USDA Projections of Bioenergy-Related
Corn and Soyoil Use for 2010-2019

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The United States Department of Agriculture released long term projections for grain and energy markets at its 2010 Agricultural Outlook Forum at Arlington, Virginia on February 18-19, 2010. Specifically, the USDA's Agricultural Projections for the 2010 through 2019 period included estimates of world and U.S. energy prices, ethanol and biodiesel production, and the quantity of U.S. feedgrains and oilseeds to be used in bioenergy production processes, The USDA's long term projections were prepared by the Interagency Agricultural Projections Committee.

The USDA's long term projections are based on assumptions about macroeconomic conditions, policy, weather, and international developments, with no accounting for domestic or external shocks to global agricultural markets. The USDA assumes that current laws and agricultural policies will continue into the future through-out the 2010-2019 projection period. Should government policies or market conditions change markedly from current trends, then these projections would be expected to be less accurae. These USDA projections were prepared during October through December 2009, based on a composite of model forecast results and judgment-based analyses of the USDA Intragency Agricultural Projections Committee. As stated in the USDA's report…

> "Prospects for the agricultural sector in the near term reflect continuing U.S. and global adjustments to the recession of 2008-09 and the subsequent economic recovery. A resumption of steady global economic growth will support increases in consumption, trade, and prices in the longer run. Additionally, longrun developments for global agriculture reflect continued demand for biofuels, particularly in the United States and the European Union. The value of U.S. agricultural trade and cash receipts to farmers grow through the projection period."

The USDA's stated purpose for development of these long-term agricultural projections is to provide at least a starting point for discussion of alternative supply-demand balance scenarios and price outcomes U.S. and world grain markets in the 2010/11 marketing year. It is stated that these projections are conditional in nature, i.e., they are dependent on the underlying assumptions about current U.S. farm and energy policy, macroeconomic conditions, agricultural productivity, and normal grain and oilseed production conditions during 2010. Assumptions about grain and oilseed market supply-demand conditions are based on the November 2009 USDA WASDE report.

Bioenergy Related Assumptions for 2010-2019

Provisions of current U.S. law are assumed to remain in effect through the 2010/11 projection period, including the Food, Conservation, and Energy Act of 2008 (the 2008 Farm Act), the Energy Independence and Security Act of 2007, and the Energy Improvement and Extension Act of 2008. The USDA indicates that…

> "Long run developments for global agriculture reflect continued demand for biofuels, particularly in the United States and the European Union (EU). Although increases in corn-based ethanol production in the United States are projected to slow, ethanol demand remains

high and affects production, use, and prices of farm commodities throughout the sector. Expansion of biodiesel use in the EU raises demand for vegetable oils in global markets."

Key Assumptions and Implications in this Long Term Analysis

Major assumptions in analysis regarding a) U.S. and World economic growth, b) the value of the U.S. dollar, c) oil prices, d) domestic and international biofuel policy and trends, and e) bioenergy impacts on U.S. grain prices are explained below.

Economic Growth: The USDA projects that U.S. and world economic growth will recover the global financial crisis and economic recession of 2008/09, transitioning back to steady economic growth – with the World and U.S. economies growing at average rates of 3.3% and 2.5-2.7% growth, respectively, over the 2010-2019 period.

U.S. Dollar Value: The USDA projects that the U.S. dollar will depreciate in relative value over the next decade in comparison to other major world currencies. Depreciation of the U.S. dollar in the longer term relative to the euro and Chinese yen is likely to result in some rebalancing of international currency portfolios, and a reduction in the relative importance of the dollar as a reserve currency.

However, the USDA also identifies the problems that would likely plague the U.S. Dollar Risks if economic conditions don't recover as projected.

> "If the U.S. economy were to undergo a longer and deeper recession due to some (combination of economic factors and forces), one possible outcome could be the U.S. dollar (would) no longer be the primary reserve currency in the world. Such an outcome would imply a substantial depreciation in the U.S. dollar, with potential for a decline in U.S. living standards. For agriculture, implications would depend on how weaker economic growth and demand gains in the developing economies would trade off against a sharply lower dollar in influencing agricultural trade."

