANSPORT PROJECTS

Lula initiated investment in infrastructure for exporting.

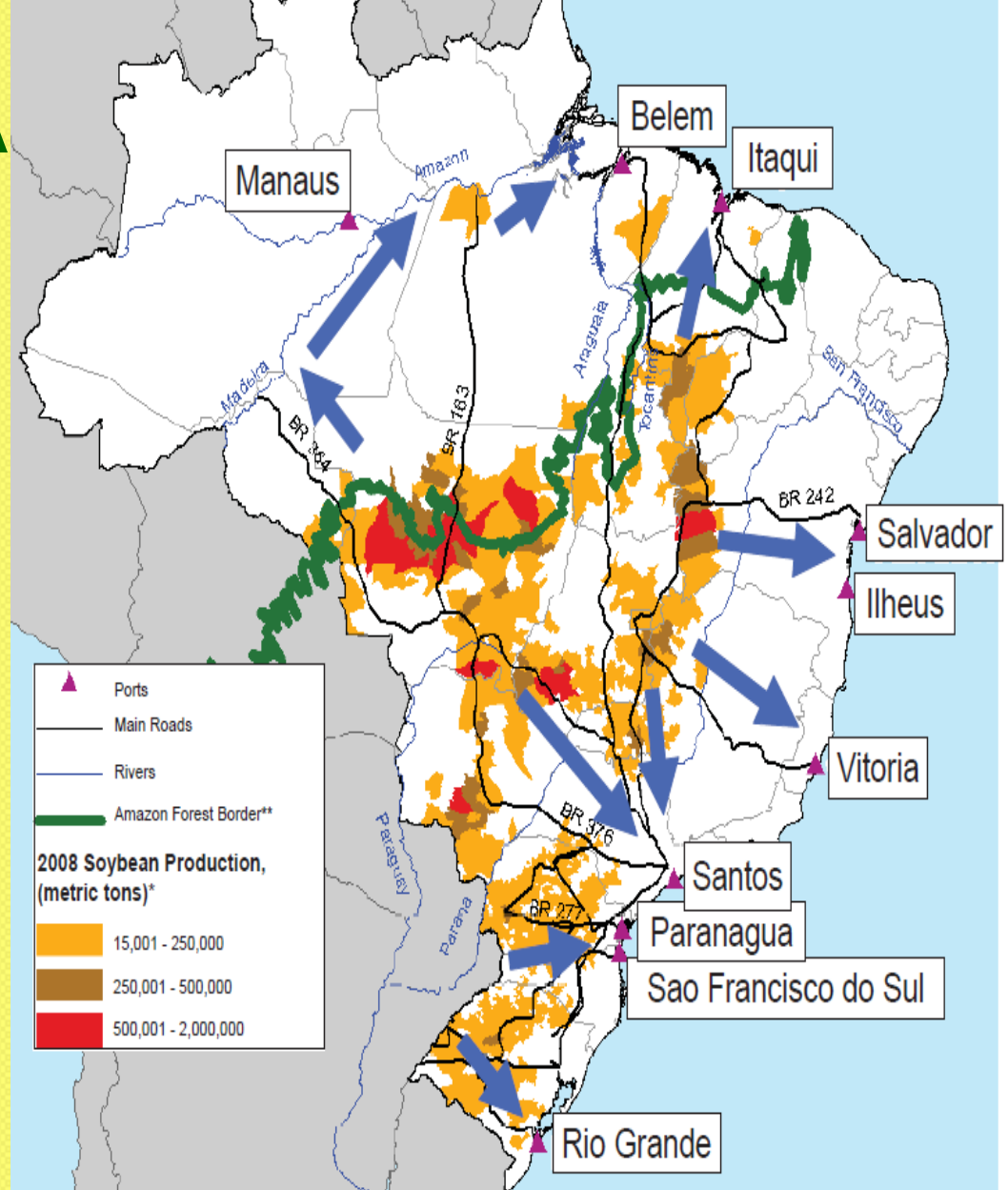
- Growth Acceleration Plan (PAC 1) 2007—2010
- National Plan of Logistics and Transportation (PNLT) 2008-2023
- March 2010 with the PAC 2 2011-2014.

\$60 billion was allocated for projects

25 billion to reduce bottlenecks, including expansion and renovation of port areas.

Key Observations

- BR163 and Rail to other northern Port Areas
- Potentially expand production and export competitiveness
- Closer to EU markets
- Prospectively closer via the Panama Canal to China
- Potential increase in production/exports +8mmt by 2020 in Amazon region



*Companhia Nacional de Abastecimento (CONAB)

**World Wildlife Fund (WWF)

Source: USDA/Agricultural Marketing Service & Foreign Agricultural Service

US Grain Rail Logistics: Major Innovations — *all countries are studying to replicate*

- Box-car to covered hopper cars;
 - to jumbo CH cars
- Short-line RR's
- Multi-car shipments: 1, 26, 52, etc
- Demurrage: Increase in demurrage charges and scope to encourage better utilization of equipment
- Forward shipping (guaranteed) instruments
 - Secondary car markets: forward, transparent and provide risk mitigation
- *Shuttle trains*: 110+ cars with incentives

