PRX Quarterly Report • Special Issue

Future Of World Grain Demand:
How Long Will China and Biofuels Last?

Bill Hudson • PRX • June 30, 2012

Topics

SOYBEAN and CORN AREA PLANTED & VALUE, 2008-2020

PRX_BS1_OverviewDeck_Start, GTB-12-06, Jun-26-12

Item	Unit	Crop Year								
		08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	20-21
Soybean area planted	*mil ac*	75.7	77.5	77.4	75.0	76.1	77.0	76.0	78.0	80.0
Corn area planted	*mil ac*	86.0	86.4	88.2	91.9	96.4	93.0	92.0	91.0	89.0
Soybean & Corn area planted	*mil ac*	161.7	163.8	165.6	166.9	172.5	170.0	168.0	169.0	169.0
Principal Crops area planted	*mil ac*	325.0	319.3	316.7	315.0					
Soybean & Corn share	*pct*	49.8%	51.3%	52.3%	53.0%					
Soybean production	*mil bu*	2967	3359	3329	3056	3167	3181	3308	3575	3975
Corn Production	*mil bu*	12092	13092	12447	12358	13565	12662	13710	14524	15377
Soybean farm price	*$/bu*	9.97	9.59	11.30	12.35	12.50	12.15	11.60	11.44	11.77
Corn farm price	*$/bu*	4.06	3.55	5.18	6.10	5.25	4.86	4.64	4.58	4.71
Soybean production value	*$bil*	29.6	32.2	37.6	37.7	39.6	38.6	38.4	40.9	46.8
Corn production value	*$bil*	49.1	46.5	64.5	75.4	71.2	61.5	63.6	66.5	72.4
Soybean & Corn prod value	*$bil*	78.7	78.7	102.1	113.1	110.8	100.2	102.0	107.3	119.2
Soybean & Corn prod value	*$/ac Pltd*	487	480	617	678	642	589	607	635	705

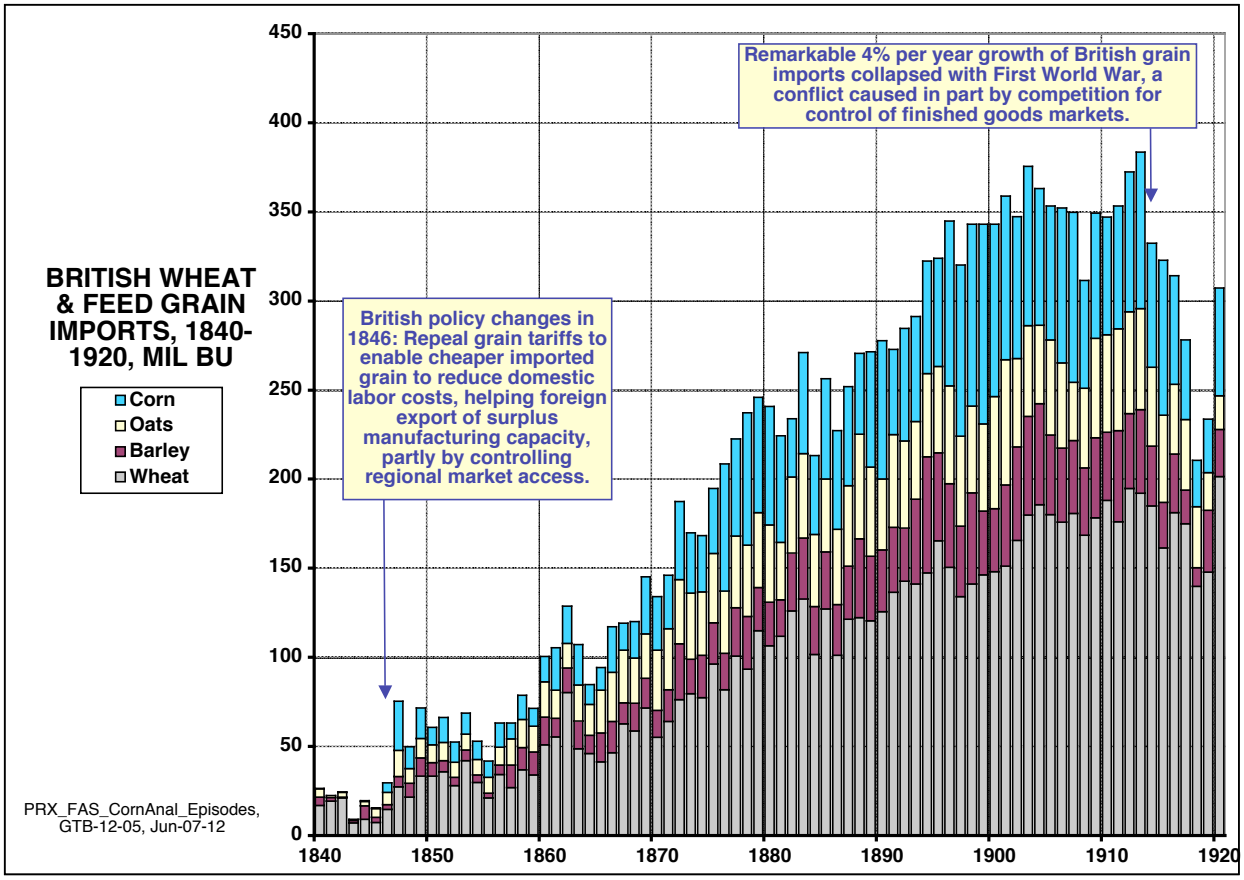
Provided that (1) EPA's execution of RFS2 enables blends of E15 and that corn is not unduly penalized by Advanced Biofuels; that (2) US share of world grain trade rebounds some from 2011-12; and that (3) US corn-soybean weather is "normal".

Politics and the Structure of World Grain Demand

For the past 160 years, world grain demand has been dominated by about one dozen politically driven episodes, laid atop slow-moving trends, commanding commercial attention—typically coming to peaks, maturing, or collapsing entirely.

Origins. In the 1840s, Britain led all nations in factory-made finished goods such as textiles. Factory owners wanted to extend this advantage, and they sought to repeal the country's tariff protection on wheat and other grains—so that bread would be cheaper in English cities, holding down the pressure for higher labor rates. After several years of debate, Parliament adopted a new "free trade" approach, and the first *episode* of intercontinental grain trade began.

Imported grain came to London from North and South America, Australia, the Black Sea, and elsewhere. The episode grew at about 4 percent per year for 68 straight years, benefiting by cheaper steam-powered vessels and transoceanic cable communications. But Germany and other European countries sought to compete with Britain for control of markets for factory goods, leading ultimately to the Great War, followed by a collapse of the grain demand episode.



MAJOR POLITICALLY DRIVEN WORLD DEMAND EPISODES, 1847-2025, BY REGION

with Peak Grain Volume Estimated in Million Bushels of Corn Equivalent

WGT_1, GTB-12-06, Jun-12-12

Years	Biofuel		Grain Imports for Food and Feed Use											
			Americas		EurAsia								Pacifica	Africa
	US	South America	Canada	Mexico & South America	North-west Europe	Eastern Europe	Russia	Muslim World	India	South-east Asia	China	Japan	Aus-tralia & NZ	South-ern Africa
1840														
1845					UK									
1850														
1855														
1860														
1865														
1870														
1875														
1880														
1885														
1890														
1895														
1900														
1905														
1910					400									
1915	WORLD WAR ONE													
1920														
1925														
1930														
1935														
1940														
1945	WORLD WAR TWO													
1950					EU									
1955														
1960														
1965														
1970														
1975		Sugar												
1980					1500	300	2000					800		
1985														
1990										800				
1995											Soy-			150
2000								1500			beans &			
2005	Corn		150	900							Corn			
2010														
2015														
2020	5000	3000									8000			
2025		equiv												

Green = Bullish for US Corn-Soybean Income, Red = Bearish

About One Dozen Political Episodes Since Second World War—the Latest the Greatest. Politically driven grain demand episodes lay atop slow-moving demographic and economic trends. These episodes command commercial attention because they emerge quickly and grow much more rapidly than the underlying fundamentals. But most of the political episodes are like shooting stars—they have beginnings, middles, and ends.

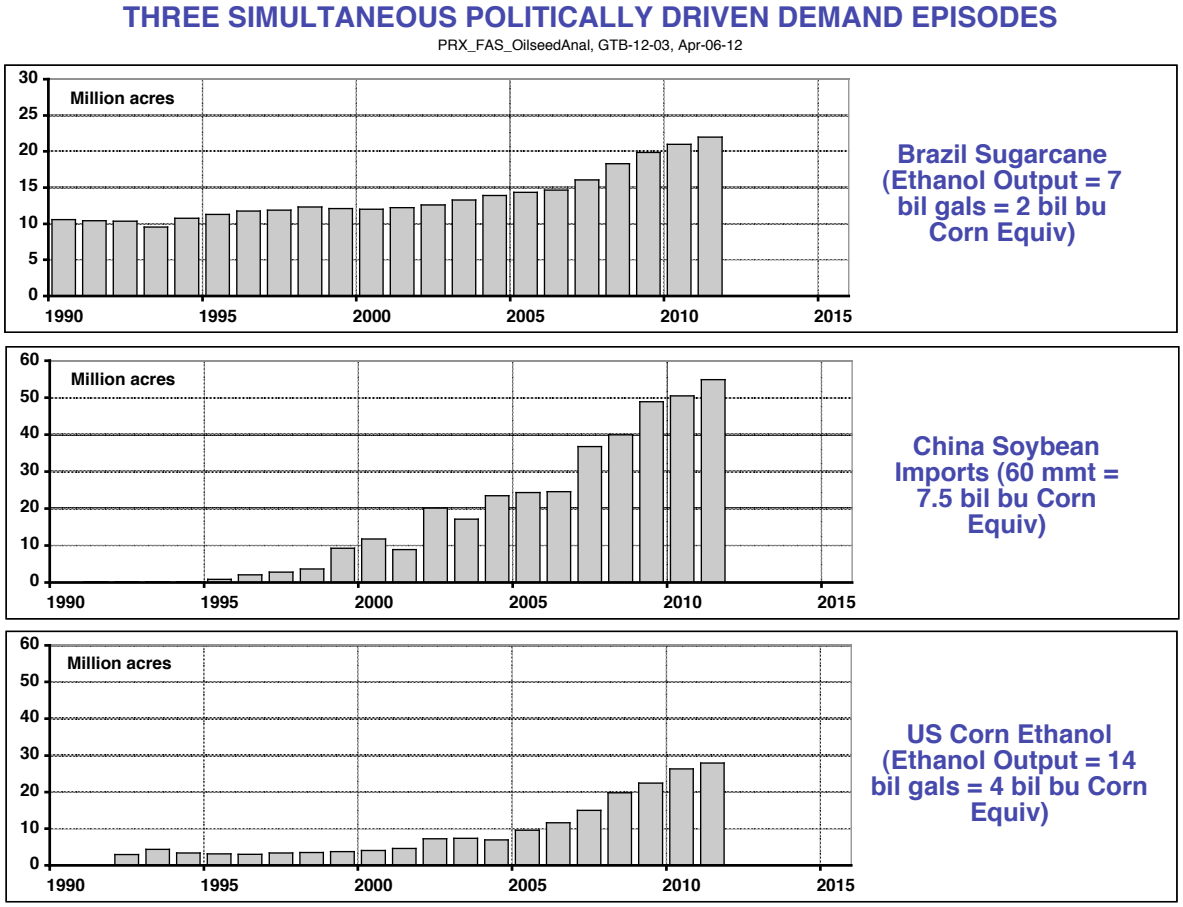
Three simultaneous episodes are at work today—the earliest of which is Brazilian sugarcane ethanol, then the China's food/feed import demand (by far the largest in volume), and the third of which is the US corn ethanol demand. The combination of China soybean imports and US corn ethanol usage has drive income of the US corn-soybean sector to new record highs. Brazilian sugarcane (and also expanded soybean and corn production in all of South America) competes with the US for farm income.