Oil Prices: World and U.S. crude oil prices are assumed to increase over the next decade as a recovery occurs in global economic activity (Figure 1). From 2010 through 2019, crude oil prices are expected to rise faster than the general inflation rate, with U.S. purchase prices for foreign crude oil imports projected to be around $100 per barrel by 2019. USDA states the following:

> "From 2010 through 2019, crude oil prices are expected to rise somewhat faster than the general inflation rate (i.e., greater than 2.8% annually). By the end of the projection period, the refiner acquisition cost for crude oil imports is projected to be around $100 per barrel."

Figure 1.

U.S. crude oil prices

Dollars per barrel
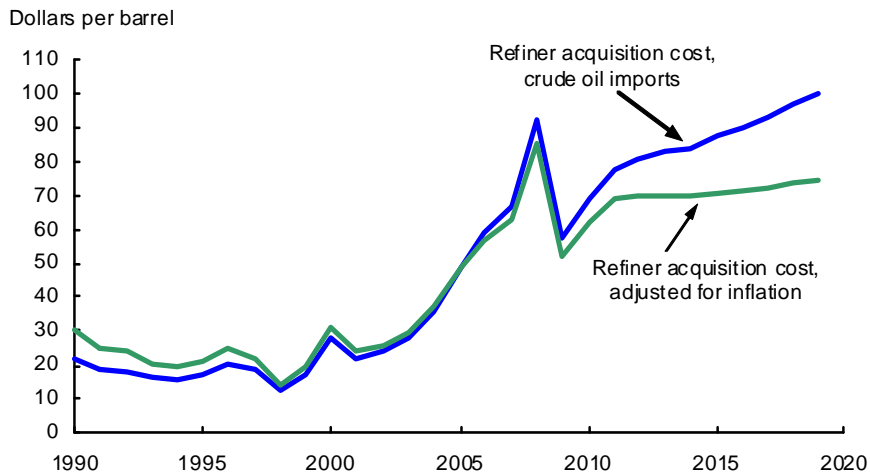
Source: USDA Longterm Agricultural Outlook, 2010-2019

U.S. Biofuels: The USDA makes the following assumptions and statements in regard to the U.S. biofuel policy over the 2010-2019 period.

"The projections assume that the 45-cents-per-gallon tax credit available to blenders of ethanol, a $1.00-per-gallon tax credit for biodiesel, and the 54-cents-per-gallon tariff on imported ethanol used as fuel are in effect through the projection period."

"Expansion in the U.S. ethanol industry is projected to continue, although the pace is assumed to slow from the rapid gains of the past several years."

"Corn is expected to remain the primary feedstock for U.S. ethanol production during the projection period. Slower annual growth for corn-based ethanol is projected, however, reflecting only moderate growth in overall gasoline consumption in the United States, limited potential for further market penetration of ethanol into the E10 (10-percent ethanol blend) market, and the small size of the E85 (85-percent ethanol blend) market. Nonetheless, ethanol production accounts for 34-35% of corn use. Corn-based ethanol production exceeds 9% of annual gasoline consumption over the 2015-2019 period."

"Biodiesel production in the United States is assumed to increase to 1 billion gallons by 2012. Less than half this volume is assumed to be from domestic first-use vegetable oils, partly due to the equalization of the biodiesel tax credit across all feedstocks."

International Biofuels: The USDA projects that the greatest increases in foreign biofuel production over the 2010-2019 period will be in EU, Brazil, Argentina, and Canada. The USDA states that…

"The projections assume that the EU mandate that renewable fuels provide 10 percent of the energy used in the transportation sector by 2020 is only partially met. It is assumed that 60 percent of the mandate (6 percent of transportation fuel use) is achieved from annual agricultural crop feedstocks by 2019."