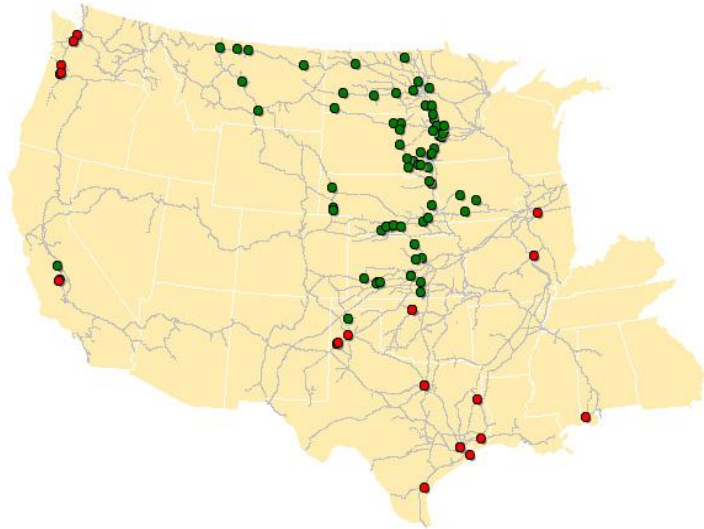
Most Recent: Gavilon at New Rockford ND



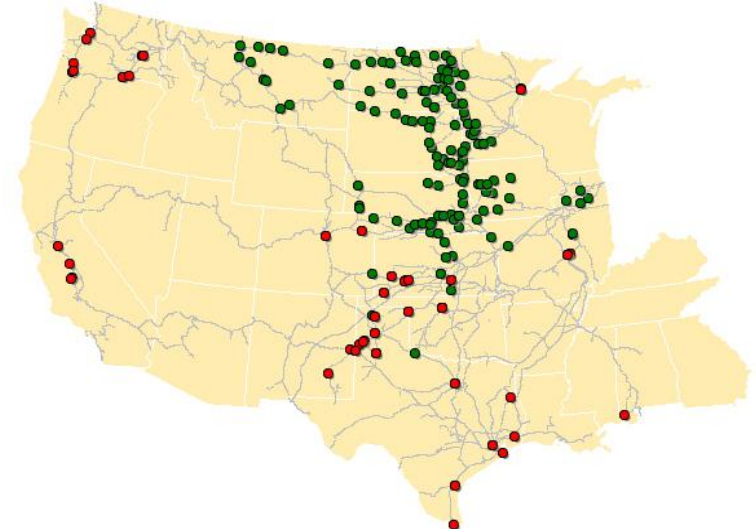
Shuttle Franchise

BNSF Shuttle Franchise

2000



2010



- Origins
- US Destinations
- Minnesota Origins
- Minnesota Destinations

	<u>2000</u>	<u>2009</u>	<u>Change</u>
Origins	77	163	+112%
US Destinations	33	71	+115%
Minnesota Origins	15	25	+ 67%
Minnesota Destinations	0	1	
Mexican Shuttle Destinations	8	29	+262%
Total Shuttle Stations	118	263	+123%

Recent Developments PNW

2009 announcement to build export plant at Longview Washington

\$200+ million project

Joint venture: EGT Development LLC.

Partnership between

Bunge North America Inc.,

Itochu Corp.,

Korea-based STX Pan Ocean.

First export grain terminal built in the U.S. in more than 20 years

Key drivers

- China, China, China and more China!
 - Shifting ocean rate differentials favoring PNW

• UPDATE:

- All the majors have announced expansions in PNW resulting in a near-doubling of unload capacity
- roughly 1\$billion.
- Concurrent w/major shift in exports shipments to the PNW vs. US Gulf



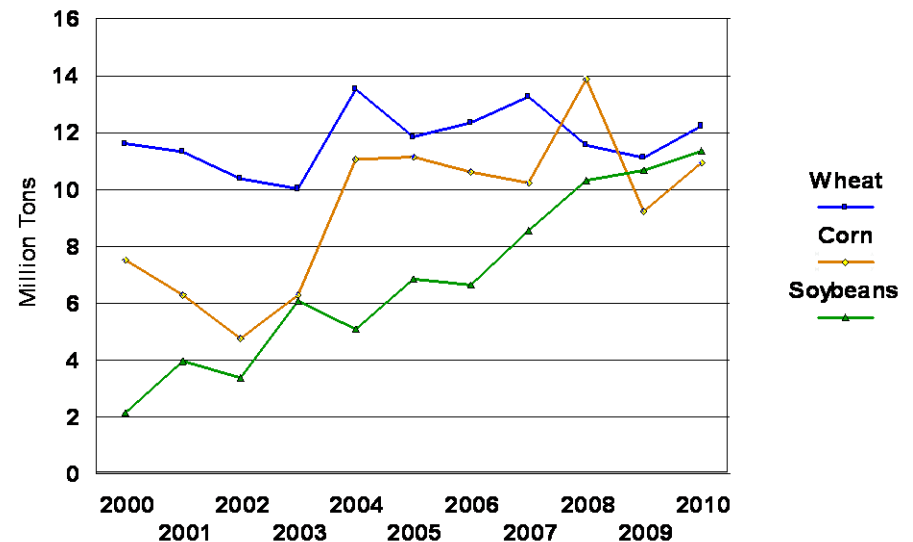
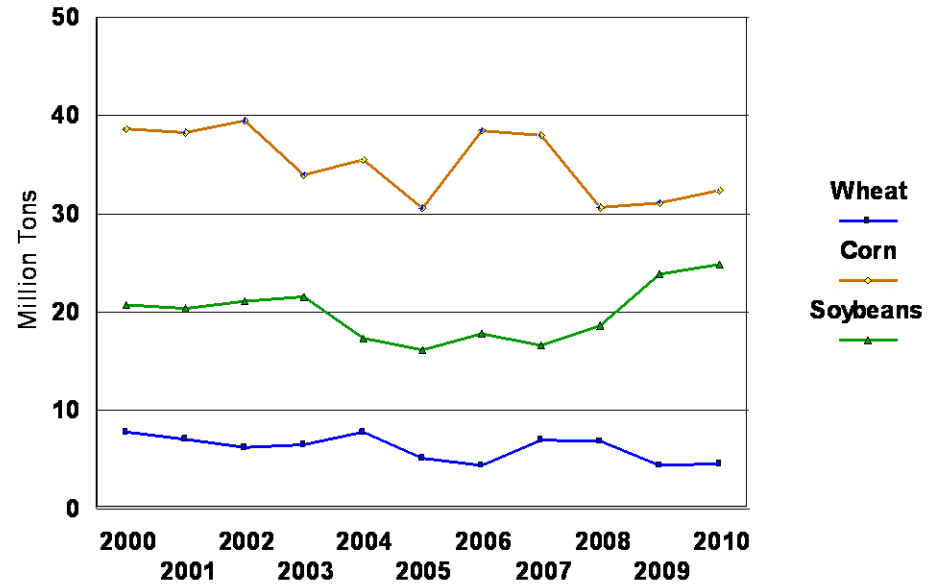
LA Gulf/PNW Export Inspections by Grain