Question. Which of these three political episodes will last the longest—and how long will this be?

Three Political Episodes Driving Grain Markets Today

After about 2005, world grain and oilseed prices began to rise under influence of the three political demand episodes already mentioned, and the grain prices also began to display "covariance" with crude oil price. But any given crop, say corn, has its own life, including *flukes* of weather!

Relative Size and Speed of Three Episodes. The increasing acreages involved in today's three dominant political demand episodes are plotted in the charts below.

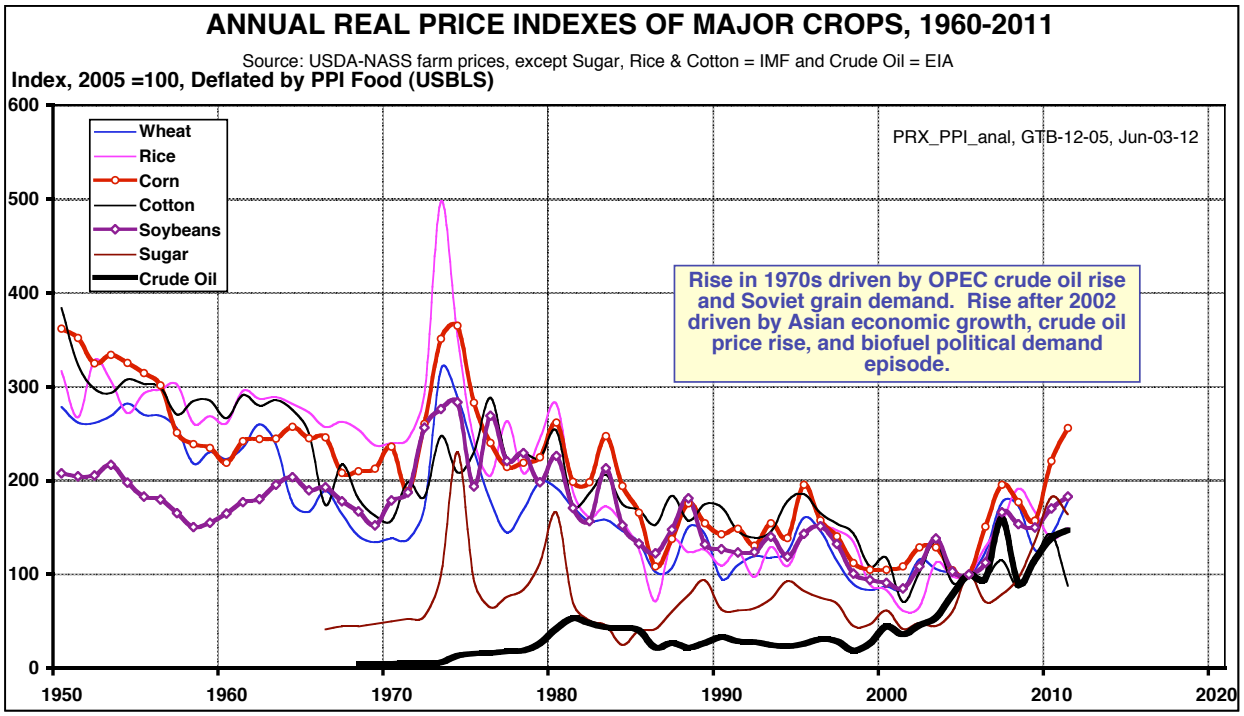


The acreage scales for China and the US are the same, topping at 60 million acres, emphasizing that China's soybean imports require *twice* the area (somewhere in the Americas) as does corn ethanol (adjusted for the corn feed value of DDG).

The acreage scale of Brazil sugarcane is set at half that for China and the US. However, it should be noted that production per acre of sugarcane is double the tons per acre of either soybeans or corn (that is, corn seeds, not including the stover). Thus, from a visual standpoint, the three charts as stacked give a fair representation of scale and rate of growth for all three episodes now at work together in affecting market prices.

One reason why today's market action is difficult to follow is indeed this overlapping and interacting of three very different supply-demand tables: (1) The 5-year perennial sugarcane; (2) the China soybean situation, in which beans are not rotated with corn but domestically remain a limited kind of "specialty

food crop" (for soy sauce and tofu), and (3) the giant US corn table, with the other triple uses of domestic feed, foreign exports, and RFS-directed ethanol.



Not Only Episodes but Statistical "Flukes." The price chart shows the long decline in real prices of the major commodities until about 2005, when the grains began a *covariance* with crude oil price (and propelling the biofuel age).

But note the situation with corn price for 2010 and 2011, increasing in real terms well above crude oil and the "rest of the family." This independent rise is due to the happenstance of two mediocre yield years in the US (2010 down 4% from trend, and 2011 down 9%), There have been only two other such "down doublets" in the 100-year history of US corn yield.

There is thus no getting away from the obvious: Political epsisodes are at risk of being overturned by flukes of crop weather as much as changes in elections or economics. —Suppose an unprecedented *third* mediocre yield year transpires in 2012?!?

World Row Crop Acreage Increasing, but Not in US

Over the past decade, world acreage of the ten major row crops increased by 184 million acres, of which only 8 were in the US. The two other Major Export Hubs, South America and the Black Sea, increased 90 million acres, accounting for half the world increase. But the two Political Demand Episodes of US Corn Ethanol and China Soybean and Corn Imports accounted for 52 million acres, or 28 percent of the world increase—and their rate of growth was 13.3 percent per year, dwarfing everything else. Brazil sugarcane, a perennial crop, grew at 6.1 percent per year.

The purpose of giving the full USDA-FAS table on the next page is to place our concept of today's three Politically Driven Demand Episodes in a convincing context. Please study the table and observe the following eight things about world and regional crop acreage:

1. Over the past ten years, 2003-2012, the total acreage of the world's ten major row crops has increased by 184 million acres, a growth rate of about 1 percent per year.
2. Only 8 million acres of the increase has been in the US, where corn has grown but other row crops have declined.
3. But this total growth of 176 million acres in the rest of the world is roughly equivalent to the world's having added an entire other "cornbelt," though with about two-thirds the yield.
4. About 99 of the 184 million acre total world increase occurred in the three "Major Export Hubs," namely the US, South America, and the Black Sea. This was a 2.2 percent rate of growth for South America and a 2.7 percent growth for the Black Sea. (Lines 27-29.)
5. The major importers grew by only 86 million acres, led by China (yes!) at 31 million acres (mainly corn), altogether only a 1 percent a year rate of growth. (Lines 31-34.)
6. By type of grain, growth in meatstuffs led with 69 million acres, and foodstuffs followed with 59 million acres. (Lines 35-38.) It should be emphasized that the role of US corn and soybeans is the production of meat for those with the money for it—not for "food" to feed the poorest.
7. **Note especially the two Politically Driven Demand Episodes shown in lines 39 and 40. US Corn for Ethanol grew by 18 million acres, and China Corn and Soybean Imports by 34 million acres. Together the two episodes represented growth of 52 million acres, or 28 percent of the total world increase. And the rate of growth over the decade of the two episodes dwarfs everything else at 13.3 percent!**
8. **Brazil sugarcane (a perennial crop), shown in line 43 separately from the annual row crops, grew by 9.4 million acres, a growth rate of 6.1 percent.**

Acreages, of course, represent different qualities of land, and thus different yields. For instance, the usable biomass from sugarcane acreage is roughly twice that of feedgrain acreage. Oilseed crops have half or less the yield in bushels as feedgrains, but their protein and oil content is much higher—and thus too their price per bushel. *But the raw acreage numbers give a useful overview of the structure of the growth in world agriculture over the past ten years.*

WORLD & US AREA HARVESTED OF TEN MAJOR ROW CROPS, 2003-2012

Crop data source: USDA-FAS, http://www.fas.usda.gov/psdonline/psdhome.aspx, May-2012