"The projections (also) assume that biodiesel accounts for 65 percent of this amount and that ethanol accounts for 35 percent, compared with 72 percent for biodiesel and 28 percent for ethanol estimated for 2009. Growth in biodiesel demand in the EU is a key factor underlying gains in global demand for vegetable oils and oilseeds, while increases in demand for ethanol add to demand for grains."

U.S. Grain Prices: The USDA projects that World and U.S. prices for corn, oilseeds and other crops will continue to remain at historically high levels over the 2010-2019 period. Grain and oilseed market prices will continue to be supported by strong domestic demand for U.S. corn to produce ethanol as well as heightened demand for oilseed products in the European Union to produce biodiesel. As a result of higher grain and oilseed prices, U.S. farm cash receipt and net farm income levels will remain at higher levels.

Bioenergy & Processing Demand for U.S. Corn During 2010-2019

The USDA projects that the growth and expansion in corn-based U.S. ethanol production will slow, but that the large expansion in recent years keeps this use of corn high. Ethanol-based use of corn in combination with an improved foundation for demand for crops over the next several years and through the remainder of the 2010-2019 period" both provide support longer run increases in global feedgrain consumption and trade, with prices for many crops remaining at historically high levels."

As stated earlier, "projections for field crops reflect provisions of the Food, Conservation, and Energy Act of 2008 (2008 Farm Act), which are assumed to continue through the projection period." In addition, "continuing high levels of domestic corn-based ethanol production and gains in exports keep corn demand high" Corn use for ethanol production is projected to increase from 3.677 to 5.025 billion bushels from the 2009/10 to the 2019/20 marketing years (Figure 2 and Table 1).

Figure 2.

U.S. corn: Feed and residual use, ethanol, and exports

Billion bushels
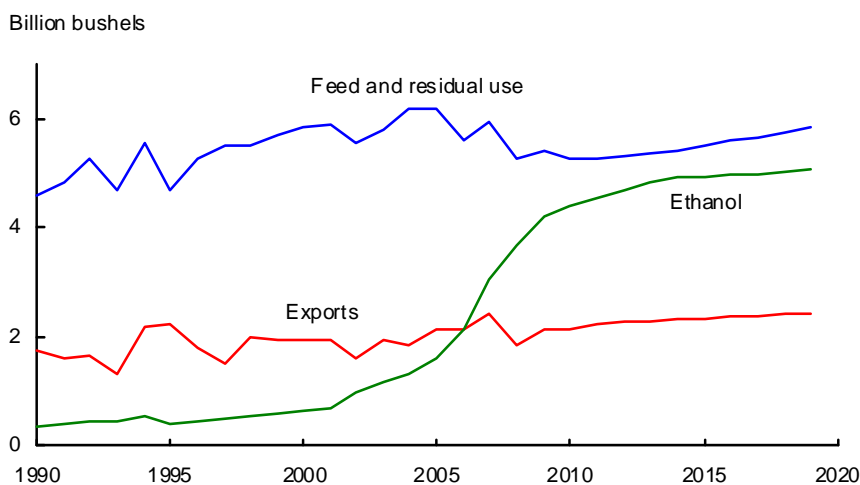
Source: USDA Longterm Agricultural Outlook, 2010-2019