LA Gulf:

- Exports have been generally declining from nearly 70 million tons to about 60 in recent years
- Soybeans have increased, but, corn and wheat has been declining

PNW

- Traditionally exported in the area of 20 million tons/year
- Beginning in 2004 (or 2003), exports began increasing to the 30 million ton range
- In 2008-2010, exports increased further to the 35 million ton range
- Increases have occurred primarily in
 - Corn: increasing from 6 to 11 million tons
 - Soybean: increasing from 2 to nearly 12 million tons

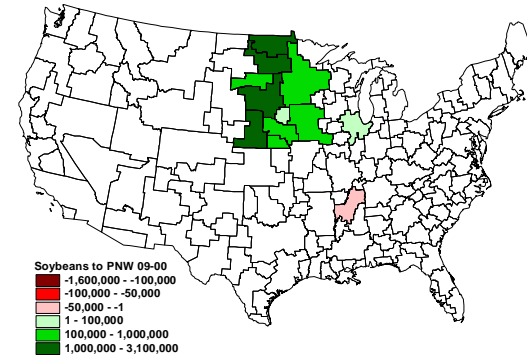


Soybean: Change in Rail Export Volume to Port, 2009-2000

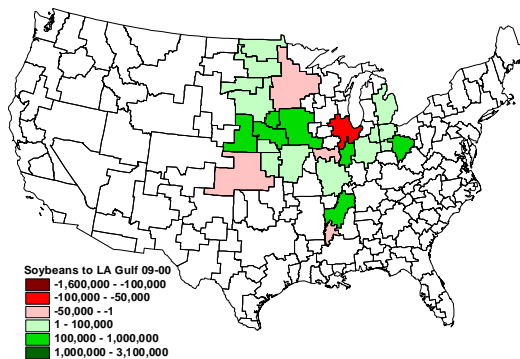
Major changes

- **PNW:** Sharp increase in volumes throughout the region, including all of ND, SD, Minn, in addition to Iowa, Nebraska and Illinois
- **LA Gulf:** Increases from most regions from ND to SD and Nebraska, and eastern Kansas
- **Tx Gulf:** Increased shipments from Nebraska, Kansas and Missouri

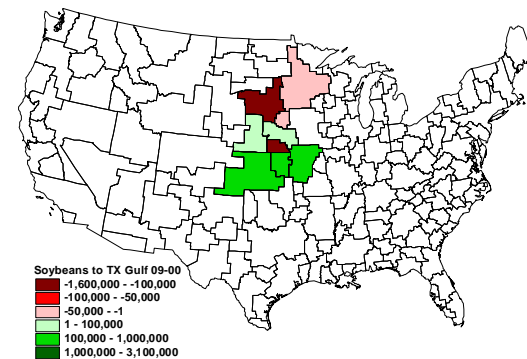
PNW



LA Gulf



TX Gulf

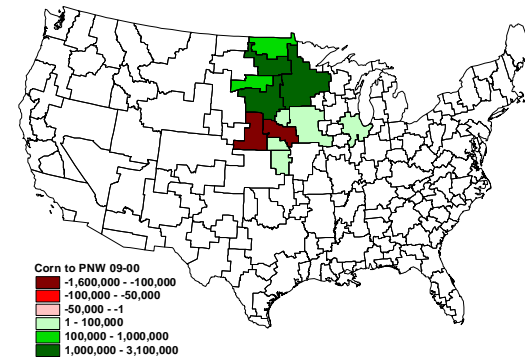


Corn: *Change in Rail Export Volume to Port, 2009-2000*

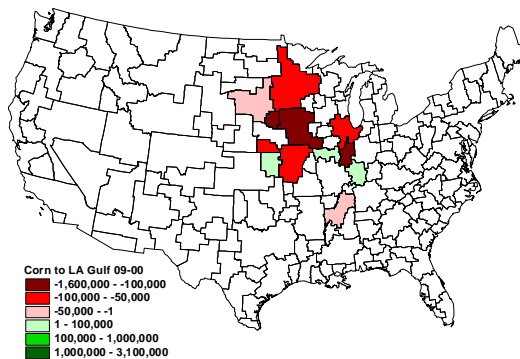
Major changes

- **PNW:** Sharp increase in volumes throughout the region, particularly Minnesota, South-Central ND and SD, and penetrating parts of Southern Ill and Iowa
- **LA Gulf:** Significant reductions in rail shipments from most regions
- **Tx Gulf:** Increased shipments from Iowa, Western Nebraska and Missouri and reductions in northerly origins