PRX_WorldAYPanal_Start, GTB-12-05, May-2012

	Region	Row Crop	Northern Hemisphere Crop Years										12-13 minus 03-04		
			03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	AH	Share	Rate
			mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	share	pct
	WORLD														
1		Barley	144	143	137	140	139	137	134	118	123	126	-18	-10%	-1.5%
2		Corn	351	359	360	369	397	392	389	402	417	431	80	44%	2.3%
3		Sorghum	107	97	104	102	105	103	95	96	94	98	-9	-5%	-1.0%
4		Major Feedgrains	602	599	601	612	640	631	618	615	635	655	53	29%	0.9%
5		Wheat	513	534	540	524	537	555	558	540	548	547	33	18%	0.7%
6		Peanuts	56	53	54	50	52	53	51	53	52	53	-3	-2%	-0.6%
7		Rapeseed	63	66	67	65	70	77	78	83	82	82	19	10%	3.0%
8		Soybeans	218	230	230	233	224	238	252	254	253	263	45	24%	2.1%
9		Sunflower	57	52	57	59	52	59	57	57	64	65	8	4%	1.5%
10		Major Oilseeds	394	401	407	407	398	427	438	448	450	463	69	37%	1.8%
11		Rice	369	375	380	382	383	391	386	390	393	395	26	14%	0.8%
12		Cotton	80	88	86	85	81	76	74	82	89	84	4	2%	0.5%
13		Major 10 Row Crops	1959	1998	2015	2010	2038	2080	2075	2074	2113	2143	184	100%	1.0%
	UNITED STATES														
14		Barley	4.7	4.0	3.3	3.0	3.5	3.8	3.1	2.5	2.2	2.9	-2		-5.3%
15		Corn	70.9	73.6	75.1	70.6	86.5	78.6	79.5	81.4	84.0	89.1	18		2.6%
16		Sorghum	7.8	6.5	5.7	4.9	6.8	7.3	5.5	4.8	3.9	5.1	-3		-4.5%
17		Major Feedgrains	83.5	84.2	84.1	78.5	96.8	89.6	88.1	88.7	90.1	97.2	14		1.7%
18		Wheat	53.1	50.0	50.1	46.8	51.0	55.7	49.9	47.6	45.7	49.2	-4		-0.8%
19		Peanuts	1.3	1.4	1.6	1.2	1.2	1.5	1.1	1.3	1.1	1.4	0		0.7%
20		Rapeseed	1.1	0.8	1.1	1.0	1.2	1.0	0.8	1.4	1.0	1.5	0		3.9%
21		Soybeans	72.5	74.0	71.3	74.6	64.1	74.7	76.4	76.6	73.6	73.0	0		0.1%
22		Sunflower	2.2	1.7	2.6	1.8	2.0	2.4	2.0	1.9	1.5	1.7	0		-2.7%
23		Major Oilseeds	147.3	150.1	145.2	151.4	130.6	151.9	154.6	155.9	149.4	148.8	2		0.1%
24		Rice	3.0	3.3	3.4	2.8	2.7	3.0	3.1	3.6	2.6	2.5	0		-1.9%
25		Cotton	12.0	13.1	13.8	12.7	10.5	7.6	7.5	10.7	9.5	10.5	-2		-1.5%
26		Major 10 Row Crops	228.6	228.4	228.0	219.5	229.6	235.4	228.9	231.8	225.2	236.9	8	5%	0.4%
	Three Major Export Hubs														
27	UNITED STATES		229	228	228	219	230	235	229	232	225	237	8	5%	0.4%
28	SOUTH AMERICA		193	201	198	202	211	205	210	219	226	235	42	23%	2.2%
29	BLACK SEA (FSU)		179	196	203	205	201	225	224	204	227	227	48	26%	2.7%
30		Subtotal	600	625	629	627	641	665	663	655	678	699	99	54%	1.7%
	Major Importers														
31	CHINA		252	260	265	268	269	274	280	282	283	284	31	17%	1.3%
32	Others		1107	1112	1120	1115	1128	1141	1131	1137	1152	1161	54	29%	0.5%
33		Subtotal	1359	1372	1385	1383	1397	1415	1412	1419	1436	1445	86	46%	0.7%
34		World Total	1959	1998	2015	2010	2038	2080	2075	2074	2113	2143	184	100%	1.0%
	Meatstuffs (Feedgrains + Oilseeds), Foodstuffs (Wheat + Rice), &Cotton,														
35	Meatstuffs ex China		972	971	975	984	990	1002	993	994	1008	1041	69	38%	0.8%
36	Wheat and Rice Total		882	909	921	906	920	946	944	929	940	942	59	32%	0.7%
37	Cotton Total		80	88	86	85	81	76	74	82	89	84	4	2%	0.5%
38		Subtotal	1934	1969	1982	1975	1991	2024	2012	2006	2037	2066	132	72%	0.7%
	Politically Driven Demand Episodes														
39	US Corn Fuel Ethanol		6.6	6.4	8.8	10.5	13.9	18.1	20.6	24.2	25.5	24.4	18	10%	15.7%
40	China Corn + Beans Imp		18.4	22.4	24.2	24.6	33.3	38.0	42.4	44.5	50.9	52.7	34	19%	12.4%
41		Subtotal	25.0	28.8	33.0	35.1	47.2	56.1	63.0	68.8	76.4	77.1	52	28%	13.3%
42		Total	1959	1998	2015	2010	2038	2080	2075	2074	2113	2143	184	100%	1.0%
	Sugarcane														
43	Brazil Sugarcane		13.3	13.9	14.3	14.7	16.1	18.3	19.9	21.0	22.0	22.6	9.4		6.1%
44	Others		37.7	36.2	34.7	36.6	40.3	41.5	38.8	37.9	36.9	37.4	-0.3		-0.1%
45		Total World Sugarcane	51.0	50.1	49.1	51.2	56.4	59.7	58.7	58.8	58.9	60.0	9.0		1.8%

China's Soybean Imports Require Twice the Acreage as Corn Ethanol

China's soybean imports, and now probably increasingly its corn imports as well, is the largest demand episode underway today—and one which should continue despite a shift in China's economy away from export growth and towards consumer demand.

The top chart on page 9 shows China's imports of all grains, oilseeds, and food oils since 1985. The boom in soybean imports began in the late 1990s with a few million tons, and today in 2012 will exceed 60 million tons.

Three points about this vast tonnage of soybeans should be made: (1) China now accounts for about 40% of all world trade in soybeans and soymeal; (2) China imports about three-fourths of all its consumption of food oil, through soybeans and palm oil; and (3) China's imports of beans requires over 50 million acres of quality cropland in the Americas, land that could deliver over 7.5 billion bushels of corn. Thus, in terms of overall world grain demand, China is twice as important as fuel ethanol—and especially to the combined corn-soybean sector of the US.

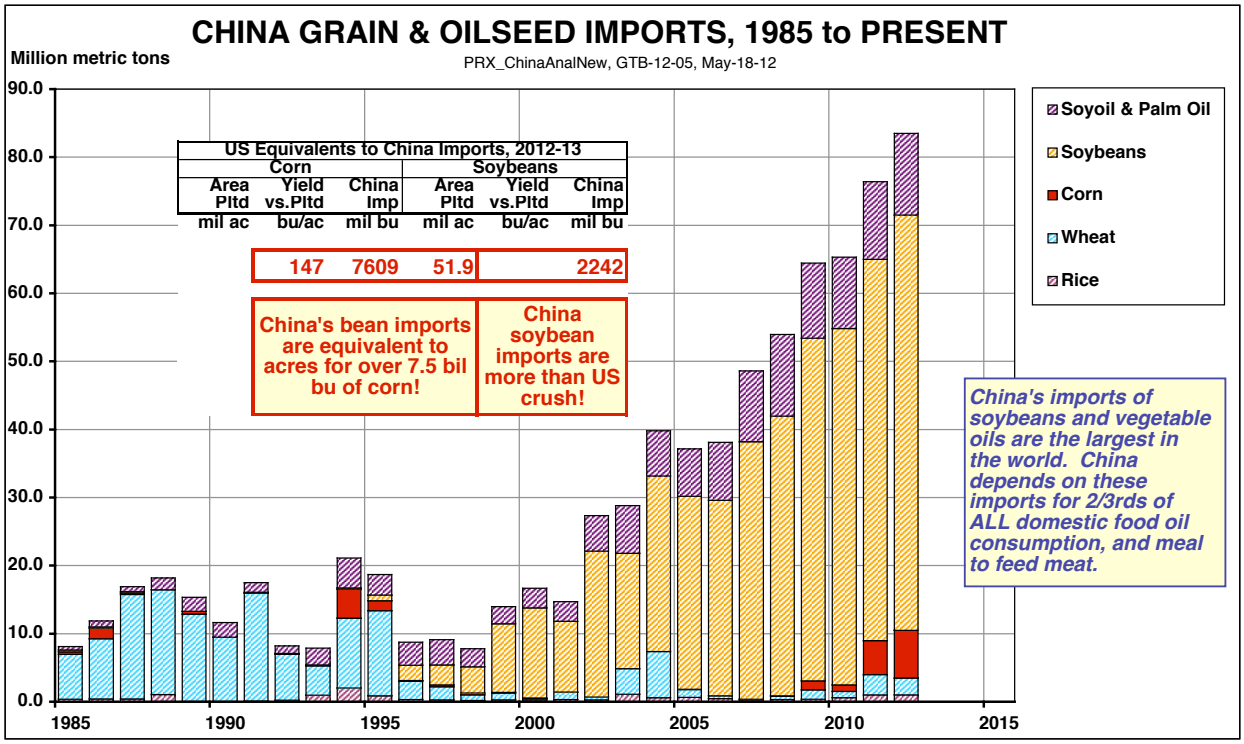
Economic Slowdown = Soybean Import Slowdown? We think not, and we cite the Former Soviet Union's grain demand episode of the 1970s and 1980s as a clear precedent. In other words, a slowing of China's export economy, and a shifting towards a consumer economy, argues that a leadership with money (China!) would make even greater grain purchases, to keep its urban meat-eaters happy. Finally, China's corn yield is half that of the US, and not rapidly increasing—and branded genetic seeds are not a possibility without full protection of intellectual property rights. So it makes sense, as shown in the table below, to project growing corn imports as well as continued soybean imports.