Table 1. U.S. Corn Supply-Demand Projections for 2010-2019

Table 18. U.S. corn long-term projections

Item	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Area (million acres):												
Planted acres	86.0	86.4	88.0	90.0	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.0
Harvested acres	78.6	79.3	80.8	82.8	82.3	82.3	82.3	82.3	82.3	82.3	82.3	81.8
Yields (bushels per acre):												
Yield/harvested acre	153.9	162.9	160.4	162.4	164.4	166.4	168.4	170.4	172.4	174.4	176.4	178.4
Supply and use (million bushels):												
Beginning stocks	1,624	1,674	1,625	1,480	1,610	1,590	1,550	1,520	1,470	1,450	1,460	1,505
Production	12,101	12,921	12,960	13,445	13,530	13,695	13,860	14,025	14,190	14,355	14,520	14,595
Imports	14	10	10	15	15	15	15	15	15	15	15	15
Supply	13,739	14,605	14,600	14,940	15,155	15,300	15,425	15,560	15,675	15,820	15,995	16,115
Feed & residual	5,254	5,400	5,275	5,275	5,300	5,325	5,400	5,500	5,575	5,650	5,725	5,800
Food, seed, & industrial	4,953	5,480	5,695	5,855	6,015	6,150	6,205	6,265	6,300	6,335	6,365	6,400
Ethanol for fuel	3,677	4,200	4,400	4,550	4,700	4,825	4,875	4,925	4,950	4,975	5,000	5,025
Domestic use	10,207	10,880	10,970	11,130	11,315	11,475	11,605	11,765	11,875	11,985	12,090	12,200
Exports	1,858	2,100	2,150	2,200	2,250	2,275	2,300	2,325	2,350	2,375	2,400	2,425
Total use	12,065	12,980	13,120	13,330	13,565	13,750	13,905	14,090	14,225	14,360	14,490	14,625
Ending stocks	1,674	1,625	1,480	1,610	1,590	1,550	1,520	1,470	1,450	1,460	1,505	1,490
Stocks/use ratio, percent	13.9	12.5	11.3	12.1	11.7	11.3	10.9	10.4	10.2	10.2	10.4	10.2
Prices (dollars per bushel):												
Farm price	4.06	3.55	3.90	3.75	3.70	3.70	3.70	3.70	3.70	3.70	3.65	3.65
Loan rate	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
Variable costs of production (dollars):												
Per acre	296	255	254	266	272	278	283	289	295	301	307	313
Per bushel	1.92	1.57	1.58	1.64	1.66	1.67	1.68	1.70	1.71	1.73	1.74	1.75
Returns over variable costs (dollars per acre):												
Net returns	329	323	372	343	336	338	340	341	342	344	337	339

Note: Marketing year beginning September 1 for corn.

Source: USDA Longterm Agricultural Outlook, 2010-2019

Quoting USDA, "Domestic corn use grows throughout the projection period, largely reflecting increases in corn used in the production of ethanol. Global economic growth underlies increases in U.S. corn exports."

"Most ethanol production in the United States currently uses corn as the feedstock, with close to a third of total corn use expected to go to ethanol production in 2009/10. The tax credit available to blenders of ethanol and the 54-cents-per-gallon tariff on imported fuel ethanol are assumed to remain in effect through the end of the projection period."

"While expansion in the ethanol industry continues, smaller gains for corn-based ethanol are projected over the next 10 years. This result reflects only moderate growth in overall gasoline consumption in the United States, limited potential for further market penetration of ethanol into the E10 (10-percent ethanol blend) market (the blend wall), and the small size of the E85 (85% ethanol blend) market. (As stated earlier…) In the latter years of the projections, production of ethanol for fuel accounts for 34-35% of total corn use, and corn-based ethanol production exceeds 9% of annual gasoline consumption."

"Feed and residual use of corn bottoms out in the initial years due to reduced meat production and increased feeding of distillers grains, a co-product of dry mill ethanol production. Feed use rises through the rest of the projections as meat production picks up and growth in the availability of distillers grains slows with the reduced pace of corn-based ethanol expansion.

"Food and industrial use of corn (other than for ethanol production) is projected to rise over the next decade. Use of corn for high fructose corn syrup, glucose, and dextrose increases at less than half the rate of population gain, limited by consumer dietary concerns and other changes in tastes and preferences. Other food uses of corn are also projected to rise more slowly than the increase in population. Starch use of corn responds to industrial demand, rebounding as the U.S. economy recovers and then continuing to rise faster than population through the rest of the projections."
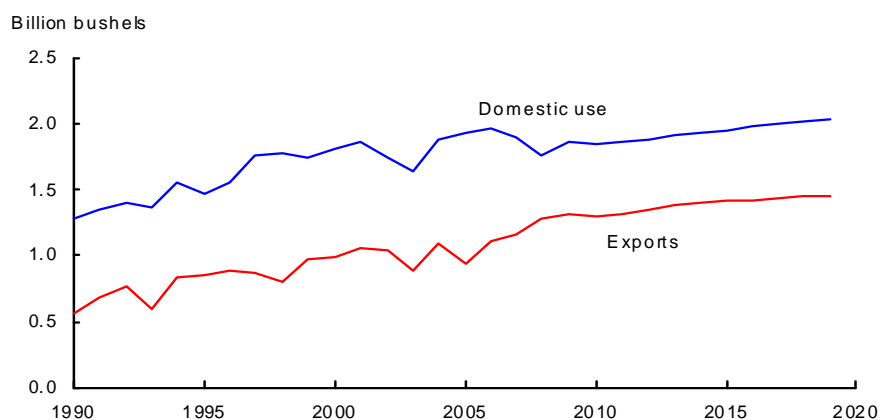
Bioenergy Demand for U.S. Soybean Oil During 2010-2019