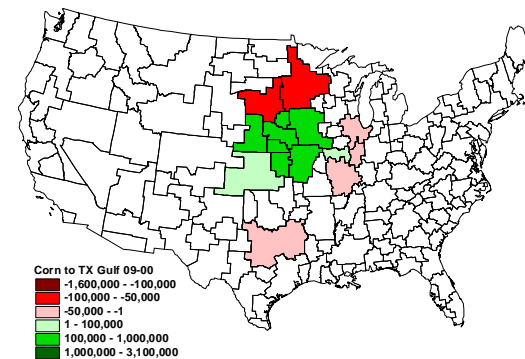
PNW



LA Gulf



TX Gulf



Export competition and Demand: *US, Brazil and China!*

1. Persistency and Longevity of Chinese growth
2. Production tradeoff: Corn vs. soybean
3. Logistics
 - High cost shipping in Brazil
 - Lagg(ed) or (ard) investments in Brazil
 - Evolution to bi-modal seasonal shipping: Brazil and US
4. International logistics competition

China Soybean Imports (comments)

- **Short term**

- Uncertain Brazil crop: *“After a brief lull in November, Chinese buyers returned to the soybean market last week, taking even more than expected. Net new bookings ... almost doubling trade guesses and more than three times the previous levels.”*

- **Longer term:**

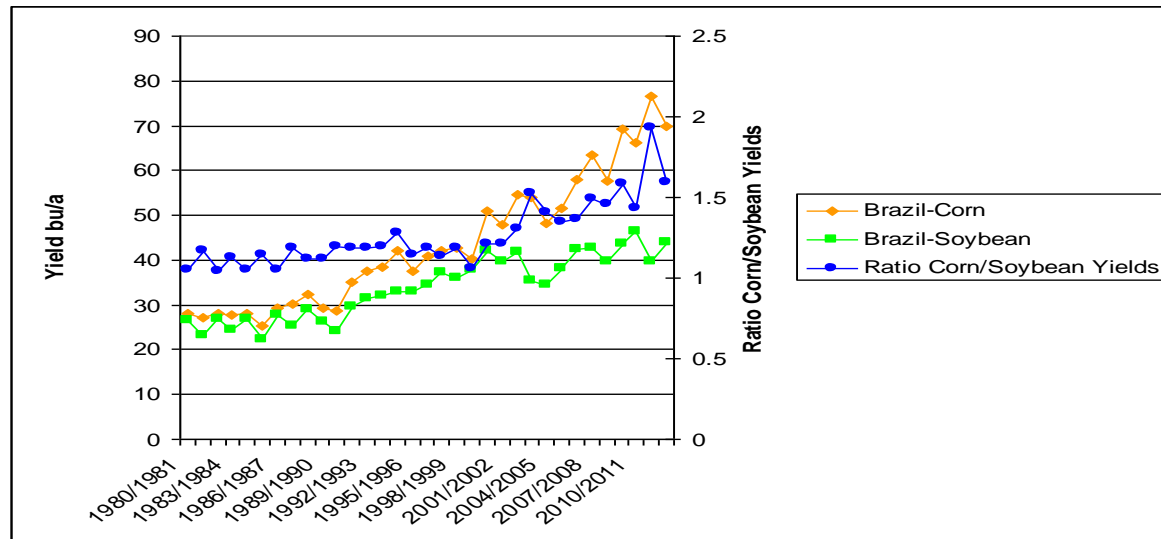
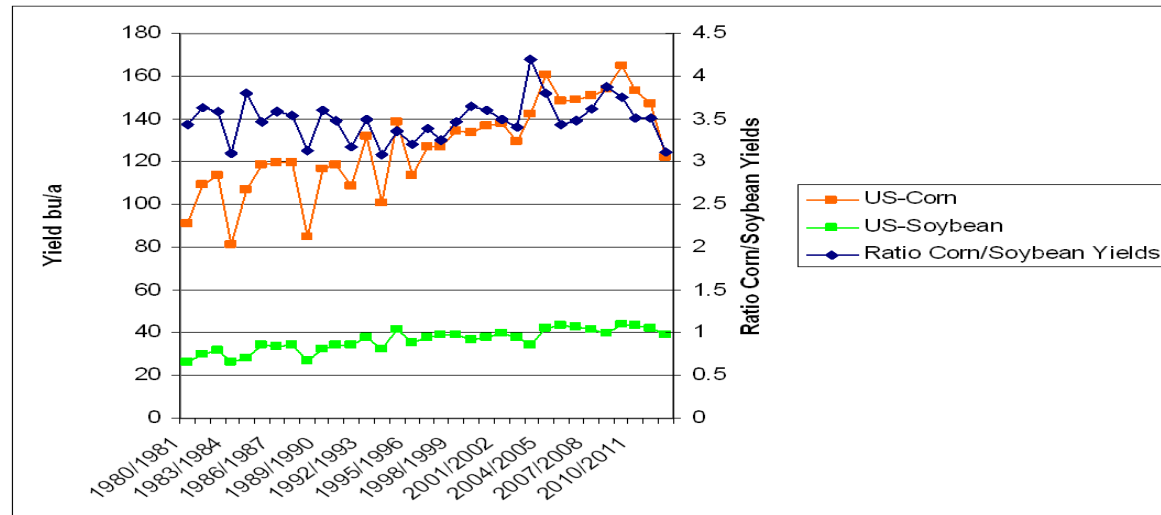
- Projections to 2021 by USB (Informa): 106 mmt (vs. current \approx 58mmt)
- PROExporter (July 2012) China imports to increase at 2 mmt/year;

- **Factors impacting imports**

- Demand: Urbanization, income, lack of productivity growth
- Difficulty of keeping labor on-farms
 - *The challenge of reviving the farming sector is daunting at a time when both the rural population and available agricultural land are shrinking. The number of rural workers has been falling for years because of a low birth rate, an ageing population and most importantly the lure of China's fast-growing cities. (TR Nov 14)*
- Concurrent efforts to accelerate crop productivity
 - *GM, Hybrids, better mgmt, etc*