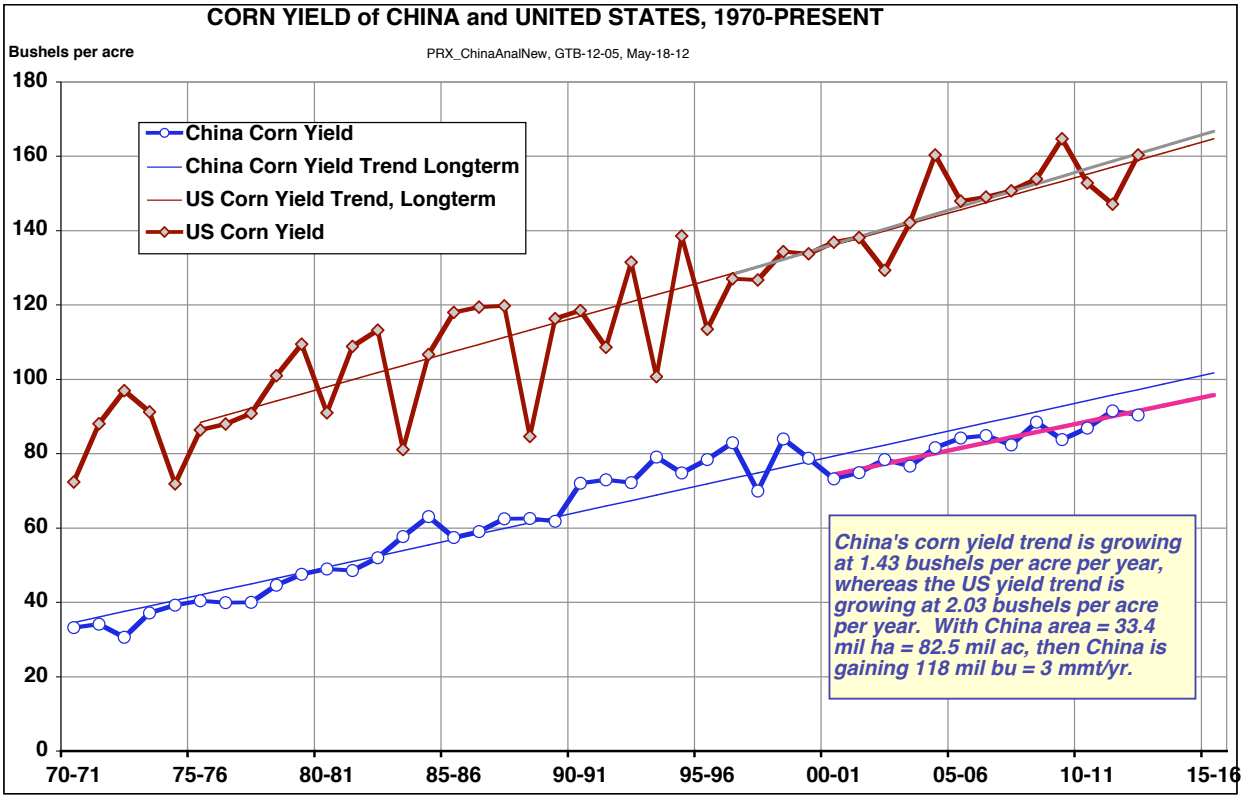
CHINA MEAT PRODUCTION VS. CORN & SOYBEAN IMPORT DEMAND

PRX_ChinaAnalNew, GTB-12-05, May-18-12. Source of data = USDA-FAS-PSD, Forecasts by PRX

Cal Year of Prdn	Meat Production				China Corn				China Soybeans				
	Beef	Pork	Poultry	Total Meat	Dmstc Prdn	Im-ports	Feed use	Fed per mt meat	Dmstc Prdn	Im-ports	Crush	Meal use	Beans Fed per mt meat
	mmt	mmt	mmt	mmt	mmt	mmt	mmt	mt	mmt	mmt	mmt	mmt	mt
2000	5.1	39.7	9.3	54.1	106.0	0.1	92.0	1.70	15.4	13.2	18.9	15.1	0.35
2001	5.1	40.5	9.3	54.9	114.1	0.0	94.0	1.71	15.4	10.4	20.3	16.2	0.37
2002	5.2	41.2	9.6	56.0	121.3	0.0	96.0	1.71	16.5	21.4	26.5	21.2	0.47
2003	5.4	42.4	9.9	57.7	115.8	0.0	97.0	1.68	15.4	16.9	25.4	20.4	0.44
2004	5.6	43.4	10.0	59.0	130.3	0.0	98.0	1.66	17.4	25.8	30.4	24.3	0.51
2005	5.7	45.6	10.2	61.4	139.4	0.1	101.0	1.64	16.4	28.3	34.5	27.6	0.56
2006	5.8	46.5	10.4	62.6	151.6	0.0	104.0	1.66	15.1	28.7	36.0	28.8	0.57
2007	6.1	42.9	11.3	60.3	152.3	0.0	106.0	1.76	13.4	37.8	39.5	31.6	0.66
2008	6.1	46.2	11.8	64.2	165.9	0.0	108.0	1.68	15.5	41.1	41.0	32.8	0.64
2009	5.8	48.9	12.1	66.8	164.0	1.3	118.0	1.77	15.0	50.3	48.8	39.1	0.73
2010	5.6	51.1	12.6	69.2	177.2	1.0	128.0	1.85	15.1	52.3	55.0	44.0	0.79
2011	5.6	49.5	13.2	68.3	191.8	5.0	131.0	1.92	13.5	56.0	59.1	47.3	0.87
2012	5.5	51.6	13.7	70.9	193.0	7.0	137.0	1.93	13.1	61.0	63.4	50.7	0.89
Annual Growth of Imports Implied at Current Meat Growth Trend				1.4		2.6		1.86		1.2			0.88
Annual Growth of Imports Implied (2012-2020) at Likely Future Meat Growth Trend (PRX)				2.5		5.0		2.00		2.5			1.00

PRX Forecasts. (1) China corn imports to increase at 2 mmt/yr (the other 3 mmt/yr from China's increasing yield trend. (2) China soybean imports to increase at about 2 mmt/yr.