The USDA projects that "soybean oil used for methyl ester for production of biodiesel grows to 2.9 billion pounds (during the 2010-2019 period, representing 13 to 15% of total use of soybean oil and supporting the production of close to 400 million gallons of biodiesel. Although some other first-use vegetable oils are used to produce biodiesel, most of the remaining biodiesel production needed to reach the 1-billion-gallon use mandate of the 2007 Energy Act uses animal fats or recycled vegetable oil as the feedstock. The $1-per-gallon blending tax credit for biodiesel is assumed to be in effect over the projection period." Soybean oil use for methyl ester (biodiesel) production is projected to increase from 1.904 to 2.90 billion bushels from the 2009/10 to the 2019/20 marketing years (See Figure 3 and Table 2)

The USDA also indicates that "strengthening competition from Argentina and Brazil, combined with increasing use for the growing U.S. livestock sector, lead to only small gains in U.S. soybean meal exports from 2010/11-2019/20, reducing the U.S. export share in global soybean meal trade. U.S. soybean oil exports similarly face increasing competition from South America. Argentina, in particular, is a competitive exporter of soybean oil because of its graduated export taxes that favor exports of soybean products over soybeans."

Figure 3.

U.S. soybeans: Domestic use and exports

Source: USDA Longterm Agricultural Outlook, 2010-2019

Item	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Soybeans												
Area (million acres):												
Planted	75.7	77.5	76.5	73.5	74.5	75.5	76.0	76.0	76.0	76.0	76.0	76.0
Harvested	74.7	76.6	75.5	72.5	73.5	74.5	75.0	75.0	75.0	75.0	75.0	75.0
Yield/harvested acre (bushels)	39.7	43.3	42.8	43.2	43.6	44.0	44.4	44.9	45.3	45.7	46.1	46.5
Supply (million bushels)												
Beginning stocks, September 1	205	138	270	354	299	271	260	258	260	261	262	262
Production	2,967	3,319	3,230	3,130	3,205	3,280	3,330	3,370	3,400	3,430	3,460	3,490
Imports	13	8	5	5	5	5	5	5	5	5	5	5
Total supply	3,185	3,465	3,505	3,489	3,509	3,556	3,595	3,633	3,665	3,696	3,727	3,757
Disposition (million bushels)												
Crush	1,662	1,695	1,680	1,695	1,710	1,735	1,755	1,775	1,800	1,820	1,840	1,860
Seed and residual	101	175	171	170	173	176	177	178	179	179	180	181
Exports	1,283	1,325	1,300	1,325	1,355	1,385	1,405	1,420	1,425	1,435	1,445	1,455
Total disposition	3,047	3,196	3,151	3,190	3,238	3,296	3,337	3,373	3,404	3,434	3,465	3,496
Carryover stocks, August 31												
Total ending stocks	138	270	354	299	271	260	258	260	261	262	262	261
Stocks/use ratio, percent	4.5	8.4	11.2	9.4	8.4	7.9	7.7	7.7	7.7	7.6	7.6	7.5
Prices (dollars per bushel)												
Loan rate	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Soybean price, farm	9.97	9.20	9.00	9.10	9.20	9.20	9.25	9.25	9.25	9.25	9.20	9.20
Variable costs of production (dollars):												
Per acre	127	121	123	127	130	132	134	136	138	140	142	144
Per bushel	3.20	2.80	2.87	2.95	2.97	2.99	3.01	3.03	3.05	3.07	3.08	3.10