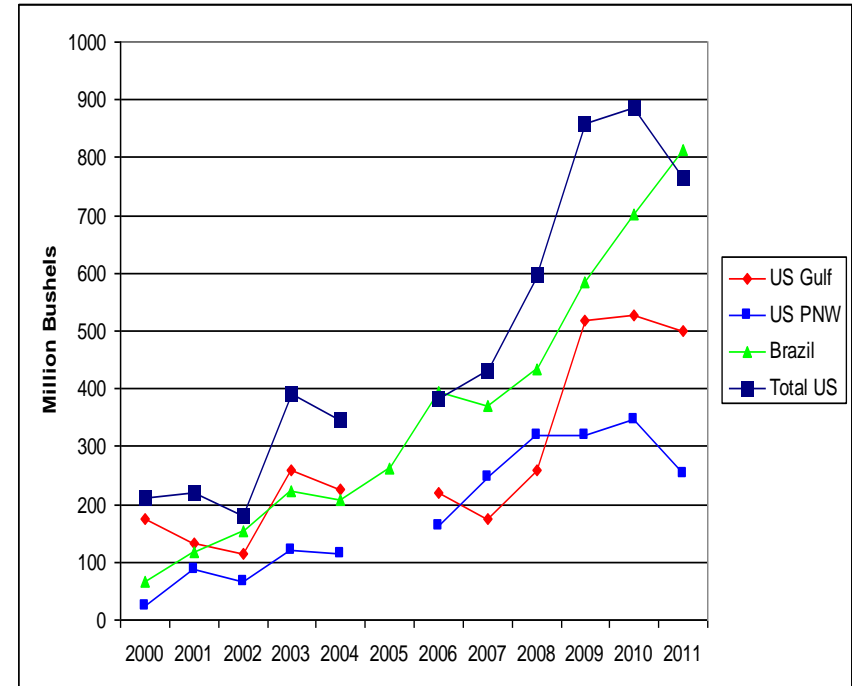
US vs. Brazil: Corn/Soybean Yields

- National average comparison:
 - US Upper
 - Brazil Lower
- Major points
 - Yield growth in Brazil corn is greater, albeit lower
 - Ratio Corn to soybean is far greater in US (3.5) than Brazil(1.5)
- Implications: Brazil will expand in corn, but, comparative advantage is limited by yield tradeoffs relative to that in US



US and Brazil Exports to China

- US Soybean exports to China increased from 2000
 - Exports largely from US Gulf and Pacific Ports
- Brazil has increased to 800mb
 - By far the largest importer (by a factor of nearly 10 X)
 - CAGR=39%



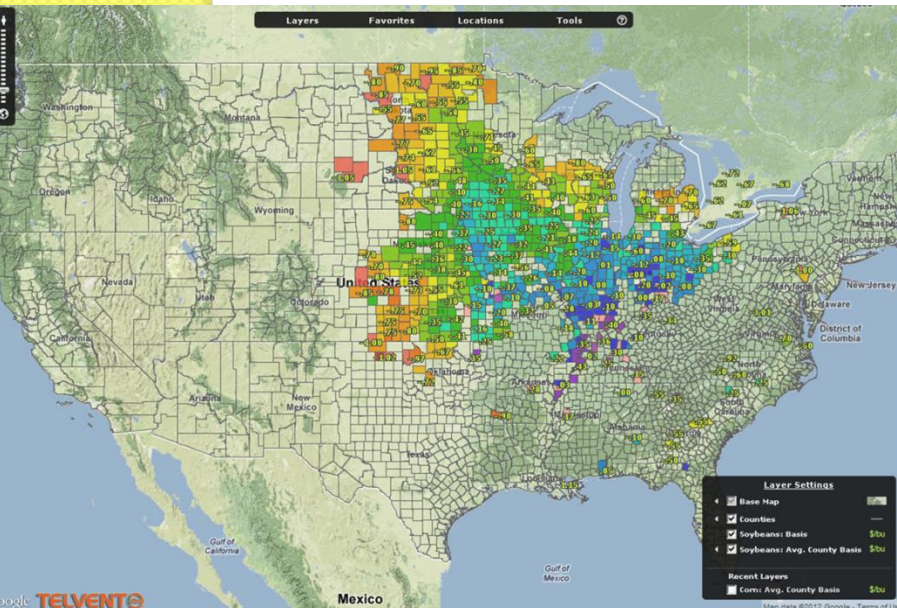
Comparison of Cost Components for US/Brazil Soybean Exports to Asia

- Comparison to Northern Tier Soybean (higher rail costs) vs. Central Brazil
- Sources of US Advantage
 - Interior shipping
 - Ocean shipping (esp from PNW)
- Comparison
 - FOB Basis values comparable
 - *Delivered China*; PNW has advantage by about
 - PNW=\$16/mt adv vs. Brazil
 - USG =\$10/mt adv vs. Brazil
- **PNW vs Brazil Differential (43c/b)**
 - Largely reflects differences related to protein content in NT US Soybean

US PNW To Asia		Basis/Shipping Costs			
City	State	Interior Ship c/bu	FOB Basis c/bu	Ocean c/bu	C&F China c/bu
Jamestown	ND	164			
Lamberton	MN	171			
Pleasant Hill	IA	178			
Lincoln	NE	165			
Madison	SD	172	165	63	229
US Gulf to Asia					
City	State	Interior Ship c/bu	FOB Basis c/bu	Ocean c/bu	Total c/bu
Jamestown	ND	177			
Lamberton	MN	170			
Pleasant Hill	IA	147			
Lincoln	NE	135			
Madison	SD	169	127	118	245
Brazil to Asia					
City	Region	Ship Para. c/bu	FOB Basis c/bu	Ocean c/bu	Total c/bu
Barreiras	Bahia				
Sorriso	Mato Grosso	300			
Rondonopolis	Mato Grosso				
Paranaqua	Parana		166	106	272