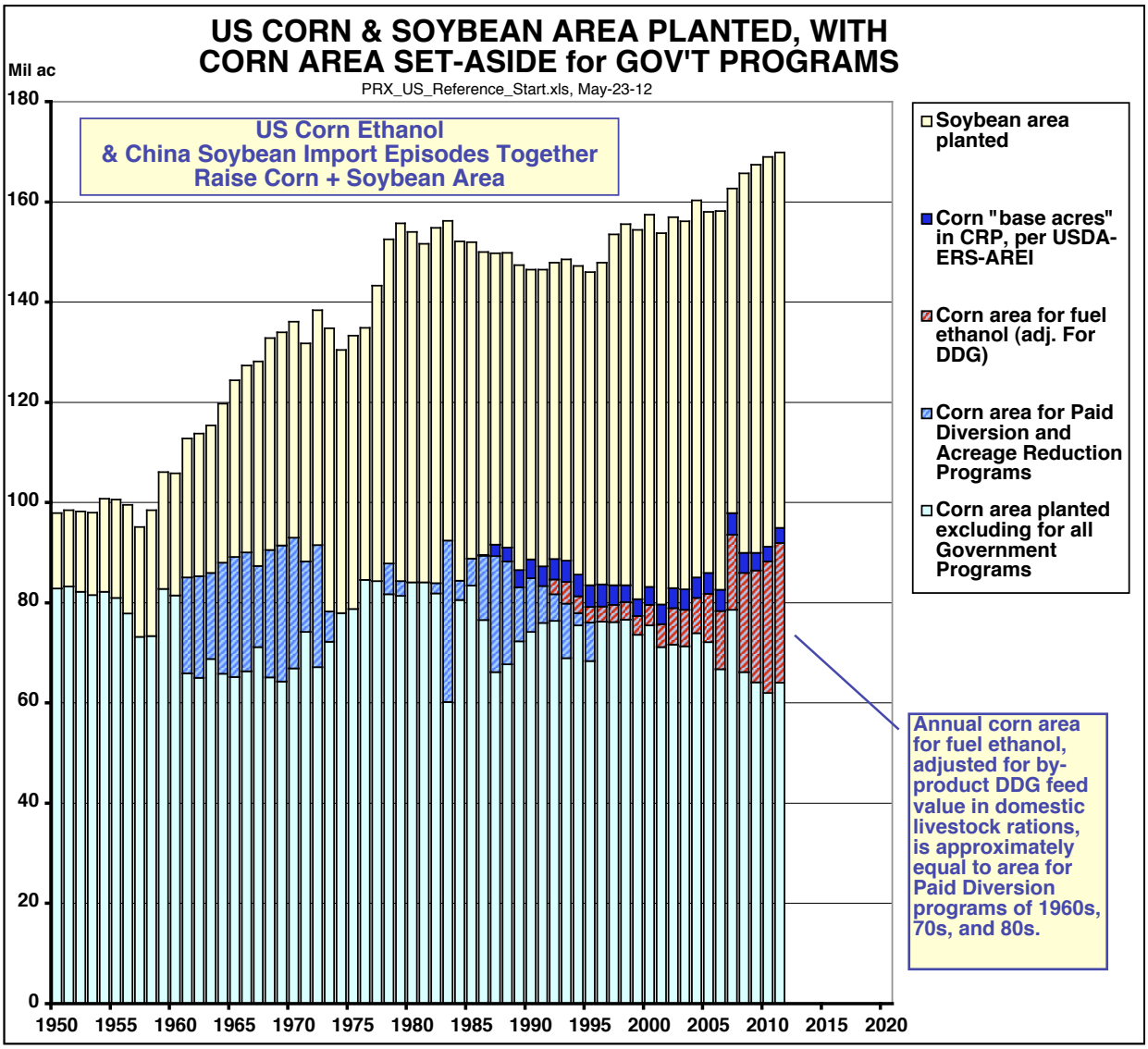


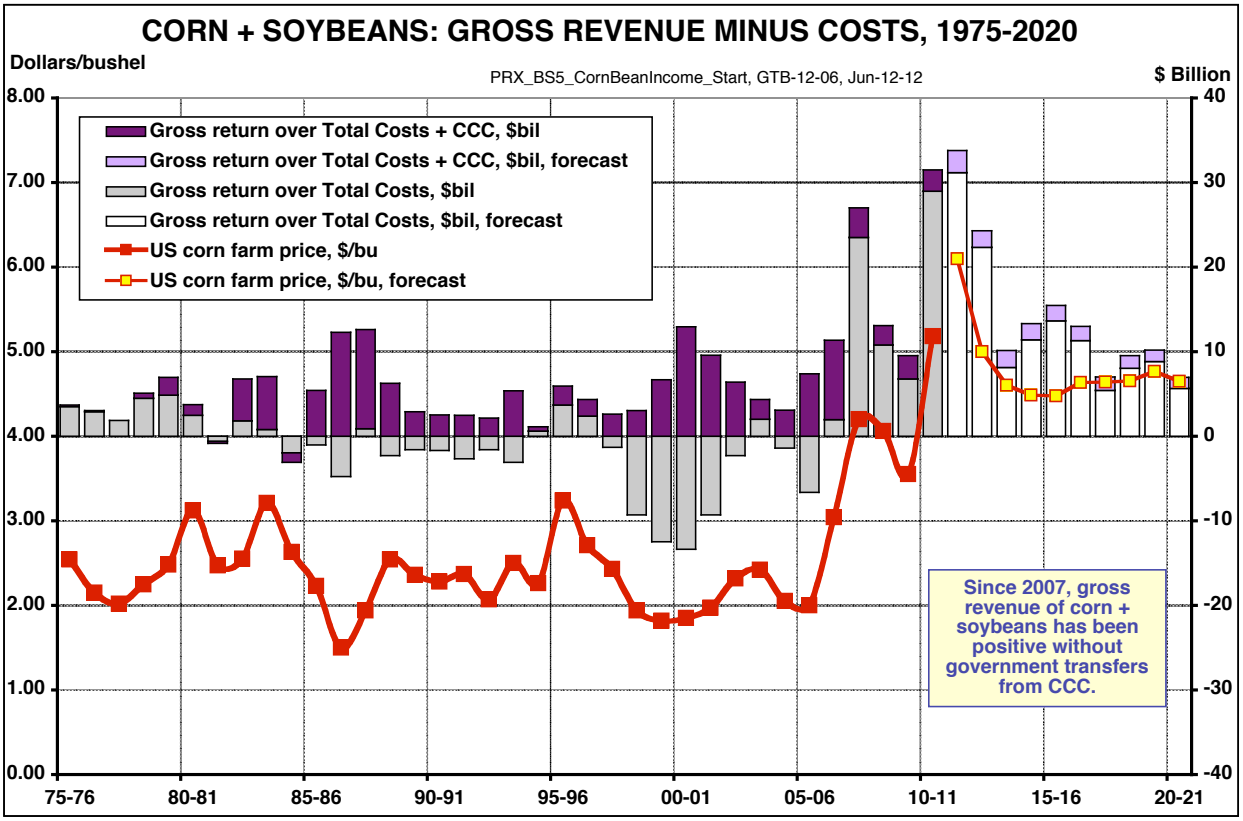


China and US Biofuel Policy Combine to Drive Record Farm Income

The two Political Demand Episodes have pushed combined soybean and corn area planted to a new record, absorbing the former paid land diversions. Whether the income boom will last depends on our assessment of the two simultaneous political episodes causing it.

Unlike most of the American economy, the country's corn-soybean sector is fully employed, expanding, and profitable. The chart below shows the area planted of corn and soybeans, which together has grown to a record 170 million acres. Corn area has been driven by the federal mandate for fuel ethanol—the acreage of which complete absorbs the former "surplus area" that required paid set-asides as recently as the 1990s. Soybean area has been simultaneously driven by China's import needs for protein meal and food oil—a demand that needs over 50 million acres in the US, Brazil, and Argentina.





The chart above plots the extent of prosperity in the US corn-soybean sector—from three previous decades of financial loss (made good only by government transfers via the CCC) to the present five years of record net profits.

Farmland Price Bubble? The price of good corn-soybean land has risen 20% or more for two straight years. Purchases, however, have been mainly by cash, not debt—and the increasing land costs are reflected in the net earnings above. The projection, of course, is no better than the joint assumption being made in our current Blue Sky Model—that both the China import episode and the US corn ethanol episode will continue, and not come to sudden collapse.

The purpose of this essay is to bring into our intellectual view the whole family of past political episodes, and to make a call. Our own conclusion is that it's a better than 50-50 chance that China's imports will not go bust, and that US ethanol policy (as complex and contradictory as it certainly is) will muddle through.

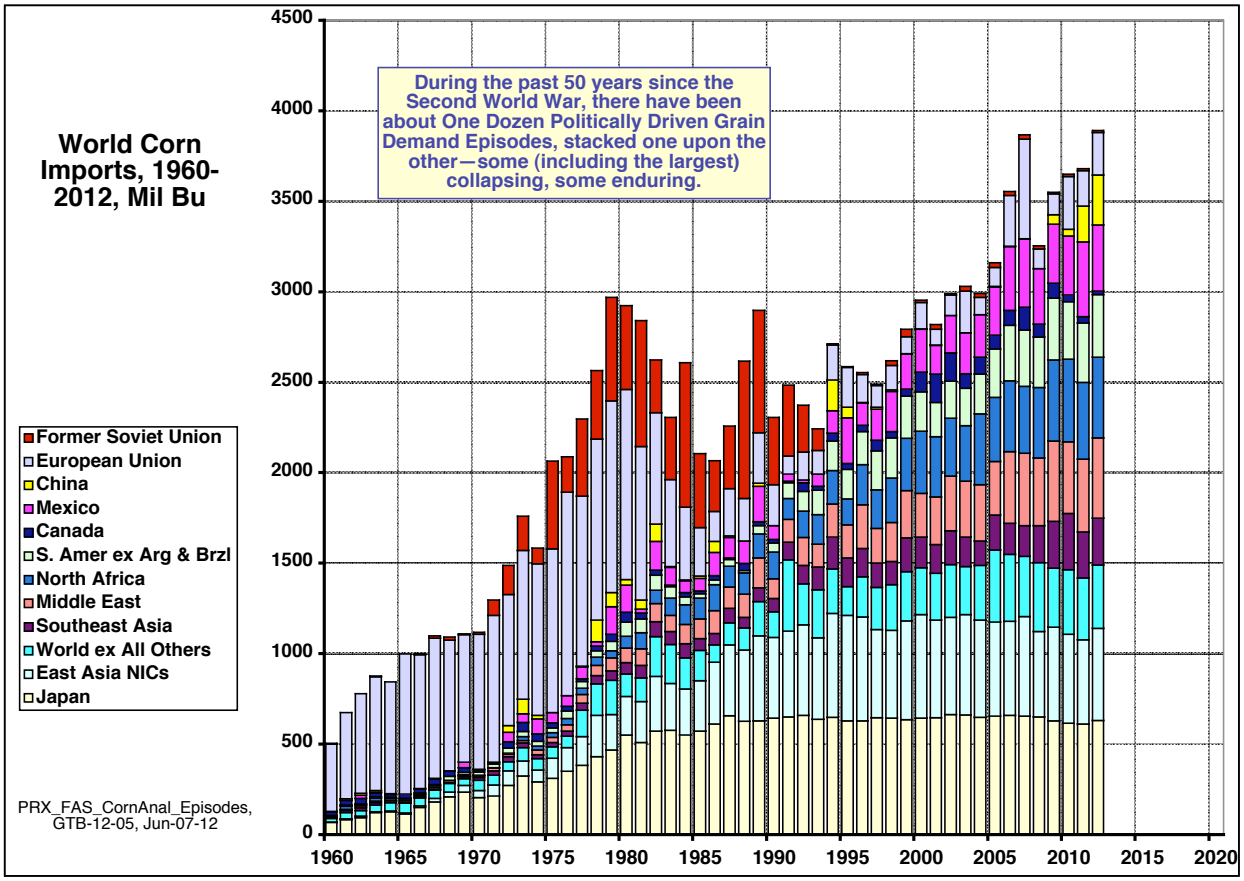
What Starts Political Demand Episodes?

Politicians respond to "clear and present dangers" with schemes designed to help their economies cope and to stay in power. Dozens of policy mechanisms have been employed. There is no one guaranteed approach.

As shown below (and in a different format previously on page 3), there are about one dozen political demand episodes making up world grain demand—apart from the underlying domestic grain demand in every country of the world, each of which moves along slowly with income growth. Our thesis here is that it is the large, rapid growing political episodes which mainly drive world grain prices.

The main political features of these episodes are shown in the table on page 13. What usually initiates an episode is a "clear and present danger" to the country involved. The politicians are neither professional economists or strategic planners—they are leaders seeking to find ways and means of preserving their power and making their economies work under the perceived conditions which threaten them. They select political schemes they think will work and on which they can achieve enforceable consensus. The mechanisms employed are diverse. Each episode has unique initial conditions, longevity, and final outcome.

The three main episodes affecting world grain demand today—China, US corn ethanol, and Brazil sugarcane—are shown at the bottom of the table on page 13, color coded green for bullish to the US corn-soybean sector and red for bearish.



Major Politically Driven Grain Demand Episodes, 1846-2012+, and Impact on US Corn-Soybean Income: Grey = Ended; Green = Bullish; Red = Bearish

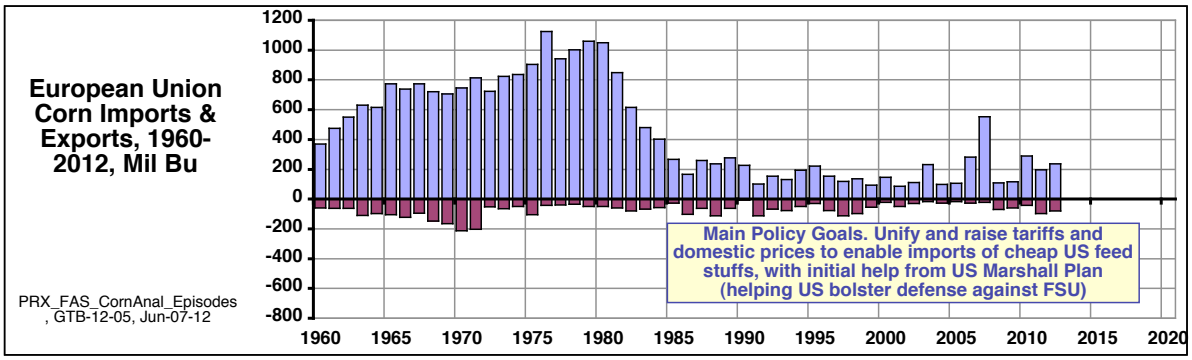
Episode	Goal	Main Policy Features
British Grain Imports, 1846-1914	Alternative Food & Feedstuffs	Repeal grain tariffs to enable cheaper imported grain to reduce domestic labor costs, helping foreign export of surplus manufacturing capacity, partly by controlling regional market access.
EU Grain Imports, 1960-1985	Supplement Food & Feedstuffs	Unify and raise tariffs and domestic prices to enable imports of cheap US feed stuffs, with initial help from US Marshall Plan (helping US bolster defense against FSU)
Japan Grain Imports, 1960-2012+	Supplement Food & Feedstuffs	Keep domestic prices high, enabling imports of cheap US feed stuffs, with initial help from US Marshall Plan (helping US bolster defense of Asia)
FSU Grain Imports, 1973-1990	Supplement Food & Feedstuffs	Use windfall profits from rising crude oil price after Arab Embargo to purchase cheap feed stuffs from Americas, to increase meat supply, contain discontent.
China Corn Exports, 1990-2007	Export Earnings	With change to controlled market economy, rural grain stocks became surplus, easier to export until growth of urban meat demand caught up.
Asian NICs Grain Imports, 1970-2012+	Consumer Food & Meat Demand	With rapid income growth (sometimes assisted by US defense interests), but small agricultural capacity, imports of food & feedstuffs fill consumer demand.
N. Afr, M. East, & SE Asia, 1970-2012+	Consumer Food & Meat Demand	With rapid income growth (sometimes assisted by US defense interests), but small agricultural capacity, imports of food & feedstuffs fill consumer demand.
China Soybean Imports, 1995-2012+	Alternative Food & Feedstuffs	Import cheaper imported grain to increase meat and food oil production for new urban consumer base, helping foreign export of surplus labor/manufacturing capacity, partly by controlling currency.
US Corn Use for Ethanol, 2005-2012+	Alternative Fuels	Mandate domestic blending of corn ethanol to reduce petroleum imports, using surplus feed grain acreage, mainly by compliance trading system to pass costs of Alternative Fuel directly to public at retail pump.
Brazil Sugar Use for Ethanol, 1975-2012+	Alternative Fuels	Mandate domestic blending of sugar ethanol to reduce petroleum imports, using surplus cane acreage, mainly by enabling flex fuel auto fleet so that petroleum and ethanol could compete at retail pump.