Returns over variable costs (dollars per acre):												
Net returns	269	277	262	266	271	273	277	279	281	283	282	284
Soybean oil (million pounds)												
Beginning stocks, October 1	2,485	2,739	2,304	2,109	2,109	2,059	2,019	1,934	1,854	1,839	1,829	1,824
Production	18,753	19,240	19,070	19,255	19,445	19,745	19,990	20,235	20,540	20,785	21,030	21,280
Imports	90	75	85	95	105	115	125	135	145	155	165	175
Total supply	21,328	22,054	21,459	21,459	21,659	21,919	22,134	22,304	22,539	22,779	23,024	23,279
Domestic disappearance	16,339	16,500	16,600	16,800	17,200	17,400	17,600	17,800	18,000	18,200	18,400	18,600
For methyl ester[1]	1,904	2,200	2,400	2,600	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900
Exports	2,250	3,250	2,750	2,550	2,400	2,500	2,600	2,650	2,700	2,750	2,800	2,850
Total demand	18,589	19,750	19,350	19,350	19,600	19,900	20,200	20,450	20,700	20,950	21,200	21,450
Ending stocks, September 30	2,739	2,304	2,109	2,109	2,059	2,019	1,934	1,854	1,839	1,829	1,824	1,829
Soybean oil price (dollars per lb)	0.322	0.350	0.370	0.390	0.395	0.395	0.400	0.400	0.400	0.400	0.400	0.400
Soybean meal (thousand short tons)												
Beginning stocks, October 1	294	239	300	300	300	300	300	300	300	300	300	300
Production	39,112	40,321	40,035	40,335	40,735	41,235	41,735	42,285	42,785	43,285	43,785	44,285
Imports	90	140	165	165	165	165	165	165	165	165	165	165
Total supply	39,496	40,700	40,500	40,800	41,200	41,700	42,200	42,750	43,250	43,750	44,250	44,750
Domestic disappearance	30,757	30,800	30,800	30,900	31,250	31,700	32,150	32,650	33,150	33,650	34,150	34,650
Exports	8,500	9,600	9,400	9,600	9,650	9,700	9,750	9,800	9,800	9,800	9,800	9,800
Total demand	39,257	40,400	40,200	40,500	40,900	41,400	41,900	42,450	42,950	43,450	43,950	44,450
Ending stocks, September 30	239	300	300	300	300	300	300	300	300	300	300	300
Soybean meal price (dollars per ton)	331.17	280.00	255.00	250.00	255.00	255.00	255.00	255.00	255.00	255.00	253.00	253.00
Crushing yields (pounds per bushel)												
Soybean oil	11.28	11.35	11.35	11.36	11.37	11.38	11.39	11.40	11.41	11.42	11.43	11.44
Soybean meal	47.08	47.58	47.60	47.60	47.60	47.60	47.60	47.60	47.60	47.60	47.60	47.60
Crush margin (dollars per bushel)	1.45	1.43	1.27	1.28	1.36	1.36	1.38	1.38	1.38	1.39	1.39	1.40

Note: Marketing year beginning September 1 for soybeans; October 1 for soybean oil and soybean meal.
1/ Soybean oil used for methyl ester for production of biodiesel, history from the U.S. Department of Commerce.

Source: USDA Longterm Agricultural Outlook, 2010-2019

Summary

These long term projections for 2010 through 2019 in U.S. agriculture indicate that growth will continue to occur in both the use of corn for ethanol and in the use of soybean oil for biodiesel. Changes in U.S. energy and/or environmental policy could significantly impact these projection either positively or negatively, as could changing macroeconomic or energy market conditions. These long term projections serve as a benchmark for comparison as more information becomes know with surety by the U.S. grain and bioenergy markets.