US and Brazil Soybean Basis, Country Locations and Export Ports

- Interior shipping cost differentials result in Brazil growers receiving lower basis than US growers
 - by about 170c/b



US Basis

City	State	Basis c/bu
Jamestown	ND	-50
Lamberton	MN	-30
Pleasant Hill	IA	-34
Lincoln	NE	10
Madison	SD	-40

Brazil Basis

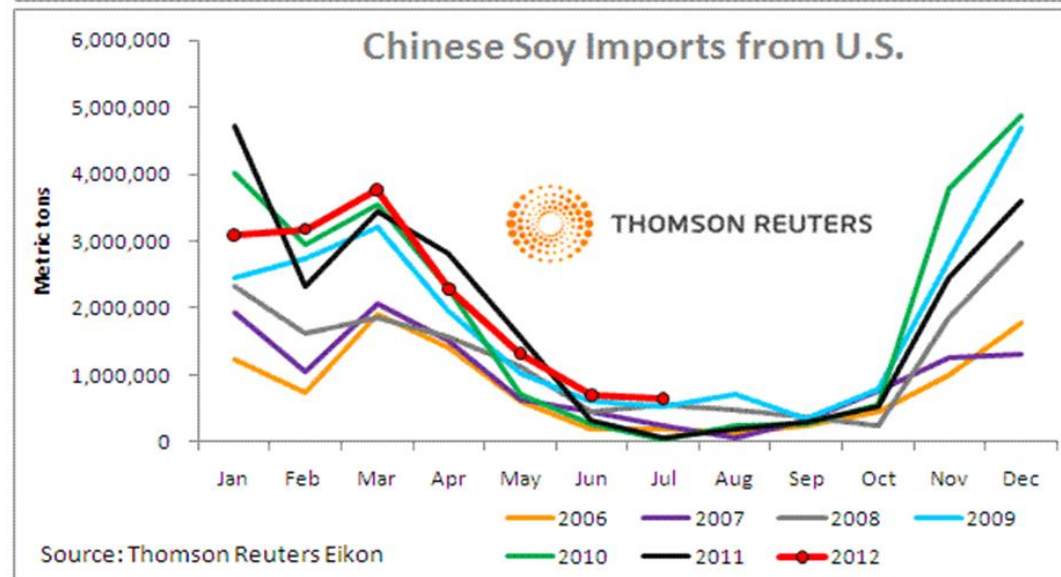
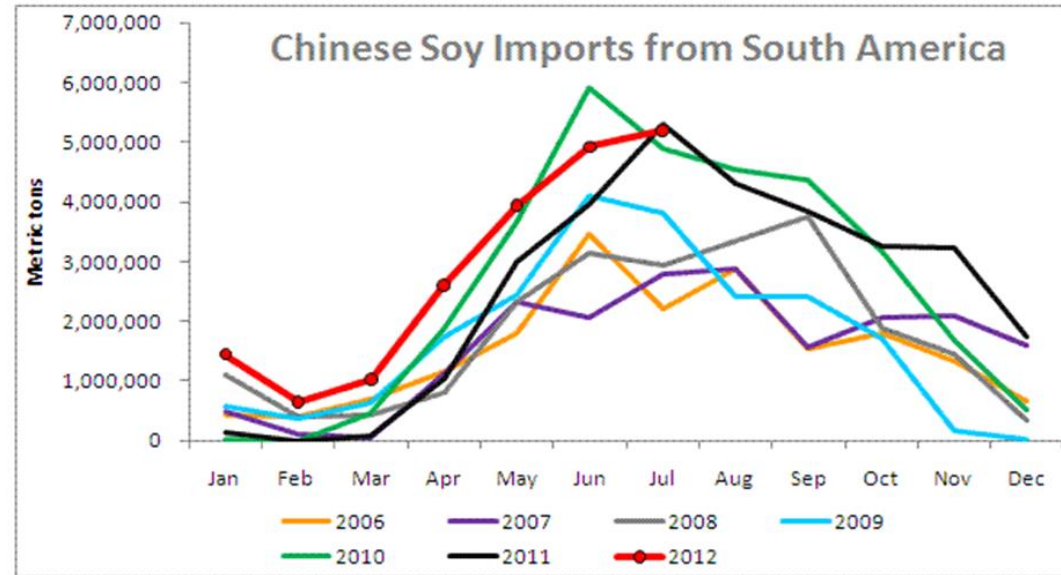
City	State	Basis c/bu
Barreiras	Bahia	-118
Sorriso	Mato Grosso	-204
Rondonopolis	Mato Grosso	-86

Export Locations

City	State	Basis c/bu
US Gulf	LA	127
US PNW	OR	165
Paranagua	Parana	166

2012 China Soybean Imports

- **Drastic drought reduced crop---**
 - 2012 S. American and US
 - Near record monthly shipments in July
- **Seasonal shipments**
 - **Highly seasonal**
- **Implications:** Evolution to bi-modal seasonal shipping
 - US: ___ October to March
 - Brazil: April to Sept
 - Challenges logistics and investment/operations of infrastructure



Summary Points: *Implications, Dramatic Times for ag and investment opportunities in Ag*

Demand:

- Demand growth exceeding productivity growth (1-4%/year)
- China Soybean and corn demand (as example) is critical!