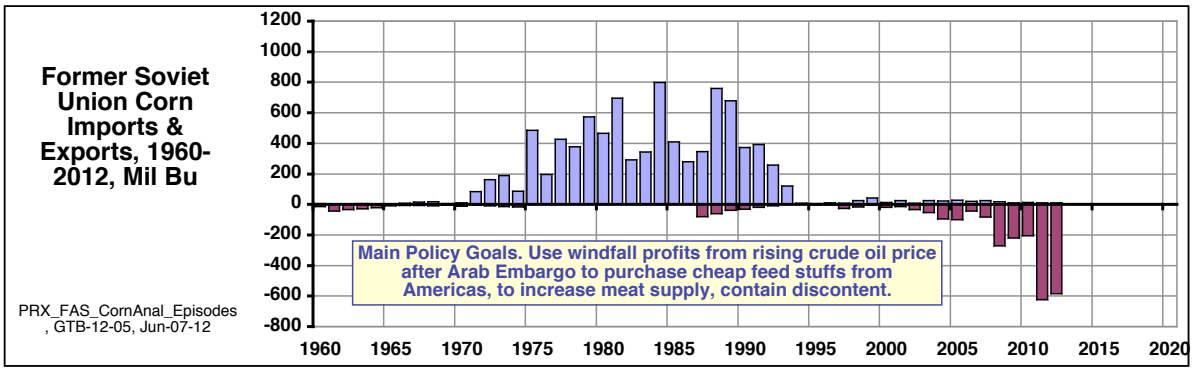
How Long Do Political Episodes Last?

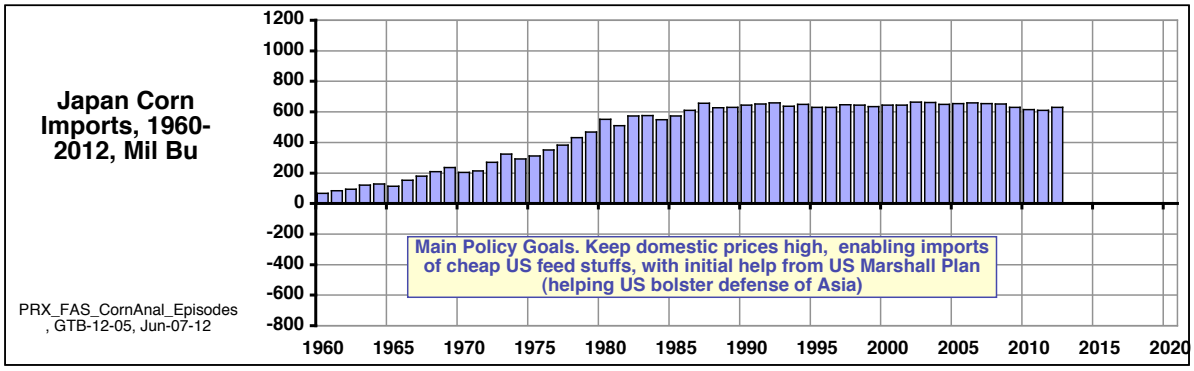
A careful look at the entire catalog of grain demand history arrives at an obvious conclusion: There is no way to say how long *any* politically driven grain demand episode will last! Episodes usually have beginnings, middles, and ends—but some can extend in a "flat" condition well beyond their peak.

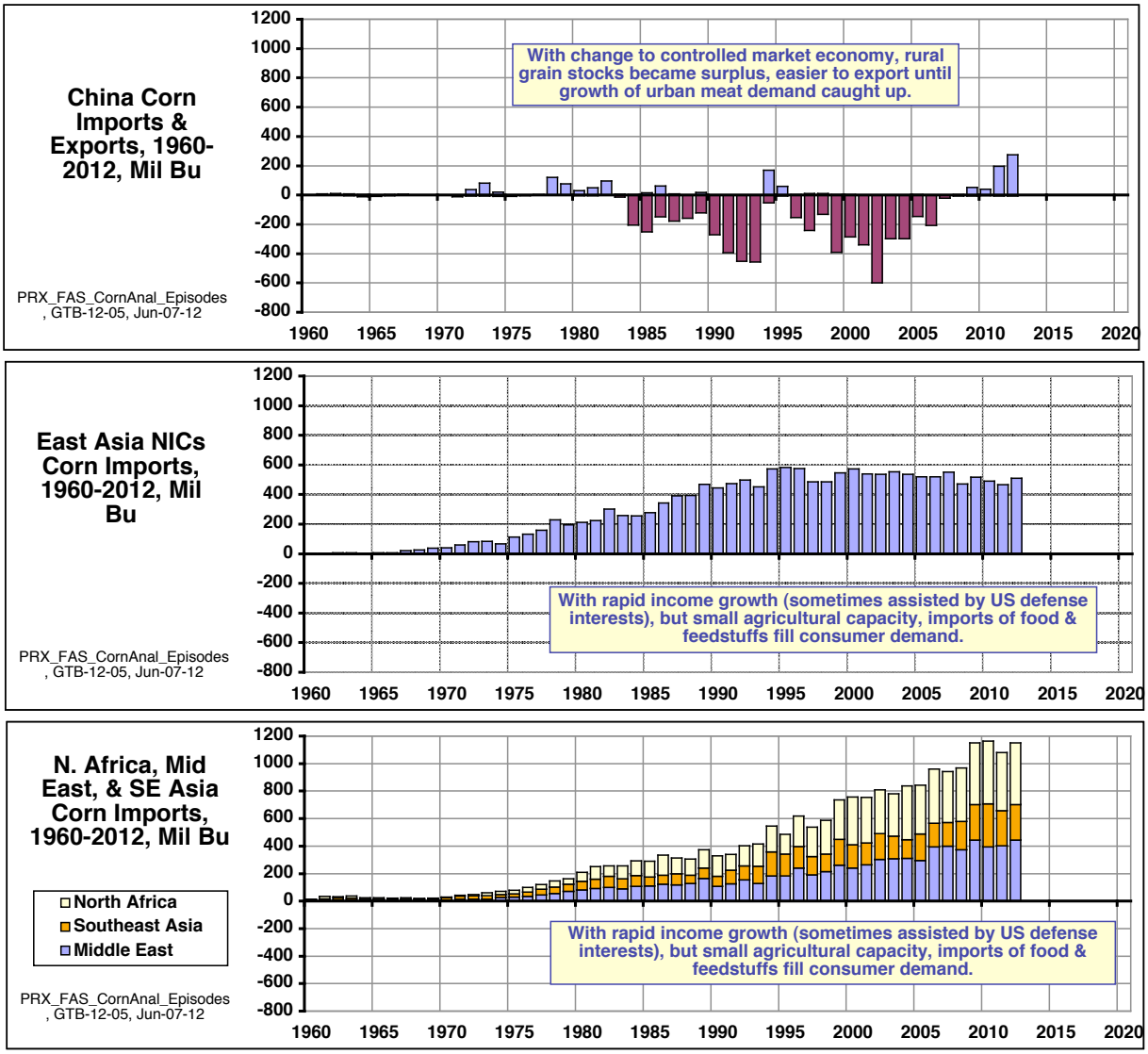
The longest running political episode on record was the British grain import episode at 4% per year for 68 years—beginning with "free trade" in 1846, and ending with the First World War in 1914.

Of the post Second World War episodes, the EU grain import episode lasted over 20 years; the Soviet grain import episode lasted a little less than 20 years; and the China corn *export* episode also lasted less than 20 years. The Japan grain import episode began and peaked after 30 years, and has remained flat another 20 years—as the country's economic growth has continued while the Island's agricultural resources are obviously small. The same pattern is true for the East Asia NICs (South Korea, Hong Kong, Singapore, and Taiwan).









The growth patterns of North Africa, the Mid East, and Southeast Asia are less "politically driven" and more "economic growth driven," although one can find plenty of politics in Western assistance to all of these regions (especially "security" assistance to the Persian Gulf). Nonetheless, the plots in the bottom chart above are much more along the lines of what economists consider fundamentals than are displayed by all the other in our family of "Political episodes."

Second Winds. Perhaps it can be said that no episode can last more than a generation (or some long period of time) without a "second wind." This was true of the British grain import episode, in the application of steam power to ocean cargo vessels in the 1870s, the laying of trans-oceanic cables for improved market communication (and thus better risk management, lower prices), and the full opening of the US prairie lands (the cornbelt) after the Civil War—using British railroad technology to move grain to the US east coast and onto steam vessels to Europe.

Future of US Corn Ethanol Demand

Congress will not likely re-open or modify the RFS. Instead, the odds favor that EPA will "muddle through" the problems and (probably before 2015) provide a reasonable new RFS3 for future required renewable fuel volumes.

Five years ago, when the Energy Act of 2007 was being debated, the price of crude oil had risen to $140 per barrel and represented a "clear and present danger"—driving politicians to agree on a new Alternative Energy program of vast scale.

But today, that danger seems in the distant past. The price of crude oil has dropped to $85 per barrel and may continue down even more. OPEC has a glut of oil, and new supplies of domestic oil and natural gas abound. The ideological question of humanity's need (immediately) to adopt alternative fuels in place of fossil fuels is much more difficult politically than the $140 price amidst hot war in the middle east.