Supply

- Conventional technology: productivity growth is .8 to 1.4%;
- New technology (biotech) will result in growth 3-3.4%/year (favors US vs... non-US origins)
- Most increase production (to meet demands) will come from productivity growth, and shifts in the geography of production

Biotechnology: Game changer and induce changes in productivity growth rates, and spatial geography of production

Risk/Volatility: Increase in risk in all markets and marketing functions, and likely sustained

Investment in Agriculture: Worldwide---massive investment in agriculture

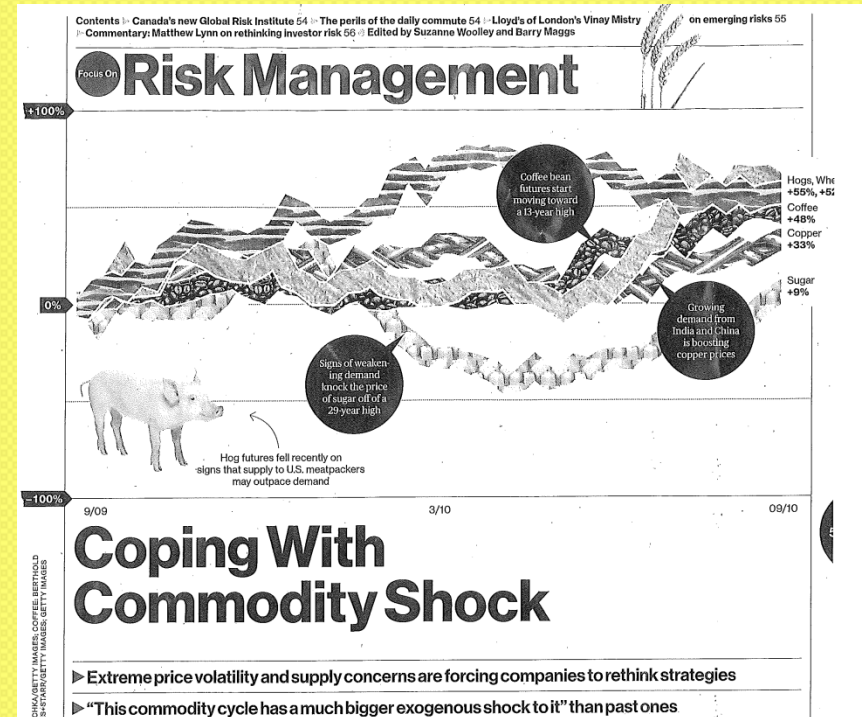
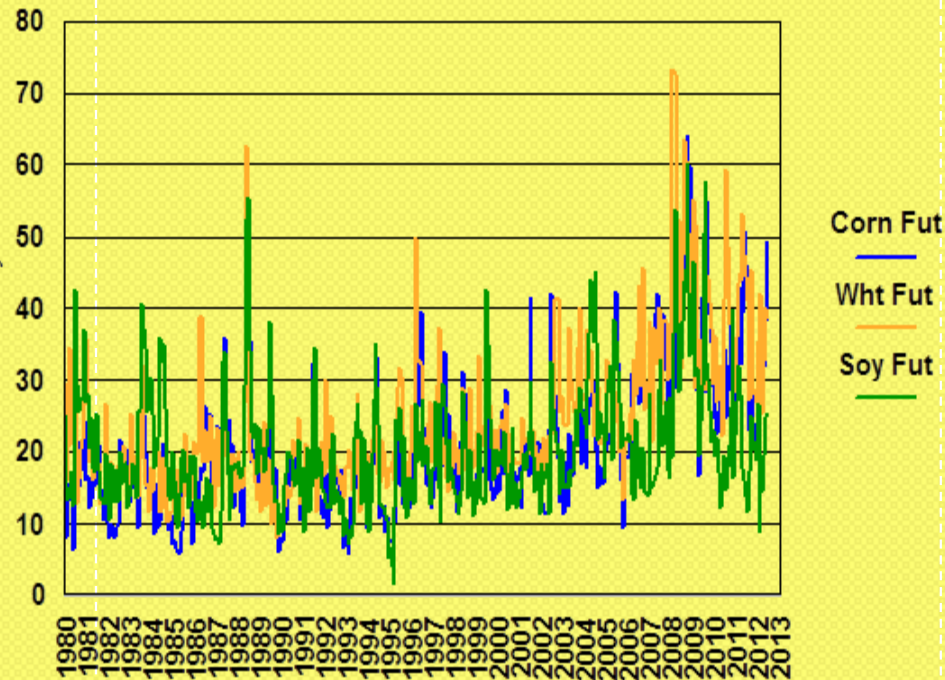
- broadly defined (farming, handling/trading, technology, logistics, etc.)
- Most stable is land; but greater returns, and risk, (more liquidity) in other technology/inputs (fertilizer, seeds and technology, machinery, information technology)

Farm Mgmt:

- Will become much more intensive in numerous dimensions (technology, diversification, marketing, finance, risk mgmt, etc)
- More professionally managed operations (including multi-unit operations).
- Sophistication will escalate to exploit these changes and compete against emerging competitors