Another dramatic change from 2007 is the federal budget, which after the financial crisis of 2008-09 is now in perilous deficit. Happily, the RFS of the Energy Act of 2007 does *not* require subsidies from the Treasury. The RFS is a straightforward mandate for refiners to blend greater and greater volumes of certain alternative fuels, the cost of which is passed on directly to the Public at the retail gas pump. From the Washington point of view, what could be better? In other words, the RFS is not costing the government anything, and without it there would be no Alternative Energy program at all!

A further change from 2007, however, is that the degree of "organized combat" among stakeholders affected by the Act (and/or by any other of our Laws) has sharply intensified. Every side of every law and regulation is noisily argued, and political agreement seems virtually impossible. In the case of the RFS, stakeholders who see themselves harmed by the higher grain prices (such as domestic livestock feeders) argue for repeal of the entire rule. So too do defenders of free enterprise and advocates of limited government. And add to this some environmentalists, who say that biofuels do not strongly contribute to reducing GHG emissions, and/or that today's corn-soybean agriculture is not sustainable.

But these political positions lack a "clear and present danger." Unless, of course, such a condition arises from poor crop weather. If the record warm winter and Spring continues and builds into a summer heat wave in the cornbelt, and we harvest a third consecutive mediocre crop in 2012, then we might see extremely high grain prices. The political cry could then become, "Look, we told you we do not have food to burn. We cannot risk mandating our grain supply for fuel in the face of today's human-caused Global Warming!"

What Congress might do in this situation is impossible to say, but the fact is that corn prices in the $7 per bushel range a few years ago did not produce legislative action. At the moment, it's hard to feature how our Congress could agree on anything!

So a more appropriate question is, "What would EPA do—in the event of high grain prices, or likewise in the event of no change grain prices? After all, is not that Agency in command of executing the mandate?"

The difficulties facing EPA in executing the RFS are well know. These problems include (1) The E10/E15 Blend Wall; (2) The lack of Cellulosic Biofuel production; and (3) The coming contradictions between the RFS rules and the new CAFÉ rules.

Simplified Forecast. We think the odds favor that EPA will "muddle through" these troublesome issues (and that Congress will not re-open the Law). Dealing with the E10/E15 Blend Wall requires

mainly a rise in the price of RINs, probably sometime in 2013, when the current surplus of D6 Conventional RINs diminishes. Dealing with the lack of Cellulosic Biofuel has so far led EPA to rule in favor of "Other Advanced Biofuels" to fill the gap, but EPA has full authority to "waiver Cellulosics *without* creating a gap" (that is, without incentivizing large imports of Brazil sugar ethanol that could displace corn ethanol). EPA is competent to recognize conditions in the world sugar market that support this route. Furthermore the text of the 2007 Energy Act compels EPA—in the wake of significant waivers of Cellulosics—to modify the Renewable Volume Obligations for 2016-2022. Upon review with DOE and USDA, EPA an be expected to respond, we believe, with a *reasonable* new RFS3 rule for the future.

The new CAFÉ rules may incentivize electric vehicles and dis-incentivize flex fuel vehicles, at the further loss of liquid fuel markets. But such an outcome is many years away; in the meantime, automakers are arguing in favor of joint designs of high compression engines and high octane liquid fuels that could lead to ultra-low emissions, and the possibility of wide-spread mid-level blends in the range of ~E30! No one knows how these additional rules will play out.

Our idea of just how the EPA's "muddling through" will look is shown below.

ANNUAL APPLICABLE VOLUMES OF THE RFS

PRX_RFS2_DisplayREV_Start.xls, GTB-12-06, Jun-12-12

	1	2	3	4	5	6		PRX Blue Sky #27 Assumptions (with new RFS3)							
Cal Year	Total Renewable Fuel	of which Advanced Biofuel: Total	of which: Cellulosic Biofuel*	of which: Biomass-Based Diesel	of which: (leaving) Other Advanced Biofuel	(leaving) Conventional Biofuel		Total Renwbl Fuel	Total Advanced	Cellulosic Ethanol	Biomass Based Biodiesel	Other Advncd Ethanol Imports	Corn Ethanol domstc use	Corn Ethanol exports	All Ethanol Inclsn rate
	at least -20% GHG	at least -50% GHG	at least -60% GHG	at least -50% GHG	at least -50% GHG	at most -20% GHG		PRX	PRX	PRX	PRX	PRX	PRX	PRX	PRX
	at least bil gals	at least bil gals	at least bil gals	at least bil gals	bil gals	bil gals		bil gals	bil gals	bil gals	bil gals	bil gals	bil gals	bil gals	pct
2009	11.100	0.600	n/a	0.500	n/a	10.500									
2010	12.950	0.950	0.100	0.650	0.200	12.000		13.167	0.187	0.000	0.153	0.034	12.980	0.827	10.0%
2011	13.950	1.350	0.250	0.800	0.300	12.600		13.809	1.023	0.006	0.767	0.250	12.786	1.250	10.0%
2012	15.200	2.000	0.500	1.000	0.500	13.200		14.230	1.230	0.010	0.920	0.300	13.000	1.200	10.2%
2013	16.550	2.750	1.000	1.000**	0.750	13.800		15.046	1.646	0.016	1.280	0.350	13.400	1.100	10.5%
2014	18.150	3.750	1.750	1.000	1.000	14.400		15.815	1.865	0.075	1.390	0.400	13.950	1.090	11.1%
2015	20.500	5.500	3.000	1.000	1.500	15.000		16.230	2.130	0.150	1.530	0.450	14.100	1.080	11.3%
2016	22.250	7.250	4.250	1.000	2.000	15.000		16.410	2.360	0.300	1.560	0.500	14.050	1.070	11.4%
2017	24.000	9.000	5.500	1.000	2.500	15.000		16.450	2.450	0.400	1.600	0.450	14.000	1.060	11.4%
2018	26.000	11.000	7.000	1.000	3.000	15.000		16.540	2.590	0.500	1.640	0.450	13.950	1.050	11.3%
2019	28.000	13.000	8.500	1.000	3.500	15.000		16.630	2.730	0.600	1.680	0.450	13.900	1.040	11.3%
2020	30.000	15.000	10.500	1.000	3.500	15.000		16.720	2.870	0.700	1.720	0.450	13.850	1.030	11.3%
2021	33.000	18.000	13.500	1.000	3.500	15.000									
2022	36.000	21.000	16.000	1.000	4.000	15.000									

**Biodiesel to be minimum of 1 bil gals after 2012.

*Cellulosic Biodiesel subject to annual waiver.

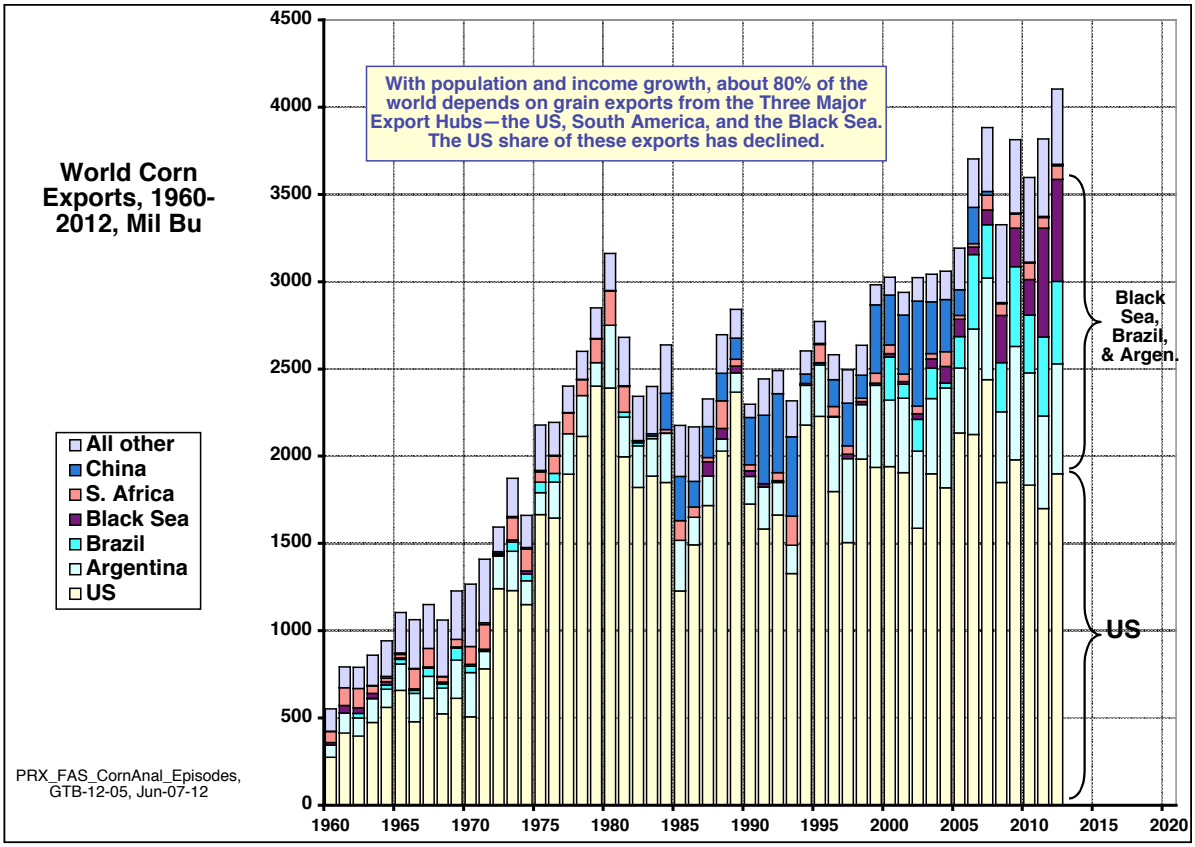
"Nested" nature of volume requirements means that Conventional (corn starch) ethanol has a MAXIMUM of 15 bil gals — subject to the E10/E15 inclusion rate restriction.

Retail pumps offer E15 and/or E85, via RIN price increases.
No assumptions on adoption of other forms than ethanol, such as "drop-ins."
For 2020, EIA shows Total Renewable at 19.929, with E85 at 2.759,
and non-ethanol, non-biodiesel at 1.073.

Future of US Competition with Other Grain Export Hubs

The US share of world grain trade will likely gain slowly on the two other world Export Hubs. Substantial contingency, of course, surrounds all of our forecasts in this report!

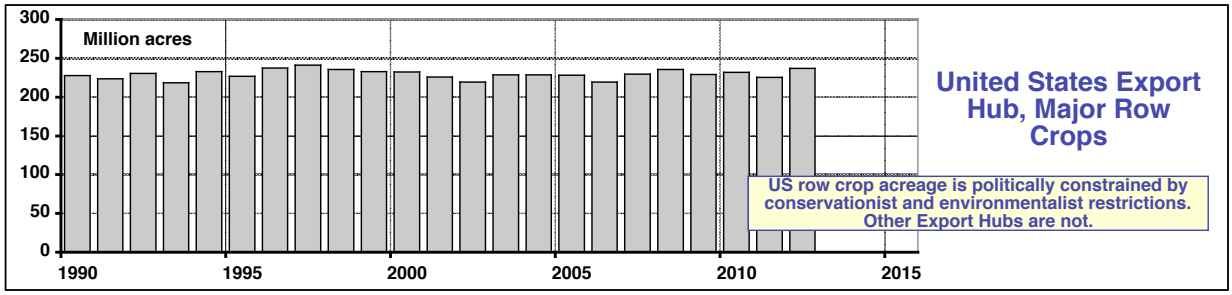
The world market share of US corn (and other grain) exports vs. the other two Major Export Hubs has declined from the levels of the 1970s and 80s, but the volume of US exports has held constant. The advantages of the US—in terms of consistent high quality product, year-around availability, and commercial finance and risk management options—will likely push the US share slowly back up in the coming years. Both South America and the Black Sea have enormous infrastructure problems, and the Black Sea has an extreme northerly climate more fickle than its competitors.

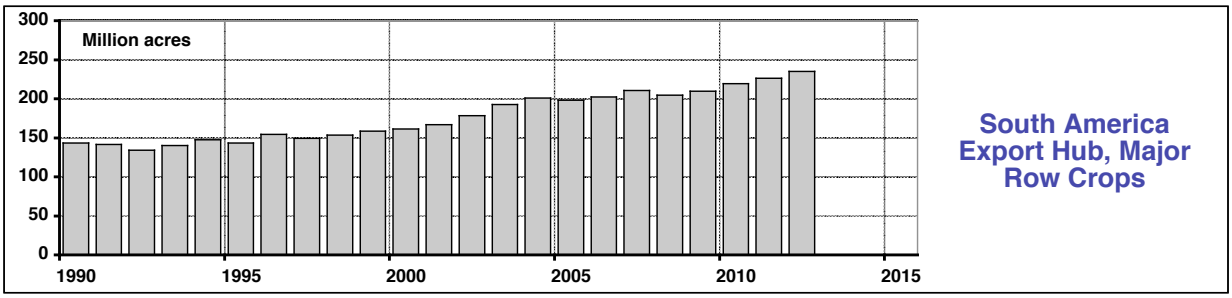


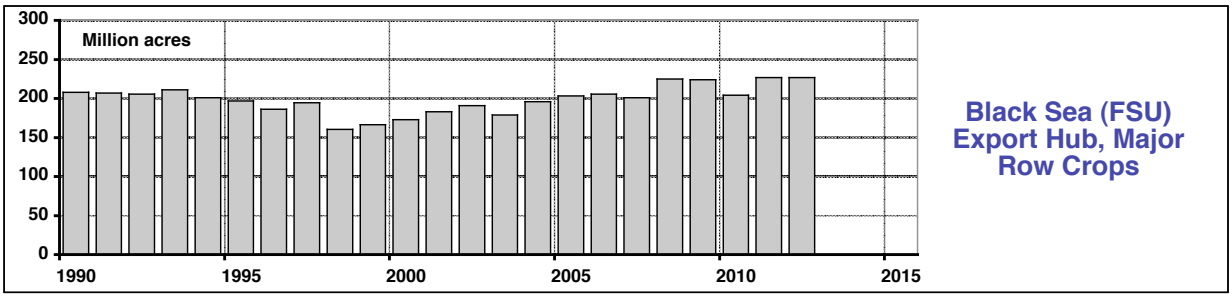
PRX Forecast and Contingency Summary—See Table on Page 19.

THREE POLITICALLY CONDITIONED SUPPLY RESPONSES

PRX_FAS_OilseedAnal, GTB-12-05, Jun-06-12







Current PRX Blue Sky 10-yr Forecast and Contingencies

Factor	PRX Current Idea	Contingency
Weather volatility	Same as past 16 years	????
China import demand episode	50-50+ to continue	World finance, economy, exchange rates ???
US competitiveness vs. other Export Hubs	Gradual, small improvement	Greater foreign investment in infrastructures
Crude oil price	Range of $80-95/bbl	????
Ethanol Blend Wall	50-50+ with high RINs we'll reach 15 bil gals	RINs = untested mechanism
Congress revises RFS	Unlikely	But if Congress re-opens, trouble for corn
Ethanol imports and exports	50-50+ no huge sugar imports or 2-way vessels	For 2010-2012, EPA followed its own reason
Cellulosic waiver & "Other Advanced" biofuels	EPA must revise RVOs for 2016-2022, will be logical	EPA (w/DOE & USDA) may not be reasonable
RFS vs. CAFE	??? The two laws are not coordinated	If CAFÉ favors Electric vs FFV, negative corn
		But if CAFÉ = High Octane Engines, then ~E30?!

Update. USDA's June-30 Acreage and Stocks Report

The table below is being revised with new yields for 2012-13 (as of 7-3-12)

US MAJOR FIELD CROPS AREA PLANTED, 93-94 to 12-13 CROP YEARS

PRX_A1_Overview_Start_New, GTB-12-06, Jun-29-12

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Crop	All	Feedgrains					Oilseeds				Corn +		Total	All Hay	Principal		Subtotal	Total	Other
year	Wheat	Corn	Sorghum	Barley	Oats	Total	Soy	Sunseed	Canola	Total	Soy	Cotton	Major	& Other	Crops*	CRP	w/CRP	EPA*	(19-18)
	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac	mil ac
93-94	72.2	73.2	9.9	7.8	7.9	98.8	60.1	2.8	0.2	63.0	133.3	13.4	247.5	72.8	320.3	36.4	356.7		cropland
94-95	70.3	78.9	9.8	7.2	6.6	102.5	61.6	3.6	0.4	65.5	140.5	13.7	252.1	71.6	323.7	36.4	360.1		pasture
95-96	69.0	71.5	9.4	6.7	6.2	93.8	62.5	3.5	0.4	66.4	134.0	16.9	246.2	72.1	318.3	36.4	354.7		& fallow
96-97	75.1	79.2	13.1	7.1	4.6	104.1	64.2	2.5	0.4	67.1	143.4	14.7	260.9	72.8	333.7	36.4	370.1		
97-98	70.4	79.5	10.1	6.7	5.1	101.4	70.0	2.9	0.7	73.6	149.5	13.9	259.2	72.8	332.1	28.8	360.9		
98-99	65.8	80.2	9.6	6.3	4.9	101.0	72.0	3.6	1.1	76.7	152.2	13.4	256.9	73.0	330.0	31.0	360.9		
99-00	62.7	77.4	9.3	5.2	4.7	96.5	73.7	3.6	1.1	78.4	151.1	14.9	252.5	76.8	329.3	29.9	359.1		
00-01	62.5	79.6	9.2	5.9	4.5	99.1	74.3	2.8	1.6	78.7	153.8	15.5	255.8	72.8	328.7	31.4	360.1		
01-02	59.4	75.7	10.3	5.0	4.4	95.3	74.1	2.6	1.5	78.2	149.8	15.8	248.7	75.9	324.6	33.6	358.2		
02-03	60.3	78.9	9.6	5.0	5.0	98.5	74.0	2.6	1.5	78.0	152.9	14.0	250.8	76.5	327.3	34.0	361.2		
03-04	62.1	78.6	9.4	5.4	4.6	98.0	73.4	2.3	1.1	76.8	152.0	13.5	250.4	75.3	325.7	34.1	359.8		
04-05	59.6	80.9	7.5	4.5	4.1	97.0	75.2	1.9	0.9	77.9	156.1	13.7	248.3	74.0	322.3	34.7	357.0		
05-06	57.2	81.8	6.5	3.9	4.2	96.3	72.0	2.7	1.2	75.9	153.8	14.2	243.6	74.0	317.6	34.9	352.5	391.6	39.1
06-07	57.3	78.3	6.5	3.5	4.2	92.5	75.5	2.2	0.9	78.6	153.8	15.3	243.7	71.9	315.6	36.0	351.6	393.1	41.5
07-08	60.5	93.5	7.7	4.0	3.8	109.1	64.7	2.1	1.2	68.0	158.3	10.8	248.3	72.0	320.4	36.8	357.2	401.6	44.4
08-09	63.2	86.0	8.3	4.2	3.2	101.7	75.7	2.5	1.0	79.2	161.7	9.5	253.6	71.4	325.0	33.7	358.7	408.3	49.6
09-10	59.2	86.4	6.6	3.6	3.4	100.0	77.5	2.0	0.8	80.3	163.8	9.1	248.6	70.6	319.3	31.3	350.6	401.2	50.7
10-11	53.6	88.2	5.4	2.9	3.1	99.6	77.4	2.0	1.4	80.8	165.6	11.0	244.9	71.8	316.7	31.0	347.7	398.2	50.5
11-12	54.4	91.9	5.5	2.6	2.5	102.5	75.0	1.5	1.0	77.5	166.9	14.7	249.1	70.0	319.1	29.7	348.8	392.0	43.2
12-13	56.0	96.4	6.2	3.7	2.9	109.2	76.1	1.8	1.6	79.5	172.5	12.6	257.3	71.0	325.8	29.5	355.3	398.5	43.2
Change from previous year, based on PRX forecast																			
	1.6	4.5	0.7	1.1	0.4	6.7	1.1	0.3	0.6	2.0	5.6	-2.1	8.2	1.0	6.7	-0.2	6.5	6.5	0.0

*Principal Crops reported by NASS in June. EPA compliance uses USDA-FSA in November, not to exceed 402. Red estimates by PRX, today's date.

With corn and other feedgrains up 6.7 mil ac, and soybeans and other oilseeds up 2.0 mil ac, the subtotal of major crops (per NASS, col 14) is up 8.2 mil ac. The EPA Aggregate Compliance for RFS2 is not based on NASS, but on USDA-FSA—which PRX estimates for 2012 at below the limit of 402 mil ac,

	Wheat	Corn	Soy
AP	56.0	96.4	76.1
AH	48.8	88.4	75.0
Y	45.3	153.5	42.2
P	2211	13565	3182
C/O	739	1009	206