Ag Price Risk

Implications for buyers/sellers/shippers



Risk: Has doubled for most crops and oilseeds

NDSU DTN Commodity Trading Room

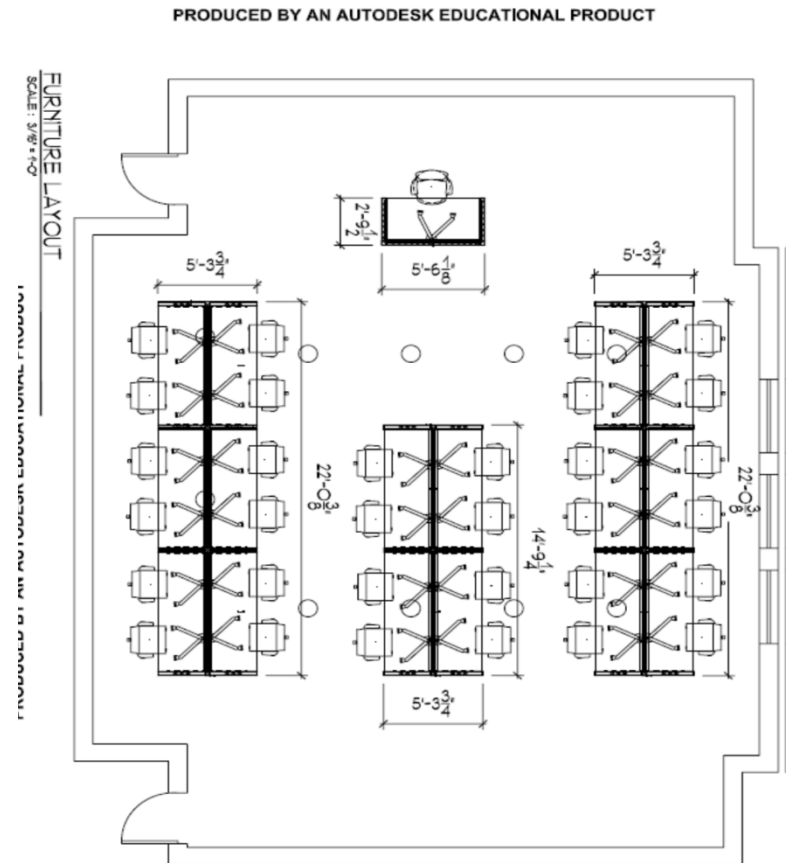


- Major Sponsors
 - CHS
 - ADM
 - Gavilon
- Goal: More students, State-of-art technology, Better training



Teaching Platform: Commodities and Financials

- **Features important for teaching:---DTN**
 - State of the art current information on company financials, credit and commodity markets
 - Easily extractable to XLS for further analysis
 - Cash prices
 - Option analyzer
 - Charting/analytcs
 - Algo-trading (HFT, or algorithmic trading)
 - Summary: Above all lend to facilitating detailed research on companies, markets and strategies
- **Trade Simulation**
 - Student team assignments to create trading strategies
 - Simulation games on trading focused on:
 - formulating/justifying a strategy, executing strategy against live markets
 - Replay simulations
- **Commodity Marketing**
 - Focus on agriculture, energy and potentially other commodity markets
 - Market research, risk and trading strategies
 - For targeted industry programs including individual firms and industry organizations



•
Thank you..... **Q&A**



USDA Comparison US/Brazil Soybeans to China

Table 2-Quarterly costs of transporting soybeans from U.S. and Brazil to Shanghai, China

	2011 3 rd qtr.	2012 2 nd qtr.	2012 3 rd qtr.	Percent change		2011 3 rd qtr.	2012 2 nd qtr.	2012 3 rd qtr.	Percent change	
				Yr. to Yr.	Qtr. to Qtr.				Yr. to Yr.	Qtr. to Qtr.
United States (via U.S. Gulf)										
Minneapolis, MN					Davenport, IA					
--\$/mt--										
Truck	12.62	11.66	13.51	7.05	15.87	12.62	11.66	13.51	7.05	15.87
Barge	33.78	28.18	32.34	-4.26	14.76	26.39	20.23	24.86	-5.80	22.89
Ocean ¹	51.62	49.07	46.82	-9.30	-4.59	51.62	49.07	46.82	-9.30	-4.59
Total transportation ²	98.02	88.91	92.67	-5.46	4.23	90.63	80.96	85.19	-6.00	5.22
Farm Value ³	461.75	502.16	562.42	21.80	12.00	478.89	503.39	565.85	18.16	12.41
Landed Cost	559.77	591.07	655.09	17.03	10.83	569.52	584.35	651.04	14.31	11.41
Transport % of landed cost	17.51	15.04	14.15			15.91	13.85	13.09		
Via PNW										
Fargo, ND					Sioux Falls, SD					
--\$/mt--										
Truck	12.62	11.66	13.51	7.05	15.87	12.62	11.66	13.51	7.05	15.87
Ocean ¹	29.43	25.71	23.88	-18.86	-7.12	29.43	25.71	23.88	-18.86	-7.12
Rail	52.51	54.89	53.95	2.74	-1.71	54.29	56.73	55.66	2.52	-1.89
Total transportation ²	94.56	92.26	91.34	-3.41	-1.00	96.34	94.10	93.05	-3.41	-1.12
Farm Value ³	456.85	493.59	542.58	18.77	9.93	456.85	496.04	552.38	20.91	11.36
Landed Cost	551.41	585.85	633.92	14.96	8.21	553.19	590.14	645.43	16.67	9.37
Transport % of landed cost	17.15	15.75	14.41			17.42	15.95	14.42		
Brazil										
North MT⁴ - Santos⁵					South GO⁴ - Paranagua⁵					
--\$/mt--										
Truck	127.77	110.07	109.73	-14.12	-0.31	65.25	50.51	53.01	-18.76	4.95
Ocean ⁶	52.31	51.35	32.00	-38.83	-37.68	59.61	57.63	55.42	-7.03	-3.83
Total transportation ²	180.08	161.42	141.73	-21.30	-12.20	124.86	108.14	108.43	-13.16	0.27
Farm Value ⁷	416.62	448.29	570.66	36.97	27.30	417.65	428.40	566.91	35.74	32.33
Landed Cost	596.70	609.71	712.39	19.39	16.84	542.51	536.54	675.34	24.48	25.87
Transport % of landed cost	30.18	26.47	19.90			23.02	20.16	16.06		